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Joint Analytical Network for Using Socio-economic research

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FINAL GLOSSARY OF TERMS AND DEFINITIONS



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Abstract:

This deliverable presents a final glossary of terms and definitions in the context of socio-economics relevant to the IST programme, based on an exploration of work in the 5th framework programme. The aim is to provide a tool that can help readers navigate among the different analyses and results of IST projects with a socio-economic focus. The glossary is a starting point for a better understanding of the Information Society for researchers and it should function as a living document requiring continuous updates.

The JANUS glossary was created through the selection, comparative analysis and synthesis of terms defined in glossaries relevant to the core projects on socio-economic research in the IST programme. Inputs were also derived from other leading studies and glossaries of relevance (e.g. thematic papers). Given the socio-economic focus of JANUS, this glossary does not include technical terminology relative to ICTs (such as bandwidth, broadband, narrowband etc.).

Keyword List:

Digital Divide, Digital SME, eBusiness, eCommerce, eDemocracy, eEconomy, eEnvironment, eEurope, eGovernance, eGovernment, eHealth, eRegion, eSociety, eWork, Flexible Work, Glossary, Immaterialisation, Information Society Technology, New Economy



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List of Abbreviations

| | |
|--------|--|
| B2A: | Business to Administration |
| B2B: | Business to Business |
| B2C: | Business to Consumer |
| B2E: | Business to Employee |
| B2G: | Business to Government |
| C2G: | Citizen to Government |
| CAT: | Computerized Axial Tomography |
| DNA: | Deoxyribonucleic Acid |
| EDI: | Electronic Data Interchange |
| EFT: | Electronic Funds Transfers |
| EU: | European Union |
| FP5: | 5 th Framework Programme |
| G2B: | Government to Business |
| G2C: | Government to Citizen |
| G2G: | Government-to-Government |
| GIS: | Geographic Information Systems |
| HRW: | Health Related Websites |
| ICT: | Information and Communication Technology |
| IS: | Information Society |
| IST: | Information Society Technology |
| IT: | Information Technology |
| JANUS: | Joint Analytical Network for Using Socio-economic research |
| MRI: | Magnetic Resonance Imaging |
| NGO: | Non-Governmental Organisations |
| NSI: | National Statistics Institute |
| OECD: | Organisation for Economic Co-operation and Development |
| R&D: | Research and Development |
| SMEs: | Small- and Medium-sized Enterprises |
| TES: | Total Environment Stress |
| UK: | United Kingdom |
| UN: | United Nations |
| US: | United States |
| VSO: | Virtual Smart Organisation |

Preface

This document *Final Glossary of Terms and Definitions* is one of the reports of the JANUS project (Joint Analytical Network for Using Socio-economic research), funded by the European Commission under the 'Information Society technology' programme (1998-2002). The overall goal of JANUS is to exploit the joint scope and synergy of existing socio-economic research projects within the IST Programme, by bringing together the results from these projects, and jointly reach out with unified messages. In other words, to show case the best insights IST helped to emerge.

This deliverable contains a glossary of terms, in particularly focusing on several key concepts that are crucial to the understanding of socio-economic research in the Information Society. By no means is it a comprehensive list of IST terms, but it rather focuses on the interrelations and developments of essential concepts. This product is an expansion of the Initial Glossary (D1.3), published in November 2002. This glossary is a starting point for a better understanding of the Information Society and will be available for other IS projects focusing on socio-economic research. To serve this purpose, it will be a living document that requires continuous future updating

Products of JANUS include an Annual Report (D2.2), which brings together insights from IST projects focusing on the different aspects of the digital divide, in particular aiming at improvement of the social divide through digital means; a Mapping of socio economic IST projects (D1.2) and their policy impact (D1.4) that will provide a structured overview of work done under the IST programme related to socio economic research; briefings focused on key subjects in socio-economics of the Information Society that are touched upon by multiple IST sponsored projects; and two major reports that bring together IST research results, of which this is the second. The first, on the IST contribution to eGovernance, appeared in May 2003. The overall project aims and approach have been described in the Revised project design and methodology (D1.1), which has a fairly technical, descriptive and research oriented character.

Main target audiences of JANUS are policy makers at a national and supranational level, and all those involved in socio-economic research. JANUS looks in two directions simultaneously, i.e. within the IST Programme, and outside the IST programme to targets in European society and beyond, in order to inform them about the IST findings and interact on results and information needs.

JANUS is led by RAND Europe (Leiden, The Netherlands), and involves the following partners: Danish Technological Institute (Taastrup, Denmark), Analytica (London, United Kingdom), Empirica (Bonn, Germany), Databank Consulting (Milan, Italy), Sylvie Feindt Consulting (Köln, Germany), and Martech International (La Hulpe, Belgium).

The deliverable has been peer-reviewed by a researcher who is not part of the JANUS team, in accordance with RAND's quality assurance standards (see www.rand.org/about/standards/).

A range of subject experts has been willing to review the key concept papers and provide valuable feedback. Therefore, the authors wish to thank Ian Culpin (Martech Intl.), Jeremy Millard (DTI), Ivica Milicevic (Work Research Centre), Stephen Simmons (Addico Cornix Ltd), Werner Korte, Karsten Gareis (Empirica), Emily Rust (CNN), Tora Bikson, Amanda Beatty (RAND Corporation), David Howell (Pardee RAND Graduate School), Jonathan Cave, Constantijn van

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More information on JANUS and its deliverables is available from www.janus-eu.org. More information on RAND Europe is available from www.randeurope.org or contact:

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1 Introduction

A glossary is an “alphabetical list of words or expressions and the special or technical meanings that they have in a particular [...] subject or activity” (Cobuild, 1990)¹. The main objective of the JANUS project is to disseminate synthesised results of socio economic research emanating from the IST Programme. Therefore, it is important that different target groups both inside and outside the IST socio economic group of actors can fully appreciate issues and results arising from the socio-economic analyses by IST projects. According to the above definition, a common glossary of terms and key concepts can provide a such point of reference. The main purpose of the JANUS final glossary of terms and definitions (Deliverable 1.5) is to assist this process by suggesting a common comprehension of terms and concepts related to such results. The glossary will make understandable what is available.

The JANUS glossary not only comprises an alphabetical list of terms relating to the Information Society, but it will function as a tool to position terms and key concepts within a context. The definitions of concepts, that are seemingly similar at a first glance, may, however, deviate significantly in different contexts. These different contexts can be characterised by the approach taken by the different core projects, by geographic regions in the world, or by periods on the timescale. Ultimately, the JANUS project can facilitate the convergence and exploitation of results of different projects which are not directly obviously inter-connected.

This glossary report consists of 6 sections. After this introduction, a second section comprises a brief outline of the types of terms identified and the methods of selection; the approach is explained in three distinct phases. Section 3 provides a brief overview of the background of this glossary, which, in this case, consists of terms that are key to the understanding of the information society and are used in socio-economic IST research. In the fourth section, which forms the main body of the document, 12 key concepts will be defined and further described. These terms have been selected based upon their relevance for socio-economic research in the Information Society. Consequently, section 5 contains the final glossary with descriptions of all background concepts, key concepts and other terms of interest that are key to understanding socio economic research in the IST Programme. A final section briefly discusses the necessary steps to be taken in the near future to ensure effective use of the glossary.

¹ Collins Cobuild English Dictionary (1990) by John Sinclair (Editor), Henry H., Jr. Collins

2 Approach

This document mainly feeds on the Initial Glossary (Deliverable 1.3). The basic sources for this document are the available glossaries of the core projects (Beep, EMERGENCE, PRISMA, SIBIS, STAR and TERRA 2000). In most cases these glossaries refer to similar issues, but not in the exact same terms. In fact, the different core projects focus on different aspects and use different methodologies in analysing socio-economic issues (for example qualitative vs. a quantitative approach). For this reason, the glossary will be the product of three distinct phases of work:

2.1 Selection

Selection of the terms in this glossary is based on their relevance with respect to the IST Programme and contribution to the basic understanding of socio-economic research in the Information Society. Hence, this is not a glossary of technical terms, but it rather attempts to provide insight in the maze of buzzwords and vague concepts, such as knowledge-based economy, eEconomy and New Economy. The concepts to be selected must be key to the background, scope, theme, objectives, methods, results, or policy impact of IST projects. They can be identified in glossaries, key words, indices and lists of abbreviations made available by the JANUS core projects. Terms of interest may also be identified in titles, objectives, abstracts and executive summaries of these project deliverables. The terms selected in the final glossary are largely based on those selected in the initial glossary. After circulation with the researchers involved in the JANUS consortium, the list of the initial glossary is updated and validated. The use of terms (and therefore their definition) is for a large part dependent on the specific objective and perspective of the project. It is therefore clear that the different lists are limited, and only reflect those terms that are core for the project itself. The conceptual areas (eEconomy, eSociety, eEnvironment, eRegion and eGovernance) that are analysed by the core projects neither have a clear and unanimous definition. By studying the use of the terms in the context of these different projects the JANUS glossary comes to its definitions, as input to a further discourse on the terms by the core projects and other socio economic projects within IST.

2.2 Classification

The JANUS glossary is a structural tool, i.e. a way of organising information and allowing navigation among the different contributions of the project. The terms in the glossary can be divided into four categories: (1) background concepts, (2) key concepts, (3) other terms of interest, and (4) terms of art.

Background concepts describe the context of the IST programme rather than its characteristics. These background concepts may not be directly related to the Information Society, however, without such concepts, such as 'Lisbon Strategy', 'Information Society Technology' or 'Sustainable development', the glossary cannot be used. These background concepts are shortly addressed in Section 3 preceding the glossary.

Key concepts comprise a selection of the most important terms for the understanding of the IST Programme. The selection of these key concepts is based on their relevance to the 26 projects in JANUS. Therefore, the JANUS

main themes were all selected as key concepts: eWork, eGovernment, eBusiness, eRegion, eEnvironment, eEconomy, eSociety; Additionally, five concepts deserved a separate discussion due to their relevance in JANUS projects: Digital Divide, Digital SME, eBusiness, eCommerce, eHealth and Immaterialisation.

The selected concepts are not concrete terms, but memes – terms standing for a cluster of meanings whose precise nature is evolving and builds in a certain amount of ambiguity. Hence, they are not mutually exclusive; terms that are closely related, either being synonyms, hyponyms, or subcategories, to other concepts are included in the selected key concept. For example, eDemocracy is an important concept in the Information Society, but for its close relation to eGovernment, eDemocracy was considered as a sub-type of eGovernment. Obviously, this is not a comprehensive selection; this glossary does not claim to have presented a complete set of key concepts. Nonetheless, it is a good start towards a consistent understanding of socio-economic research in the Information Society. The key concepts will be presented in alphabetical order: (1) Digital Divide, (2) Digital SME (Small and Medium-sized Enterprise), (3) eBusiness, (4) eCommerce, (5) eEconomy, (6) eEnvironment, (7) eGovernment, (8) eHealth, (9) eRegion, (10) eSociety, (11) eWork, (12) Immaterialisation. *Other terms of interest* are the remaining terms in the glossary.

Terms of art relate to methodologies and tools that are often used in socio-economic research in the Information Society. They are in principle not unique to the Information Society. However, these ‘arts’ are key to the understanding of the analyses, results and implications of research conducted in the IST Programme.

2.3 Definition

The background concepts, key concepts, terms of interest, and terms of art are gathered and defined in alphabetical order.

2.4 Analysis

The key concepts are subject to further analysis. Their interdependencies, redundancies, different perspectives and evolution over time are discussed more thoroughly in Section 4; this is the main body of the document. This effort results in a set of 12 papers of approximately 1,000 words providing an up-to-date elaboration of the most important concepts of socio-economic research in the Information Society. These papers are based on up-to-date literature from peer-reviewed journal articles, conference proceedings, leading websites and project deliverables. They explain the historic context and the different definitions that have been used in practice. The relation between different key concepts is also addressed. Finally, they elaborate on how the concepts relate to the eEurope initiative and how European Commission has addressed them in the different Framework Programmes. Each key concept paper has been reviewed by at least one subject expert either from within the JANUS consortium, or in the network of JANUS contacts.

2.5 Synthesis

A synthesis of these glossaries can be drawn up, allowing the reader to use a comprehensive but at the same time practical tool to interpret not only the results and issues per se, but, more importantly, the way they are tackled by different projects, and therefore their deeper significance and use. In combination with the

key concept papers it offers the reader a more comprehensive understanding of IST socio-economic research.

For this document the focus is on a common understanding from an IST perspective of the key policy areas (eSociety, eGovernance, eEnvironment, eRegion and eEconomy), and what socio-economic terms are related to them.

3 Background²

As explained in the introduction, a glossary is an alphabetical list of words or expressions and the special or technical meanings that they have in a particular context. A glossary is only valuable with an adequate understanding of that context. This section provides a background for the subject of this glossary: socio-economic research in the IS programme, Understanding the context of the information society and socio-economic IST research facilitates the use of this glossary.

At the break of a new millennium, the potential for IST to improve human quality of life has never been greater. For the economy, IST is crucial to information flows and the “race to knowledge” on which improved productivity and competitiveness. The IST industry itself has become one of the largest economic sectors, while innovations strengthen growth in other sectors. In public services, IST enables services to be delivered more efficiently, as well as new services that correspond to people’s evolving needs. And for society at large, IST are beneficial by offering citizens goods and services that did not exist previously or by improving access to those already available.

IST may also play a crucial role in tackling new challenges Europe is facing in the near future. The enlargement of the EU (European Union) with 10 new Member States on 1 May 2004 increased the number of EU citizens substantially.³ Additionally, 4 more candidate countries are expected to join in the coming years.⁴ The EU will have to accommodate, and turn into assets, the further social, economic, cultural and religious diversity the enlargement has brought. It also has to address the “productivity challenge”: how to create wealth and prosperity in an enlarged Europe. European businesses should be able to take full advantage of technology development, mainly in IST, to adapt and benefit from the emerging networked business environment. Europe needs to improve its competitiveness and develop higher value products and services whilst ensuring a sustainable future. After the events of 9/11 in 2001 and Madrid on 11 March 2004, security issues remain high on the political agenda and in citizens’ concerns. Also, with the aging pyramid set to be reversed by around 2010, the EU will have to come to terms with a “greying” population and its implications for the economy, and society as a whole.

Against this background, in Lisbon in 2000 the EU gave itself ten years to become the world’s most competitive and dynamic knowledge-based economy, addressing simultaneously three objectives: competitiveness, employment and social cohesion. The Lisbon Strategy is a commitment to bring about economic, social and environmental renewal in the EU with 2010 as the magical year. Under the strategy, a stronger economy will drive job creation alongside social and environmental policies that ensure sustainable development and social inclusion.

² This section draws heavily upon the following two documents:
European Commission (2003) IST 2003 - The Opportunities ahead. Directorate-General Information Society, Brussels. Available at: ftp://ftp.cordis.lu/pub/ist/docs/ist_2003_opportunities_ahead_en.pdf. Accessed on: 3 August '04

Zobel, R. (2000) e-Europe and the IST Programme - New methods of Work and Electronic Commerce. The proceedings of the e2000 conference, IOS Press, Amsterdam. Available at: www.cheshirehenbury.com/ebew/e2000plen/zobel.html. Accessed on: 3 August '04

³ Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia,

⁴ Bulgaria, Croatia, Romania and Turkey

The Lisbon Strategy touches on almost all of the EU's economic, social and environmental activities⁵. The European Council in Lisbon made the promotion of social cohesion an essential element in the global strategy of the Union to achieve its strategic objective for the next decade. It also set a goal for full employment in Europe in an emerging new society, which is more adapted to the personal choices of women and men and reduces the risk of poverty and social exclusion between 2001 and 2010.⁶ In addition to the resolutions on poverty, social exclusion and the ageing population that are laid down in the Lisbon strategy, the main aims of the EU Sustainable Development Strategy include combating climate change, improving the use of renewable energies, addressing risks to public health, managing natural resources more responsibly, promoting ecological mobility and reducing land use.

At the heart of the Lisbon strategy lies the European Union's policy for the information society. Its goal is to enable Europe to take full advantage of IST and to contribute to their progress within an inclusive, knowledge society for all. With the aim to accelerate Europe's transition to the Information Society and thereby achieving greater economic progress and social cohesion, the President of the European Commission launched the eEurope initiative in December 1999. Following its positive reception from the Member States, the European Parliament and key actors, the European Commission submitted a Progress Report to the Lisbon Summit of March 2000. At this Summit, the Heads of State and Government committed themselves to a number of measures, including target dates, to bring eEurope forward.

The European Commission then produced the eEurope Action Plan that has been endorsed at the Feira Summit on 19-20 June 2000. It set out a strategy to address key barriers to the uptake of the Internet in Europe and ensure that the conditions are set for a decisive move towards the new economy. It proposed that Member States and the Commission bind themselves to achieving the following three objectives for 2002: a cheaper, faster, more secure Internet; investing in people's skills and access; and stimulating the use of the Internet. The thrust of the plan was to accelerate legislation, roll out infrastructure and services across Europe and open co-ordination between Member States - including benchmarking activities by the Commission.

In June 2002 at the Seville European Council the eEurope 2005 Action Plan was endorsed by the Council of Ministers in the eEurope Resolution of January 2003. This Action Plan narrowed the focus compared to the 2002 Action Plan, concentrating on effective access, usage and the availability of the Internet. This Action Plan put users at the centre and at all levels and in all implementing measures it emphasised Inclusion, including accessibility for people with special needs. Inclusion refers to key services that must be available not only via personal computer but also via other interactive services, such as digital television, third generation mobile phones and cable networks.⁷ It aimed to develop modern public services and a dynamic environment for eBusiness

⁵ European Commission (2002) The Lisbon strategy for economic, social and environmental renewal. Available at www.europa.eu.int/comm/lisbon_strategy/intro_en.html, Accessed on: 6 August 2004.

⁶ Council of the European Union (2001) Draft Joint Report on Social Inclusion. 13926/01 SOC 447 ECOFIN 327 EDUC 136 SAN 147 REV 1. Available at: www.europa.eu.int/comm/employment_social/soc-prot/soc-incl/approb_en.pdf, Accessed on: 06 August 2004.

⁷ European Commission DG Press and Communication (2002) Towards a knowledge based Europe – The European Union and the information society. Brussels, October 2002. Available at: www.europa.eu.int/information_society/newsroom/documents/catalogue_en.pdf, Accessed on: 6 August 2004.

through widespread availability of broadband access at competitive prices and a secure information infrastructure.⁸

With more than 3.6 Billion Euro of Community funds, the IST Programme has been the largest thematic programme in 5th Framework Programme (FP5) of research. FP5, in which all JANUS core projects are conducted, is different to its predecessors. The Council decided that it should be made up of thematic programmes of research. For the IST programme, this means that all research is carefully focussed on finding solutions for those technological barriers that still inhibit the emergence of an Information Society, involving rapid, broad and deep access to and exchange of information among all elements of society. Overall in FP5, there were some 15000 participants in IST projects comprising around 6000 separate organisations, including a strong representation of Small and Medium-sized Enterprises (SMEs). The IST programme is an integrated Research and Development (R&D) programme aiming at a focus of European efforts in order to ensure that Europeans both develop through, and benefit from, the transformation from an industrial to an information society. By helping to ensure that all individuals and companies benefit from the benefits of the Information Society its scope is beyond that of simply developing technologies.

⁸ European Commission DG Information Society (2004) eEurope 2005 – An Information Society for all. Available at: europa.eu.int/information_society/eeurope/2005/index_en.htm, Accessed on: 6 August 2004.

4 Thematic Papers on Key Concepts

In this section 12 key concepts will be defined and further described. These terms have been selected based upon their relevance for socio-economic research in the Information Society.

An important perspective on the terms used in socioeconomic research relating to the Information Society concerns the relative importance of technologies and associated socioeconomic phenomena. The essays below describe how the different definitions and overlapping terms – and indeed the research itself put these two elements together. Some projects and literature concentrate on the technologies themselves, while others focus on business, economic or social phenomena associated with the diffusion of these technologies. Sometimes a technology is described in terms of what it *is* and at other times in terms of what it *does* (or how it is used). Technologies, like policies, are often used in ways that were not ‘designed in’. This gives rise to external, systemic or rebound effects as a result of the actions and reactions of third parties. Socioeconomic research is perhaps the only tool that can shed light on such unintended or secondary consequences. This variation in focus sometimes leads to different definitions for the same term; in other cases, similar terms with different root definitions come to be used interchangeably.

A further element of the distinction between technology and its socioeconomic effects concerns causality. Much (especially early) socioeconomic research (and IST policy) takes a ‘deus ex machina’ approach: technology is an exogenous driver, and socioeconomic research merely provides ways to measure its impacts. Later and more advanced research incorporates the reverse influence of socioeconomic needs, incentives, pressures and policies on the pace, direction and use of technology. The most advanced socioeconomic research in this area looks at joint and reciprocal influences, from a system-wide and evolutionary perspective. Developments in and among technology, economy, government, and civil society domains are driven by the (sometimes strategic) activities of stakeholders with diverse influences, competence, rationality, information and knowledge. The system is further subject to endogenous and exogenous shocks. The socioeconomic research reviewed in JANUS is gradually approaching this state-of-the-art coherence and depth of vision. It has identified essential disciplines and research threads. It also reflects the interests of participants (e.g. the academic, business and policy perspectives identified in the eCommerce essay) and the need to balance comprehensiveness with comprehensibility, utility with rigour, data availability with relevance, etc.

A second essential clarification concerns the specific technology clusters considered. Information Technology is characterised by digitisation, computing power, etc., offers economies of scale on the demand side (interoperability benefits) and is mediated by largely competitive global markets. By contrast communications technology is characterised by network interactions and large economies of scale in production and is generally mediated through regulated markets where local presence and infrastructures are critical. The range of research surveyed in JANUS and the uses of terminology reflect not only these separate perspectives but also the convergence or intersection of the two technology streams. *Information and Communication Technology (ICT)* is treated both as a ‘sector’ and as a set of tools defining a general-purpose disruptive technology and *Information Society Technology (IST)*, is used both for a programme (and by implication a set of policy objectives) and for a cluster of technologies (or their impacts).

A third clarification concerns the term 'socioeconomic' as used in JANUS or in the IST programme. As with technologies, it is useful to bear in mind that the term is sometimes used to define what it is (the disciplines and methods involved) and in other cases used as a shorthand for what it does (the issues addressed and the intended results). It is also worth remembering that some insights apply as much to knowledge-based concepts as to information-based ones, while others do not. For one example, information is easy to spread, while knowledge is increasingly hard to disseminate; the same caution applied to the codified, tacit and systemic (or relational) forms of knowledge.

Finally, several of the key concepts discussed below relate to transactions between two or more parties in the information society, which are functionally not specific to the information revolution. Throughout history, there have always been business or government services. However, due to the electronic transfer of information these terms are preceded with an extra "e". In socioeconomic research a systemic approach is used to refer to such transactions between different segments of the information society: This approach deserves some attention as it is often used to define the character of certain processes, such as eDemocracy, eCommerce, eGovernment, etc. In general, three segments of society are identified: Administration (or Government), Business and Civil Society (or Consumers). Actors in these segments transfer information with actors within the same segment, or with actors from different segments. The (digital) transactions between the different segments are categorised referring to principal and agent: Principal to Agent (P2A). Examples of such transactions include: B2C (Business to Consumer), B2A (Business to Administration; also called B2G, Business to administration), Administration to Civil Society (A2C). While not all possible types of transactions are used equally frequent, examples exist for all nine combinations. Figure 1 provides a schematic illustration of the various options.⁹

The following twelve sections will each contain a paper on a key concept. The papers generally touch upon various aspects of the terms, among which: definitions of key concept; their use in different contexts; sub-types of the concept; examples of ISTs related to the key concept; the way they are related to other key concepts; evolution over time; and the role of key concept with the IST Programme and how it is addressed in some IST projects. Several examples of projects are mentioned, mostly relating to the JANUS core and focus projects.¹⁰ In the chapter the following key concepts are presented: 1) Digital Divide; 2) Digital SME; 3) eBusiness; 4) eCommerce; 5) eEconomy; 6) eEnvironment; 7) eGovernment, eGovernance and eDemocracy; 8) eHealth; 9) eRegion; 10) eSociety; 11) eWork; and 12) Immaterialisation.

⁹ Cave J. (2004) The Cure for the Ills of (e)Democracy is More (e)Democracy - Networked Governance in the Information Society. Conference proceedings eChallenges e2004.

¹⁰ For an overview of these projects, see: "Initial map of the work of core and focus projects", deliverable 1.2, October 2002. Available at: <http://www.janus-eu.org/Documents/JANUS%20D%201-2%20-%20final.pdf>

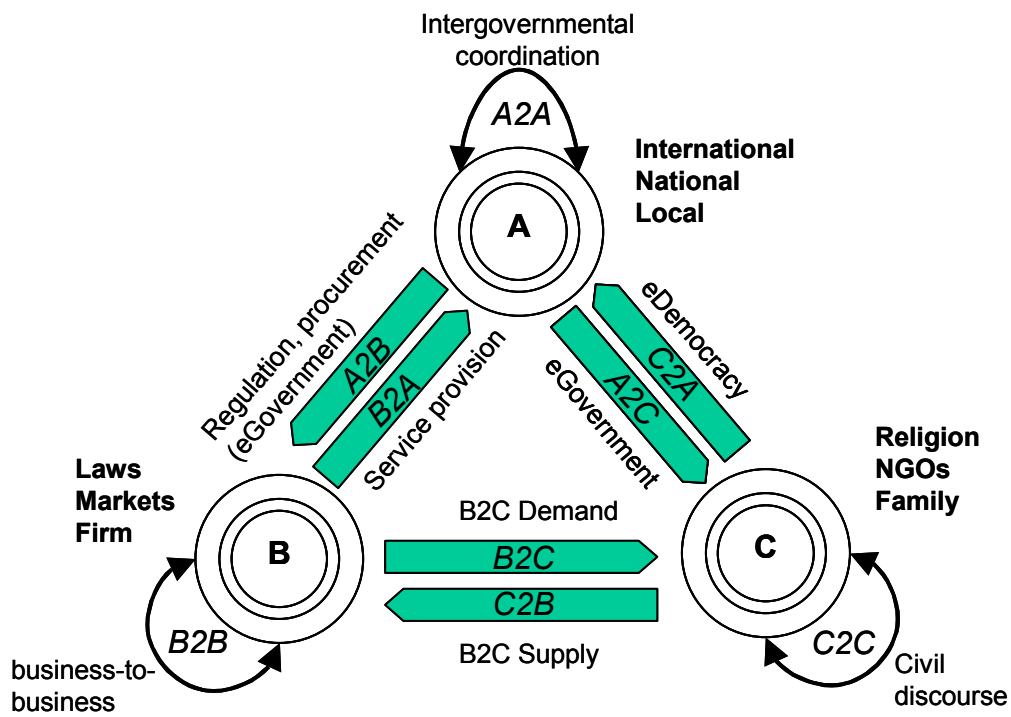


Figure 1. Possible options and examples of transactions between Administration (Government), Business and Civil Society (Consumers). Source: Cave J. (2004)

4.1 Digital Divide

The increased use of Information and Communication Technologies (ICTs), particularly the Internet, is well documented. Eurobarometer data, for example, shows that across the European Union (EU) household access rates to the Internet have been growing steadily, reaching 43% in November 2002 [1][2][3]. More recent data suggests that 50% of the EU population actively uses the Internet [4], but this number might be higher if we added “occasional Internet users” (i.e. persons who access the Internet less than once a month) and alternative access locations such as Public Internet Access Points [5].

The possibilities offered by these new technologies are stunning. eWork, eCommerce, eGovernment are new realities that can significantly improve our quality of life. Yet, together with its advantages, the “information revolution” brings along the risk of some persons being denied those advantages. The expression “digital divide” is commonly used to describe the gap between those who have access to ICTs and those who do not [6], but its different perspectives are often blurred.

In general, the digital divide can be defined as “the gaps among individuals, households, businesses and geographic areas at different [...] levels with regards both to their opportunities to access ICTs and their *use* of the Internet for a variety of activities” [7]. These differences can be categorized according to “what” the problem is and “where” it takes place. In other words, the digital divide can be an issue of *access* or *usage* and can be confined *within* a country (in which case the gap is between different socio-economic groups) or *amongst* countries (see Table 1, below).

Table 1. Categorization of the Digital Divide

| | | <u>Where</u> | |
|-------------|--------|---|--|
| | | Amongst countries | Within countries |
| <u>What</u> | Access | International Digital Divide due to national disparities in accessing ICTs | Domestic Digital Divide due to social disparities in accessing ICTs |
| | Use | International Digital Divide due to national disparities in using ICTs (part. the Internet) | Domestic Digital Divide due to social disparities in accessing ICTs (part. the Internet) |

The Digital Divide is used to refer to division of citizens in terms of their ‘proximity’ to the Information Society. It is a multi dimensional term that has been introduced in a range of studies and refers especially to divisions along ethnicity and income lines (though it may also have geographical and other dimensions). The division can combine:

1. Motivation; groups differ in terms of their reasons to engage with the IS
2. Access; wealth, infrastructure penetration, etc. may result in differential technical (outside the individual’s capability) ability to participate in the IS.
3. Skills – differences in the possession of ICT skills.

Depending on whether the digital divide is international or intra-national, its measurement can be based on aggregates or averages (international digital divide) or must be based on distributional inequality measures (intra-national divide). If, for example, in country A each household has one computer, but in country B the top 10% of households have 10 computers each, both countries have one PC per household on average (although country B has a greater domestic digital divide). Some projects, such as Terra 2000, measure not simply aggregates but distributions—direct measures of inequality within countries (e.g. % of computers owned by top 5% of population, Gini coefficients etc.) [8].

Criteria to measure the distribution of ICTs in different countries and within countries, which is the key indicator of the digital divide, include number of computers, infrastructure and access, affordability, relevant content (e.g. content in local language that addresses the audience's needs), size of the IT sector, poverty, age, race, education attainments etc. [9]. The variety of criteria that can be used to assess the digital divide has led many to talk about the digital *divides* rather than the digital *divide*. SIBIS, for example, measures the participation of seven socio-economic groups with on-line usage and certain on-line activities such as eCommerce and eBanking [10]. The study concludes that certain divides (e.g. income and education) are greater than others and that their magnitudes vary from country to country¹¹. Beep too, in its good practice synthesis, addresses the issue of numerous divides, although it specifically focuses on “people with special needs” [11]. Key divides include, but are not limited to, gender, age, education, income, employment status (e.g. employed, self-employed, unemployed, etc.), type of occupation, position, household type (with children, single person household etc.), and disability.

While contributing to confusion about what *the* digital divide is, “multiple divides” approaches do help to put the issue into context. Economic and social disadvantage have undoubted impacts on the access and exploitation of new technologies, but also affect other social benefits, suggesting that the digital divide is a new aspect of an existing socio-economic divide. At the same time, digital exclusion threatens to reinforce social exclusion. The eLiving project, for example, emphasizes the negative correlation between ICT use/access and socio-economic exclusion, indicating that those who have computer skills will probably have better prospects in the labour market¹² [12]. Much research is devoted to understanding the role of ICTs in improving quality of life for society at large or for specific groups (elderly, persons with special needs, etc.), which in turn implies that the digital divide should be minimised [13][14][15][16][17][18].

The digital divide, today at the top of the EU political agenda [19][20], is likely to remain a crucial topic in the future. Understanding and measuring the digital divide is a difficult task that might change as technology develops and its use becomes even more pervasive among the general population. At present, Internet access is the most important criterion used to position people on one side of the divide or the other; in the future, broadband access may become the standard [21].

¹¹ For example, the report illustrates the differences between the European Union and the United States- in fact a (international) digital divide in its own right- stating that “the ‘age divide’ presents the most striking differences between the EU and the US, with the oldest age groups in the US much less relatively e-disadvantaged compared to other age groups in the US than are their counterparts in the EU, even in the case of mobile phone ownership”, and that “the ‘gender divide’ is also greater in the EU than the US.”

¹² The reader should be aware that “correlation” is not “causation”— it would be inappropriate to argue that improving people’s ICT skills will necessarily improve their collective job prospects (even though improving job prospects may motivate them to acquire such skills).

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4.2 Digital SME

The term digital SME is used to refer to a Small or Medium Sized Enterprise SME that exploits Information and Communication Technologies (ICTs) to their full potential. ICTs, therefore, affect every aspect of the operations of digital SMEs: the products and services they offer, the markets they address, their relationships with customers, the operation of their value chains, their relationships with other firms, their organisational and management configurations, and their management of knowledge.

The term digital SME was developed most rigorously by the Best eEurope Practices (Beep) Project [22], funded by the European Commission under the IST Programme of the 5th Framework Programme. In the Beep Project, researchers collected, analysed and refined best practices (also referred to as good or smart practices) in a variety of socio-economic areas by collecting case studies and coding them according to a variety of indicators. This resulted in an extensive Beep Knowledge System comprising four domains, one of which is the digital SME¹³. Outside the Beep Project, the term is also implicit or explicit in policy discourse at the European level, notably in the policy documents relating to the eEurope Action Plans. Here, we review the term digital SME as developed and applied in the Beep project and in policy discourse.

The working definition of the term digital SME used in Beep recognised that SMEs progress through different stages of development towards fully digital status. Therefore, three aspects were distinguished:

- An SME whose products and services are predominantly digital;
- An SME that uses digital methods as the primary means of carrying out core operations, such as marketing, sales, after-sales service etc.; and
- An SME that exploits the benefits of digital methods to a significant extent.

The definition of an SME is based on EU quantitative parameters relating to employment, assets and turnover. A company with less than 250 employees is considered an SME. A typical example of a digital SME explored by Beep is Roundstone Musical Instruments.¹⁴ The analysis of the 400 cases included in the Beep Knowledge System, particularly those within the digital SME domain, revealed the relationships between this concept and several other key Information Society concepts. An example is the development of the concept of eCommerce¹⁵. An important part of electronic commerce refers to Business-to-Customer commerce, and pertains to the buying and selling of consumer products and services over the Internet, particularly software, music, books, travel and advertising [23]. Enterprises wishing to engage in such electronic commerce

¹³ The other three are work and skills, social inclusion and regional cohesion.

¹⁴ a manufacturer of the traditional Irish instrument known as the bodhrán in a small town in Ireland. The firm has become the leader in its field. The Internet played an important part in this development, especially in foreign markets. About 20% of business is now conducted via the website and the company received numerous awards in recognition of its success on the web. Roundstone exemplifies a small company engaged in a very traditional activity which has adopted the Internet as a valuable marketing and sales tool. The website helped transform the firm's prospects from simple survival to niche market success, marketing and selling its products throughout the world while significantly reducing travel (and its costs) to promote product awareness. The company now earns over 70% of its turnover from exports. The Roundstone experience provides another example in which size and location no longer determine business success; e-practices can allow even the smallest and most niche-oriented firms far from urban centres to compete in the global market. See: www.beepknowledgesystem.org/ShowCase.asp?CaseTitleID=327&CaseID=657

¹⁵ See also: Key concept paper on eCommerce

need to develop electronic catalogues, electronic malls and procedures relating to the design, operation and maintenance of commercial websites and related databases. Still, eCommerce is not limited to online shopping. As Quah [24] notes: "The initial emphasis on the eShopping dimension of electronic commerce has subsequently been balanced by a greater appreciation of the importance of Business-to-Business applications. The awareness of the potential impact of the Internet technologies on the business processes behind the front office has grown." However, these internet technologies go beyond the concept of eCommerce and are usually considered to be eBusiness. Therefore, digital SMEs are concerned not only with the use of ICTs for connecting with their customers, but also for connecting with other companies and for organising their internal processes.

Using ICTs to connect with other businesses is central to the concept of eBusiness.¹⁶ eBusiness is an umbrella term encompassing eCommerce, including marketing and information websites and business services: i.e. the range of ICT support services associated with the customisation, implementation and ongoing running, hosting and maintenance of eCommerce applications and marketplaces. A number of eBusiness models implement ICT driven business processes and supply chain integration [25]. These transform the value-added activities of an enterprise and the structure of the enterprise itself, reinforcing the shift in focus from the activities and operation of the enterprise itself to the relationships between enterprises in a multi-enterprise network [26]. Such networks create value by facilitating transactions, matching orders between companies and providing additional services that would otherwise not take place. Such value creation was initially experienced by large and multinational enterprises, but has increasingly been recognised as relevant to SMEs. Cases from the Beep Knowledge System indicate that 'going digital' in this way helps SMEs not only to reduce costs, but also to improve the quality of the products and services they offer.

Important lessons for the development of digital SMEs drawn from the Beep Project, as well as other research and surveys, point to the following key success factors [23]:

- Applying effective ICT solutions requires an intimate knowledge of the business, and the ability to translate this knowledge into, for instance, a website and related services for customers or partners.
- The use of ICTs tends to create a positive, reinforcing loop of increased ICT usage. Increasing awareness of the benefits of ICTs within networks can occur through the joint implementation of key content, and the realisation of business growth and economic regeneration.
- The Internet has provided companies with an unlimited number of channels to access and communicate with intelligent systems, which in turn has led to the emergence of new forms of intra-company organisation, as well as inter-company co-operation and competition. Flexibility in the use of these communication channels is often needed to prevent businesses being excluded from digital networks.

Despite the advantages for SMEs of adopting digital solutions, the Beep Project identified some of the reasons why progress is not always as smooth as hoped. The adoption and use of Internet application by SMEs is selective, driven

¹⁶ See also: Key Concept paper on eBusiness

essentially by their immediate business interests, rather than by the intention to advance along the business maturity ladder.

References to the concept of digital SME in policy discourse are generally not as explicit, detailed and comprehensive as those found in the Beep project. Nevertheless, European policymakers certainly recognise the importance of this concept, and the breadth of activities it encompasses. The eEurope 2002 Action Plan included activities in support of SMEs adopting ICTs. The eEurope 2002 Action Plan was launched to implement the Lisbon strategy goal of making the European Union the world's most dynamic and competitive knowledge-based economy by 2010. The development of digital SMEs can help policymakers in pursuit of Europe's main strategic socio-economic goals. As part of the eEurope 2002 Action Plan, the GoDigital initiative was launched to support SMEs doing business online [27]. This initiative emphasised that simply connecting to the Internet was not enough to improve business performance. It also recognised that some barriers to digital SME development concern such soft issues as prevailing cultures, mental models, styles of decision making, risk aversion and experience with collaborative efforts. These need to be overcome if more advanced forms of digital SMEs, including electronic co-operation, knowledge sharing and learning networks, are to emerge.

The recognition of the importance of the digital SME, and commitment to supporting its development, was reaffirmed in the eEurope 2005 Action Plan [28]. The presentation of the 2005 Action Plan reviewed the range of legislative and non-legislative activities that had been and need to be taken to support the beneficial adoption of ICTs throughout society, including SMEs. Special attention was given to supporting co-operative networks among SMEs. This resembles the above-mentioned concept of multi-enterprise networks in the definition of eBusiness. In addition, attention was focussed upon the importance of developing trust and confidence that facilitate cross-border electronic transactions for SMEs. Again, this confirms the breadth of activities required for the development of mature digital SMEs.

A closely related concept is Virtual Smart Organisations (VSOs). VSOs are effectively networked digital SMEs. The goal of these new organizational structures, according to Wagner et al. [29] is to "distribute decision-making authority by flattening the traditional pyramidal organizational hierarchy and moving from a top-down, linear, station-to-station, command-and-control structure, to an organization structured as a multi-dimensional capabilities matrix." In such organisations discrete company departments are replaced by alliances of talent and capabilities that form, dissolve, and reform to accomplish highly specific tasks. These alliances can be made up of individuals, teams, or technology associated with the parent company ("native" skills and capabilities) or "outsourced" labour or technology engaged for the duration of the required task. Organizing, cataloguing, cost-allocation and ready access to the individuals, teams, and technology needed to accomplish a business task—inside or outside an organization's walls—can best be done by recasting old-economy organisations as "virtual" organisations that affiliate, assemble, and dissolve resource alliances in "smart" ways focused on discrete business goals.

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4.3 eBusiness

Information Society Technologies, such as e-mail or the Internet, have had a radical impact on the business environment. Since the mid-nineties, companies all over the world have been quick to realise that the Web's true value is not in peoples' ability to browse the Internet or send e-mail, but rather, in the new opportunities it creates for enhancing business processes, reducing costs and increasing profits [30]. eBusinesses use these technologies to conduct, develop, expand or enhance their business by reducing costs, increasing productivity, enhancing customer services and so forth. eBusiness has since become a buzzword, which can be defined as the integration of digital media, including the Internet, into business activities and processes[31]. The popular perception, that the impact on business is due to the Internet, however, is too simplistic. Not only are other technologies involved, but changing relationships, values, preferences or strategies are only partially 'driven' by that or any other technology. Moreover, the relation between the technological and socio-economic domains is at least two-way.

It is worth noting that the use of the term eBusiness is often used ambiguously and the definition of this concept varies according to the source. While definitions of the same term should at least refer to consistent objects or concepts with certain characteristics, the different existing definitions often leave ambiguous whether eBusiness refers to functions, technologies, transactions or organisations. In some cases, for example, the term refers to the architecture and design of information systems, while in other cases, it refers to how companies conduct their business online (payments, marketing, delivering services etc); to the restructuring of business processes to exploit digital technologies; to secure businesses operations on the Internet; or, more generally, to the use of Internet for electronic commerce or any other business activity.¹⁷ In context presented in this paper, however, an eBusiness is regarded as an organisation with certain characteristics. These characteristics refer to the use of certain technologies; the performance of certain functions; and certain motivations and linkages. Definitions describing these characteristics are discussed below.

An eBusiness is not merely a business with a website; according to IBM [30] it uses "technology to redefine old business models to maximise customer value ." The integration of the Internet and other ISTs into business processes is what distinguishes an eBusiness from a regular business. While the Internet plays a substantial role, this is not exclusive [31][32].

The European Commission's eBusiness W@tch initiative applies the term to both external and internal company processes, from external communication and transaction functions to flows of information within a company. It refers to IBM's perception of the concept [30]: eBusiness is not simply defined as eCommerce transactions, but It relates to using technology to redefine your business. To succeed, companies will need an infrastructure flexible enough to absorb new technologies, maximize efficiency across your organisation, and support business model changes. Exemplary of the opaque and dynamic character of this concept is IBM's use of another definition, which is much narrower and only refers to the business use of Internet technology [33]:

¹⁷ See for example www.europa.eu.int/information_society/eeurope/2--5; www.e-Business-watch.org; www.E-Businesslex.net; www.4e-strategy.com/services.htm; www.cio.com/research/ec/ or www.tcs.com/0_service_practices/e-Business/e-Business_consulting.htm; www.patrickhardy.com/internet-marketing-services/ecommerce-solutions.html.

“[eBusiness is] the process of using Web technology to help businesses streamline processes, improve productivity and increase efficiencies. Enables companies to easily communicate with partners, vendors and customers, connect back-end data systems and transact commerce in a secure manner.”

It is worth distinguishing the concepts of eBusiness and eCommerce,¹⁸ which are sometimes used interchangeably. While they are certainly closely linked, eBusiness is broader. A key to this distinction is the transactional aspect [34]. eBusiness goes beyond the eCommerce process of buying and selling goods and services on the Internet to include all forms of transaction by means of ISTs with customers or business partners along the supply chain. In other words, eCommerce covers mainly external transactions, while eBusiness also includes internal business practices and it refers to more than buying and selling, but also to operations such as exchanging information, monitoring use, providing aftercare, etc. This includes a wide range of activities from supply chain management, procurement or electronic management control systems (internal) to electronic payments or global marketing (external) [35][36]. These internal and external processes, categorised in a systemic manner referring to principal and agent,¹⁹ include: B2B (Business to Business); B2C (Business to Consumer); B2E (Business to Employee) and B2G (Business to Government; also called B2A [35][31].²⁰

The following figure provides a schematic illustration of the overlap between eBusiness and eCommerce [35]. Business-to-Employee interactions are included in the processes within establishments (i.e. business units). The illustration shows that interactions among partners in the value chain can be either internal or external. External interactions, e.g. Business-to-Business transactions, are referred to variously as eCommerce and eBusiness. However, an internal transaction among different locations in the value chain applies only to the concept of eBusiness. A survey of business views on the definition of eCommerce conducted on behalf of Statistics Canada [37] also distinguishes eBusiness and eCommerce. According to the findings of the survey “the notion of transactions, computer-mediation, channels and trigger events were found to be key concepts in defining eCommerce”. Also, industry perceptions of relevant computer-mediated channels or electronic commerce networks on which eBusiness or eCommerce takes place differ across sectors, hence a definition should clearly specify on what type of networks or applications eCommerce occurs [37][34].

¹⁸ C.f. Key Concept Paper on e-Commerce

¹⁹ See introductory section to the Key Concept papers

²⁰ Although not frequently used, G2B or A2B are possible as well. Essentially, these abbreviations indicate who is the principal and who the agent.

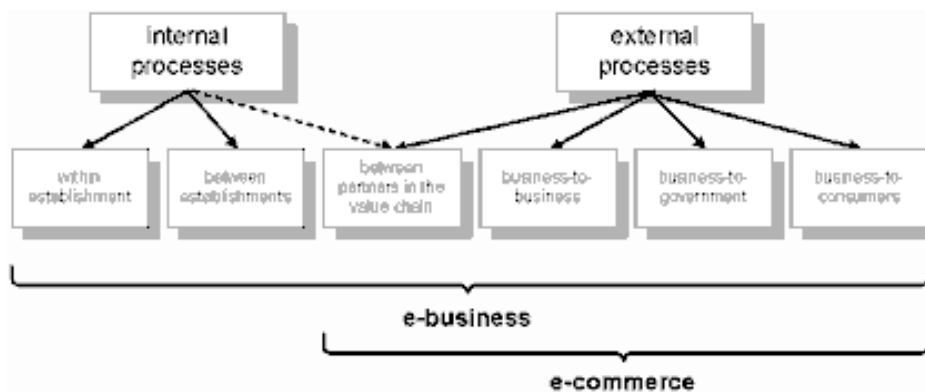


Figure 2. Basic concept of "eBusiness" and "eCommerce". Source: eBusiness W@tch [32].

A crucial aspect is that eBusiness has been able to reduce the barrier of physical distance that historically hampered the development of worldwide trade, partly contributing to an increasingly competitive and global economy. In this context, it is also worth mentioning that the concept of eWork²¹, also invokes the diminishing importance of physical distance as a result of ICTs [31].

Technology allows SMEs both to cooperate and compete with large corporations, as well as to adapt faster to change. Digital SMEs²², a concept closely related to that of eBusiness, exploit ICTs to enhance their products and services, working methods, productivity, markets, customer relations, value chains, inter-company relations including new business partnerships, organisational and management set-up and knowledge management [31]. A similar concept, networked businesses, may either be public or private organisations that use ICTs to support organisational networking, process integration, and sharing of resources. These organisations should be able to build faster and more effective partnerships and alliances, re-engineer and integrate their processes, develop value added products and services, and efficiently share knowledge and experiences [38]. Finally, the VSO concept²³ is related to networked organisations through eBusiness solutions..VSOs are networked digital SMEs, whose goal is to "distribute decision-making authority by flattening the traditional pyramidal organizational hierarchy and move from a top-down, linear, station-to-station, command-and-control structure, to an organization structured as a multi-dimensional capabilities matrix"[39].

Over the past five years, Internet-based eBusiness has spread throughout the global economy. Fostering innovation and organisational change, it is a primary source of productivity and economic growth. Finance, energy, transport and communication services are key examples of the potential of ICT in the creation of new business opportunities [40].

The development of eBusiness is strongly supported by the European Commission and the concept has been extensively addressed in the Framework Programmes. Various projects have highlighted different aspects of this concept [31], for instance:

²¹ C.f. Key Concept Paper on e-Work.

²² Cf. Key Concept Paper on Digital SMEs.

²³ C.f. Key Concept Paper on on digital SMEs.

- ASSIST²⁴ linked eBusiness to immaterialisation²⁵ in the consumption of goods [41];
- STAR related eBusiness to socio-economic changes and the adoption of eBusiness methods in the private sector[42];
- DEEDS studied eBusiness take-up by SMEs [42];
- REGIONAL-IST²⁶, SIBIS²⁷ and STILE²⁸ carried out work on the statistical measurement of eBusiness [44][45] [46]; and finally
- BEEP²⁹ included eBusiness within its work on best practice case studies [47] [48].

Within the eEurope 2005 Action Plan, presented in Seville 2002, eBusiness comprises both eCommerce and the restructuring of business processes to make best use of digital technologies. Investment in ICTs, human resources (especially eSkills), new business models (so-called interoperable eBusiness solutions for transactions, security, signatures, procurement and payments) and new regulatory systems (including those concerned with privacy) are all emphasized. Within the Action Plan, eBusiness is linked directly to SME support, encouraging innovation in eBusiness, sharing of good practices and promoting guidelines and standards [32]. Within the Sixth Framework Programme, eBusiness is linked to creation of SMEs, eSkills, interoperability (referring to transactions, security, signatures, procurement and payments) and legal issues, particularly in relation to trust and confidence and dispute resolution [49].

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²⁴ Among other things, ASSIST studied the potential for ISTs to contribute to a reduction in material consumption in e-business.

²⁵ C.f. Key concept paper on Immaterialisation.

²⁶ Regional IST examined the adoption of e-Business in European regions by measuring, auditing and benchmarking ICT take-up and readiness. The Regional IST method has taken regional targets into account, as well as the eEurope targets.

²⁷ Empirica performed market research on different sectors to examine the use and impact of electronic business – see www.ebusiness-watch.org/ or www.empirica.biz/sibis/ for results.

²⁸ In this case, STILE was linked to an analysis of sectoral and occupational classifications of e-businesses.

²⁹ Used within EUREXIS in Switzerland, looking at the European experience in e-Business.

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4.4 eCommerce

The concept of eCommerce, or electronic commerce, dates back to the 1960s and such developments as EDI (Electronic Data Interchange), the networking of business communities and digitalisation of business information. Nonetheless, the term eCommerce really came into common usage during the mid-1990s as a buzzword for newly emerging shopping cart systems for online catalogues, especially with the appearance of Amazon and eBay, respectively in June and September 1995 [50].

eCommerce is essentially the processing of transactions through electronic communication - buying and selling goods or services online. It is arguably one of the most important economic aspects of the Internet, since it allows people and businesses to exchange goods and services immediately, without the constraints of time or distance. In addition, eCommerce allows suppliers to reduce costs through automation, to reach wider markets, to work with a wider range of suppliers and to respond to customer inquiries quickly and cheaply. The lowering of costs [51] and enhanced consumer search capability enhance market competition.

Typically, eCommerce is understood to include all *external* business processes of electronic commercial transactions on the Internet, including shopping, selling, negotiation, contracting, digital financial transactions and (credit card) payment, invoicing and sometimes delivery of products and services [53][56].[57]³⁰ However, definitions of eCommerce given by various sources differ significantly.³¹ Some include all electronic financial and commercial transactions, including electronic data interchange (EDI), electronic funds transfers (EFT), and all credit/debit card activity. Others limit electronic commerce to retail sales for which the transaction and payment take place on open networks like the Internet. The first type of electronic commerce has existed for decades and results in trillions of euros' worth of activity every day. The second type has only existed for a few years and is not yet very large. Some definitions also include tools that facilitate eCommerce, such as email, encryption or other electronic commercial transactions software. There is, however, disagreement on this last point. For instance, some definitions specifically exclude orders received via telephone, facsimile and non-interactive e-mails [58] A definition used by the American Census Bureau, for instance, mentions explicitly which technologies are included in eCommerce and which are not:

“eCommerce (or electronic commerce) is any business transaction whose price or essential terms were negotiated over an online system such as an Internet, Extranet, Electronic Data Interchange network, or electronic mail system. It does not include transactions negotiated via facsimile machine or switched telephone network, or payments made online for transactions whose terms were negotiated offline.”

A key definitional problem revolves around how much business activity eCommerce incorporates. For instance, while the European Commission defines eCommerce as any transaction that involves an on-line commitment to purchase or sell a good or service and that results in the import or export of this good or service [50]. Other institutions within the European Union do not explicate whether the definition should exclude domestic eCommerce. Eurostat, for

³⁰ For several useful e-Commerce examples, the BBC website, under the heading of e-Commerce, gives rise to a raft of technology oriented business stories. See: www.news.bbc.co.uk/2/hi/business/e-commerce/default.stm

³¹ See for example a Google search on: “define:e-commerce”

example, uses in its pilot report on eCommerce: “For the purposes of this publication electronic commerce (e-commerce) is defined, in line with the definition developed by the OECD, as the trading of goods and services over computer mediated networks; the payment and/or delivery of the products may or may not be made over such a network. What distinguishes e-commerce from traditional commerce is primarily the way in which information is exchanged and processed: instead of being exchanged through direct personal contact, information is transmitted via a digital network, or some other electronic channel.”³²

Definitions are designed and appropriate for different purposes. Therefore, users of the concept should choose a definition carefully. For instance, policy may need to be narrowly focused to avoid having support ‘hijacked’ by those entities or activities that are not the intended focus. These deliberately narrow definitions can thus can exclude important aspects. If, for example, eCommerce is limited to the Internet, proprietary networks are excluded, which until recently would have included minitel and some mobile technologies. In contrast, other definitions are broader. A definition used to establish the scope of a multilateral agreement such as the G8, for example, should be broader than one used to define a body of law or the applicability of a particular regulation. An example of a definition for a multilateral agreement in this regard is the one used by the G8 [53]:

“Electronic Commerce is a general concept covering any form of business interaction executed using information and communications technology. This covers interaction between companies, between companies and their customers, or between companies and public administrations. Electronic Commerce includes electronic trading of goods, services both material and non-material, it also includes the advertising and promotion of products and services, the facilitation of contacts between traders, the provision of market intelligence, pre- and post-sales support, and electronic procurement and support for shared business processes.”

This definition is all-inclusive and obviously encompasses eBusiness, whereas normally eBusiness is considered to be broader than eCommerce.³³ and even many eGovernment processes wholly unconnected with buying and selling. The OECD definition attempts to avoid these difficulties[54]:

“Transactions between companies, private households and non-profit organisations (including government) via non-proprietary protocols established through an open standard-setting process, and all activities needed to provide the necessary infrastructure to pursue these transactions.”

Furthermore, definitions may differ when they emerge from different contexts. An academic perspective on eCommerce focused on electronic commerce as a strategy or business model, rather than on eCommerce as an application or technology [55] would include all communication applications that support commercial activities. Private research companies, however, may concentrate on the ‘business process’ perspective or focus on Internet commerce, distinguishing between B2B and B2C. Finally, definitions given by the same organisation change over time. eCommerce definitions are necessarily dynamic and vary with the objective of the definition.

³² See for example Deiss R.[52]

³³ According to the European Commission [51], in addition to eCommerce, eBusiness includes processes such as purchasing, tracking inventory, managing production and handling logistics, customer support services, supply chain management and collaborative engineering constitute as part of a wider range of activities that constitutes eBusiness.

The OECD [55] has analysed different definitions of eCommerce and concluded that aside from research, three additional contexts provide different perspectives on eCommerce: (1) business/industry, (2) statistics offices and (3) policymakers. Firstly, business or industry often use a narrow definition, for which the transactional aspect is key. When using a broader definition, industry generally refers to eBusiness, including both internal and external processes. eCommerce is better understood as one ICT mechanism which eBusiness might use [56]. However, eCommerce is sometimes used interchangeably with eBusiness.³⁴ Secondly, National Statistics Institutes (NSIs) are now starting to develop eCommerce-related surveys, with statistical definitions that are inevitably more focused, narrow, precise and often include a list of items that fit within the boundaries of existing statistical classifications. Thirdly, policy makers' definitions of eCommerce are often very broad in order to invoke all impacts of eCommerce, cover all segments of transactions and include all economic actors. However, when measuring the eCommerce impact of specific policies, policymakers need narrower definitions. Hence, in a policy context, often a set of definitions is used that capture eCommerce size and impacts in ways that are comparable across countries.

A common classification of eCommerce is based on types of transaction: first, B2A, which includes here citizens' *financial* interactions with eGovernment as well as eProcurement; second, business-to-business (B2B); and third, business-to-consumer (B2C). While B2C can be seen as most traditional form of eCommerce, B2B represents the core of eCommerce in today's global economy. B2A is likely to grow, especially in issues of public procurement, taxation, and other business issues[59].

Projects within the fifth Framework Programme took specific approaches to eCommerce. For instance, the DEEPSIA project [60] examined the use of eCommerce technologies by SMEs while the STAR project [61] touched on the role of eCommerce within socio-economic changes resulting from the emerging digital economy, in order to develop an evidence base on European eCommerce and to examine the development of eCommerce in the private sector. Other projects that addressed issues related to eCommerce include Beep and SIBIS.

Electronic transactions in goods and services has had a massive commercial impact and is likely to continue to change the way we do business. It has the potential to increase trade and market growth, improve efficiency and effectiveness. It also has the capacity to distort market efficiency and damage competition. It is relevant to consumer and business interests, as well as those of service providers. The term itself seems to be giving way to others such as eBusiness or eEconomy. The basic concept, however, remains arguably one of the most important aspects of the Information Society.

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4.5 eEconomy

The spread of Internet-based technologies is a major aspect of the economic reality of the 21st century and has transformed industrial economies to electronic ones, so-called eEconomies. This insight goes back to Allyn Young [62] and Joseph Schumpeter [63] who argued that the introduction of new goods was an important engine of economic growth.³⁵ In an eEconomy information and communication technologies are used for product and process innovation across all sectors of the economy. However, the relation between technology and growth is neither straightforward nor in one-direction. The initial insights to the understanding of the drivers of the various eEconomy definitions came from growth accounting; econometricians accounted for as much measured growth as possible using known and measurable inputs (e.g. capital, labour, raw materials) and market (e.g. demand and competition) conditions, and attributed the residual to technology, or intangible (knowledge) capital, etc. Because ICTs could not be measured in unambiguous terms that matched the expectations of businesses who invested in ICT-capital, and because knowledge capital could hardly be measured at all in economically-meaningful terms, this attribution was inevitably fuzzy and gave rise to a profusion of opinions. A further complication came from relation between innovation and economic growth, which tend to drive in both directions. This led to the development of endogenous growth models. Finally, as the implications of the Schumpeterian perspective, the discontinuities of technological diffusion and the networked nature of the economy became increasingly recognised, traditional representations of the economy as a system of continuous relationships which could be aggregated to give a picture of macro-development began to give way to evolutionary and game-theoretic representations which more accurately described observed economic development [64].

Thus, the emergence of the cluster of eEconomy concepts accompanied a deepening understanding of economic development and the role of innovation. This was not limited to, nor is it adequately described, in terms of IT, ICT, IST or any technology cluster. Therefore, some argue that it's important not to narrowly define the eEconomy in terms of ICT. Some even use a definition as narrow as "an economy based on network technologies and B2B and B2C models" [67]. Michael Mandel [68] argues that, while ICT is important it is equally critical to be concerned with the next wave of innovation, which might come in an area such as energy or material sciences. Among others, concepts have become relevant to the information society, such as globalisation, dematerialisation, immaterialisation³⁶ and networking. Each of these perspectives has its adherents; each contributes its own terminology and poaches terms developed by the others.

The human dimension of the eEconomy is crucial. The eEconomy involves people in a wide variety of roles: as policy- and decision-makers, as customers, citizens, community members, workers, etc. The sustainability and stability of the eEconomy rests on the pervasive and equitable distribution of the skills and knowledge needed to operate in, work with or understand the functioning of the technology in the eEconomy. Further, it requires organization to focus and transform this understanding into specific knowledge [66] [69].³⁷ For this reason, the European Union, in pursuit of its policy objective of becoming the most

³⁵ Young and Schumpeter were obviously not referring to ICTs, but only to innovation *per se* - specifically to 'disruptive technologies' that trigger further waves of technological, socioeconomic, etc. innovation.

³⁶ C.f. Key Concept paper on this topic

³⁷ C.f. Key Concept Paper on this topic.

competitive knowledge-based economy in the world by 2010,³⁸ has set out a vigorous education strategy. It is for the education authorities in each country to develop the skills of its citizens through education and lifelong-learning, but the Europe-wide “eLearning” initiative will enhance the compatibility and interoperability among member states, labour mobility, etc. [70].

A second crucial element for the sustainability of the eEconomy involves the safety of citizens and their trust in the apparatus of the eEconomy, for example with regard to key interests such as privacy and consumer rights. Accelerating the eEconomy requires a coherent approach to advancing the legal framework and self-regulation. The European Commission [71] acknowledges that even where legislation is in some cases needed as the ultimate safety net, self-regulation and technology is required to create trust and confidence in the eEconomy.

The term “e” in eEconomy is often used interchangeably with “knowledge-based”, “digital”, “internet”, “network” or “information”. Arriving at a set of objective, clear and distinctive definitions is complicated by the many different ways in which these terms are used in the Information Society. Available literature does not provide a consistent terminology and corresponding definitions. Often, different terms are used to denote the same vague concept of a society in which IST plays an important role in everyday life; conversely, different authors use the same term in different ways – often without formal definition. To clarify some of this semantic confusion, several of the afore-mentioned concepts will be briefly explained.

Generally speaking, a “**digital economy**” refers to an economy supported by intensive availability and use of ICT. The term is predominantly used in the United States as a synonym of eEconomy. Every two years, the US Department of Commerce reports on the state of the Digital Economy [72]. The Department reckons that the vitality of the digital economy is grounded in IT-producing industries—firms that supply goods and services that support IT-enabled business processes, the Internet and eCommerce [67]. However, the report, which according to Madrick [73] was widely criticised for oversimplification, does not seem to distinguish the term from such related concepts as the “information economy”.

Whereas the emphasis of digital economy and eEconomy seems to be on the use of ICT, the term “**information economy**” focuses on the use of information. This phenomenon seems to be apparent in other concepts as well. Definitions of terms used in the Information Society often have two branches or alternatives: one that focuses on ICT use and one that focuses on information.³⁹ The OECD [74] notes that information contributes an increasing share of the value of most goods and services and that households and citizens increasingly are occupied with information-intensive activities. The contribution of the information economy to overall economic growth and performance is nonetheless related to the amount of resources devoted to new information technologies, whether in terms of consumption, investment or innovative effort. The OECD uses “**information economy**” to highlight the impact of rapid ICT growth and development on many economic and social changes. In contrast, the European Commission has adopted the term “**information society**” to refer to these social changes and emphasise their potential contribution to social inclusion.⁴⁰ More generally, this phrase seems – much like the other phrases explained in this paper – to be used as an umbrella term for discussing new economies.

³⁸ C.f. Background Section of this document.

³⁹ See for example Key Concept Paper on eCommerce.

⁴⁰ C.f. Background section of this document.

In information societies, a large and growing proportion of the labour force is engaged in handling information as opposed to more concrete production factors. Computer literacy and access to network facilities have become gradually more important. The term “**knowledge-based economy**” is often used to refer to economies in which information technologies have an important role. However, the importance of ICTs does not define knowledge-based economies – rather, increasing importance of knowledge makes ICTs more attractive, and ICT availability makes knowledge (or at least information) easier to incorporate in goods, services and business processes. The knowledge-based economy is characterised by the need for continuous learning, which in turn requires both codified information and the competencies to use it [75].⁴¹ The knowledge-based economy has been extensively analysed by the OECD, which has played a vital role in the taxonomy of economic evolution. The term is based on the recognition that the creation, distribution and use of knowledge, rather than merely data or information, fuels today’s economic growth, and these processes are facilitated by technology use [77]. Knowledge has always been central to economic development. But in the last few years the recognition of its importance and the sophistication of our understanding of its role have both increased enormously. While the “high-tech” sectors showed the most rapid output and employment growth during the early days of the “eEconomy,” recently knowledge-intensive services have overtaken them, raising the returns to “knowledge” as an input [75].

As access to information becomes easier and less expensive, skills and competencies relating to its selection and efficient use become more crucial. Skills needed to handle codified knowledge are more important than ever in labour markets. Knowledge workers will require both formal education and the ability to acquire and apply new theoretical and analytical knowledge; they will increasingly be paid for their knowledge skills rather than for manual work.⁴² Hence, the OECD [75] recognises that education will be the centre of the knowledge-based economy, and learning the tool of individual and organisational advancement. An interesting discussion on the taxonomy for knowledge-based economy is given by Pol, Carroll and Robertson [78].

The notion that education is a crucial component of a knowledge-based society is also reflected in the definition of a concept closely linked to those discussed above: the **New Economy**. Introduced as early as the 1970s widely accepted in the mid-1980's, this concept is broadly based on information, networking and globalisation [67][79]. In this sense, the New Economy is similar to the knowledge-based economy and hence broader than eEconomy, since it highlights education, information, communication, knowledge and social skills [67][66][80].⁴³ Initially, the explosion of ICT within the ‘ICT sector’ of the economy seemed to point the way to a New Economy paradigm of sustained high growth levels and freedom from cyclical forces. Part of this was due to the continued influx of investment money and the ‘dotcom bubble’ in which investors were more motivated by changes in stock value than by dividend flows and real productivity. When the market (inevitably) corrected and when the costs and delays of ICT diffusion into ‘old economy’ sectors began to be felt, many lurched to the opposite

⁴¹ For a discussion on the definition and origin of the term “knowledge (based) economy” see for example: Peters[76].

⁴² Many jobs produced by the Knowledge-based Economy do not require such knowledge skills. For more information see: Reich [74].

⁴³ For a discussion of the origins, evolution and abuse of the term, see Madrick[73][81]. Other authors discussing the subject include John Naisbitt[82][83], Ronald Shelp[84], Nicolas Negroponte, Manuel Castells [85] and Jeremy Rifkin[86]. These works mainly came from outside economics, and were reflections rather than scholarly investigations in the classic sense. However, some books from a more mainstream economic perspective have placed these ideas in a rigorous context – especially Nuala Beck [87] and Hal Varian and Carl Shapiro[88].

extreme, claiming that the New Economy paradigm was itself a burst bubble. However, while the dynamics may have changed, this process is not wholly new (see above discussion of Schumpeter *et al.*). While there is still no widely accepted definition of New Economy, the term fell out of fashion after the burst of the dotcom bubble, when the New Economy appeared subject to traditional economic rules after all.

Finally, it is worth noting that often documents purportedly written on the eEconomy tend to discuss eBusiness or eCommerce, rather than the eEconomy itself. eBusiness and eCommerce are indeed aspects of an eEconomy, however their definition is much narrower.⁴⁴

To assess the nature, impact and policy needs of the eEconomy, several initiatives have been developed under the Fifth Framework Programme. For instance, SASKIA concentrated on identifying the research challenges facing a sustainable knowledge-based economy [89], while STAR [90] concentrated on socio-economic changes stemming from the emerging digital economy, thereby contributing to a better understanding of the conditions leading to sustainable social and economic growth. This focused on both macro-economic changes from the new digital economy as well as the evolution of skills to support it [90].

A range of problems associated with the transition to a digital economy were addressed by the DEEDS project, which set up a forum of high-level European policy makers to exchange ideas and experiences in the hopes of facilitating a coherent European policy on the eEconomy in general and on SME take-up of eBusiness practices in particular [77]. Similarly, PRISMA produced strategic guidelines for policy makers, service providers and other stakeholders based partly on public sector innovation in the knowledge economy [91].

Two projects focused on developing statistical indicators and statistics to measure facets and trends of the emerging digital economy.⁴⁵ SIBIS [92] and STILE [93] created indicators and methodologies for the statistical monitoring of the European labour market in the eEconomy and formulated strategies for European convergence of this type of statistical monitoring. STILE also identified and mapped new skill requirements in the digital economy.

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4.6 eEnvironment

Prior to elaborating on the concept of eEnvironment, some introductory words on the environment in general are justified. Although environment from a holistic perspective comprises the conditions that affect the behaviour and development of somebody or something [94], the term as used in e.g. “eEnvironment” is generally taken to refer to the natural environment of living beings. Therefore, a more appropriate definition of *the* environment is: “the natural world in which people, animals and plants live” [94]. The term also invokes concepts of sustainability and sustainable development. Although “environmental” and “sustainable” are often conflated, their definitions deviate substantially – indeed, many important environmental phenomena (e.g. extinction and speciation) are almost opposed to sustainability. Moreover, sustainability (and the related concept of sustainable development), as currently understood, go well beyond the natural environment⁴⁶. The famous Club of Rome report “Limits to Growth” [95] introduced the concept of sustainable development. Several years later, the UN report “our Common Future”, which became known as the Brundtland report [96], outlined the concept of sustainable development comprehensively and identified three dimensions along which sustainability can be assessed. Environmental sustainability (resource use and ecological impact) is complemented by economic (provision and distribution of the means of sustaining life) and societal (institutions through which we interact) sustainability.⁴⁷ Sustainable development policy aims to provide macro-scale solutions to growing global sustainability challenges arising within or across these dimensions, such as increasing pollution, waste, population and inequality and decreasing biological and cultural diversity, economic resilience and socio-political stability. The natural capital of the environment and of natural resources is more threatened than ever by continued population and economic growth. The same line of thinking led to a clear distinction between sustaining the environment itself (conservation) and being sustained by it.

This has usefully been expanded to highlight three related points.⁴⁸ The first is the distinction among different types of ‘capital’: natural (resources and carrying capacity), economic (wealth), human (knowledge) and social (relationships, institutions). The second is the distinction between “private” (exhaustible or non-renewable) resources such as oil or metals and “public goods” or commons resources such as air and water that are difficult to own, trade or manage through markets. The third is an expanded scheme that relates: a) sustainability dimensions (environmental, economic, social, cultural); b) levels of institutional governance (micro, meso and macro); c) time (from the static perspective of stock exhaustion or depletion to more modern dynamic or evolutionary perspectives⁴⁹); and d) uncertainty (from comparing deterministic relative rates of replenishment and exhaustion to more modern stochastic analyses of shocks and resilience). Although the term eEnvironment appears often in research and policy documents, especially in relation to the European Commission, the concept seems to be ill-defined. Whereas eEnvironment - the reciprocal sustainability impacts of (aspects of) ISTs and the environment - has been addressed by

⁴⁶ In a strict sense, a system may interact with its environment in a sustainable way, but may equally be sustainable in and of itself.

⁴⁷ Recent work, including some of the IST projects considered here (e.g. TERRA2000, ASSIST) adds cultural sustainability.

⁴⁸ Among other places, in IST projects such as TERRA2000 and SASKIA.

⁴⁹ This focuses on functions rather than specific means of fulfilling them and thus accepts exhaustion as part of sustainable development if substitutes can be found – it distinguishes sustainability from conservation.

various socioeconomic research projects in the Information Society Programme,⁵⁰ albeit often not the prime focus of IST the term is not used consistently. eEnvironment is either used to refer to [94] the influence of environmental concerns on the deployment of Information Society Technologies - their ability to collect, store, share and transfer digital environmental information and data or [95] the influence of the development of the Information Society on the environment.

The first perspective refers to initiatives focusing on the use of Information Society Technologies as environmental policy and decision making tools, giving increased access to information about the environment, building arenas for dialogue, increased insight and participation in decision-making processes, and visualising local environmental initiatives [98].⁵¹ Given that the Internet was first established to help researchers share data across geographical boundaries, ISTs - and the Internet in particular - are naturally used to share information about our complex global environment. By making it easy to collect, distribute and analyse data from a variety of resources in the virtual world, ISTs have helped scientists to build a suitably global, inclusive and holistic understanding of the world's ecosystem [99]. While ISTs alone cannot stop environmental degradation, they have become a key means of developing our understanding of the processes and boundaries of the natural world. Digitised environmental information and enhanced computing and communication capacity have allowed scientists to push back the boundaries of our ignorance of natural systems. The evidence thus provided *can* be used to devise better policies or (more frequently) to muster support for environmentally-aware policy. Examples of how digital environmental data may be beneficial are scientific information, eco-efficiency, or the use of commons resources. Of course, the holistic and crosscutting nature of the issues and the complexity and uncertainties that surround the processes under investigation can also slow progress towards effective and efficiently-implemented solutions, not least because the capacity of IST-enhanced science to answer questions often outstrips our ability to frame sensible questions or understand the answers. Examples of how digitised environmental information can offset sustainable development relate to raising consumption expectations; a more efficient (hence more rapid) search for and exhaustion of scarce resources, intensive agriculture, use of specific environmentally-damaging resources (eWaste) and increased demand for electricity. Decision makers increasingly recognised the importance of ISTs in environmental management throughout the 1990s, particularly in relation to environmental monitoring, disaster response, coordination and planning and promoting citizen and business information and awareness [100]. Such eEnvironment technologies as remote-sensing and geographic information systems (GIS) have experienced substantial development in the past decade. The PRISMA project analysed several good practice examples, including: environmental informatics initiatives undertaken by the city of Leicester⁵², the MEDSAFE network⁵³ and Umweltatlas of Munich⁵⁴ [101]. In

⁵⁰ Several 5th Framework Programme projects do this specifically, such as Beep (specific cases), eLiving (quantitative data on environmental impact and perceived quality of life), and Flexwork (dematerialisation and better resource use due to telework).

⁵¹ These tools can expand the scope for public discourse and governance, leading to enhanced eco-efficiency and better management of environmental commons. However, as discussed below, their use can also have unintended "rebound" consequences that can make matters worse.

⁵² Prime examples include HEAVEN (Air pollution), EQUAL (Electronic Services for a Better Quality of Life) and STARTRAK (real-time bus information and signal priority).

⁵³ A web-based co-operation platform to enhance communications and interaction among partners interested in Sustainable Safety in the Mediterranean. The interactive website has become a reference for Mediterranean urban safety.

⁵⁴ An environmental atlas for the City of Munich, first compiled in 1991 and twice upgraded, which now contains some 70 maps and collateral texts describing the environmental situation. About 1300 hard copies were distributed mostly for free; the Umweltatlas is now available on internet.

preparation for the 2003 World Summit on the Information Society in Geneva, the International Telecommunications Union provided several examples of eEnvironment technologies as well, including ENO-Environment Online⁵⁵, the Great Lakes Network⁵⁶ and Ghana's Environmental Information Network⁵⁷ [99].

The second perspective of eEnvironment relates to the impact of ISTs on the environment for good or ill. IST projects such as TERRA2000, SASKIA and ASSIST, have examined the sustainable development impact of Information Society Technologies. On the one hand, ISTs can help to dematerialise production and distribution of goods and services by reducing associated material inputs and waste outputs. On the other, new technologies and the new forms of human interaction they support can lead to a substitution of immaterial for material goods and services [102]. Applying these concepts of dematerialisation and immaterialisation, ASSIST and TERRA2000 have shown how the use of ISTs *can* reduce the opportunity costs (and even price) of material inputs and environmental sinks, while at the same time increasing the welfare productivity of income and wealth [103]. However, these projects also point to substantial unintended consequences in the form of so-called "rebound effects" – systemic and long-term impacts that develop through the whole system and may reverse the original gains. For instance, by reducing the need for material inputs and sinks, IST-linked dematerialisation drives down their costs relative to other inputs and thus encourages their use. By the same token, immaterialisation that drives down the cost of satisfying basic needs increases real incomes and thus encourages additional (material and immaterial) consumption.⁵⁸

Traditionally, implementation of environmentally friendly (information) technologies tended to be driven by government regulations, which often distorted development, produced unfair burdens, and triggered perverse effects. The UN environmental summit meeting in Rio 1992 marked a turning point towards a broad range of non-legislative tools such as self regulation, voluntary agreement, property rights and negotiated settlements, and thus towards more cooperative, stakeholder-based environmental initiatives and partnerships. In this context, governments serve as facilitators, helping progress towards the "circular model" that reconciles the conservation and substitution perspectives [101].⁵⁹ This trend offers the potential of fundamental change in relationships towards industry and public decision maker partnerships. eEnvironment support can sustain this market pull paradigm through continuous interaction of building, re-design and re-creation, and co-operation of the actors on the basis of equal opportunities. Therefore, according to the PRISMA project [101], IST support for environmental networking should have the following functions:

- Shared information, easy access.

⁵⁵ A global web school for environmental awareness organised and co-ordinated by the city of Joensuu, Finland since 2000. Four different environmental themes (Social, Natural, Cultural Environment and Sustainable Development) are studied within a school year on a weekly basis.

⁵⁶ A tool for information relating to the environment, economy, education and tourism for the Great Lakes region in the United States, launched on-line in 1994 by the non-partisan Great Lakes Commission to provide resources for environmental, economic and cultural research and analysis.

⁵⁷ A national repository launched by the Ghanaian Environmental Protection Agency, containing digitised environmental information from the EPA, Forestry Research Institute, and the Building and Road Research Institute, to enhance environmental management by facilitating networking as well as information collection, processing and sharing among policy makers, civil society, NGOs and the general public.

⁵⁸ See also key concept: Immaterialisation

⁵⁹ This model envisages recycling and reuse of all products. There are dedicated efforts to achieve zero waste discharge, create a technological base for manufacturing spent materials and engineer products for ultimate disassembly. The circular environmental paradigm is based on making participating companies more efficient and effective while conserving raw material, bio-diversity and public health and safety (Iversen and Moos, 2003).

- Interaction – government agencies, enterprises, citizens, and community groups – should proactively seek, produce and exchange data, information and knowledge.
- Processes and methods for case handling and decisions should be open and multidirectional.
- Possibilities for creating, disseminating, supporting and publicising synergy, feed back and innovations should be assured by linking actors and information in mutually agreed manners.
- Proper rules of the game and 'ethics' for the network activities must be supported.

Market-based eEnvironment policy instruments are increasingly popular. 'Working with the market' was announced by the EU Commission as one strategic approach of the 6th Environment Action Programme. The part of the IST Program dedicated to environmental applications focuses on new generation monitoring, forecasting and decision-support systems and services for administrations, industries and the public, together with advanced systems and services for the risk identification, assessment, monitoring and prevention and for management and mitigation of both natural and man-made emergencies [100]. In the eEurope context, the main challenge for eEnvironment in the near future, according to Iversen and Moos [101], is related to system standardisation, which can yield effective gains that could allow regional actors to fit eEnvironment services to local conditions, but still in a holistic perspective.

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4.7 eGovernment, eGovernance and eDemocracy

In recent years the relationship between citizens and governments has changed significantly, in large part due to the ever-increasing role of ICT in people's everyday lives and its effects on their attitudes to and their contact with public administrations. The Secretary-General of the United Nations, Kofi Annan, even suggested that eGovernment could enable developing countries to "leapfrog some of the painful stages of development that other countries had to go through"[104][105].

eGovernment, eGovernance and eDemocracy have become "buzzwords" which vaguely suggest beneficial effects of ICTs on government-citizen relations. However, even though these terms describe different ideas, they all express the use of the electronic means to improve governments' performances, either by changing the way citizens and governments interact, or by improving "back-office" processes with the goal of delivering more efficiently traditional government services (i.e. without effecting the "old" ways of citizen-government interaction). It is with this in mind that we intend to shed light on their often blurred understanding. Starting from the results of major IST SER projects funded under the FP5 we shall define eGovernment, eGovernance and eDemocracy, their mutual relationship and development.

eGovernment is generally understood as the provision of government services (such as income tax declaration, car registration, etc.) by means of ICTs. Using ICTs can allow public administrations to provide traditional services in new and more efficient ways, but can also mean offering novel services which could not be provided without ICTs. In other words, eGovernment "[...] stands for a novel and comprehensive mode of using ICT by institutions of the state" [106]. In its communication "The Role of eGovernment for Europe's Future" [107], the European Commission defines eGovernment as the use of ICTs in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies. eGovernment enables the public sector to maintain and strengthen good governance the knowledge society by being more transparent, user-centred, and productive. At the same time, earlier studies on electronic government classify the provision of eServices in different "levels" or "stages"[108][109][110]:

Stage 1—Information: on-line information about public services

Stage 2—Interaction: downloading of forms

Stage 3—Two-way interaction: processing of forms (including authentication)

Stage 4—Transaction: case handling, decision and delivery (payment)

PRISMA, for instance, analyses the "state-of-the-art" and describes long-term scenarios in delivering eServices to citizens; other projects (Regional-IST, BISER) concentrate on local and regional eServices supply; SIBIS, a statistical indicator development project, measures for the first time citizens' and businesses' *demand* for eGovernment services [111][112]. Hence, in the IS, eGovernment indicates the supply of eServices from government to citizens (G2C), businesses (G2B) and other governments (G2G), and how these intended "beneficiaries" interact electronically with government. eGovernment is made up of an internal and external component. The internal component includes uses of ICT in what may be called the back office, i.e. from the domains of traditional electronic data processing to more recent applications such as workflow and

knowledge management systems. The external component, which is new one, is to employ ICT to deliver eServices. See also Aichholzer [106].

In general, as figure 2 below shows, it has been suggested that eGovernment can help rebalance the two sides of government, namely the production and distribution of public goods (content) and public administration (control)[113].

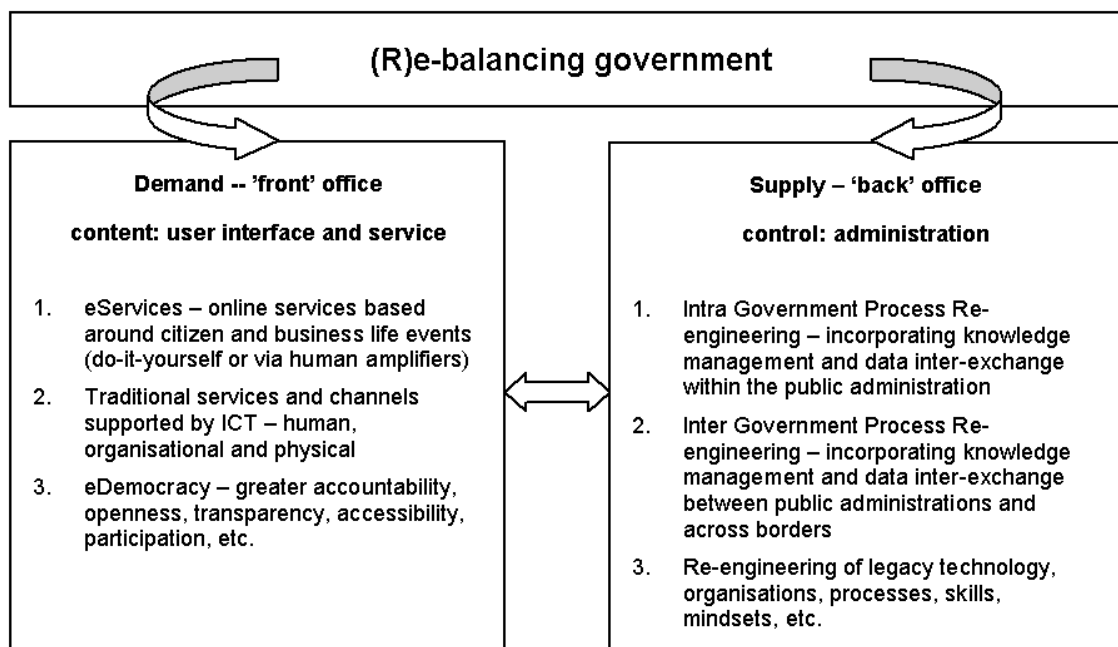


Figure 3. The two sides of eGovernment (Source: Millard, 2003)

The idea of “eDemocracy” includes citizens’ power to control their government, and communities’ power to deliberate and act. eDemocracy overlaps to a certain extent with the concept of eGovernment⁶⁰. eDemocracy is deemed by many as the way forward to re-engage the citizenry in the democratic process [114]. It is generally defined as “the use of ICTs (mainly the Internet, and mobile technologies) and CMC to enhance active participation of citizens and to support the collaboration between actors for policy-making purposes without the limits of time, space and other physical conditions in democratic communication, whether acting as citizens, their elected representatives, or on behalf of administrations, parliaments or associations (i.e. lobby groups, interest groups, NGO’s) within the political process of all stages of governance” [115]. Recent research has suggested that the use of ICTs in the democratic process could eventually lead Europe to a new form of democracy, termed “collaborative direct democracy”, which would enable an optimal synthesis of the ancient–Greek–style direct democracy tradition with the modern representative democracy tradition. Others have emphasised that new technologies have the potential of rebalancing traditional top-down, institutionally controlled participation with new bottom-up, informal and non-institutional forms of democratic participation [116].

Following the OECD’s classification, citizens’ engagement through policy design, implementation and evaluation can evolve through the “eDemocracy” cycle [116][117]. At the *information level* (“eEnabling”), citizens may have access to governmental information through websites, search engines or electronic

⁶⁰ The scope of the concept of e-Democracy can include a wide variety of areas of social life (e.g. the relationship between the civil sector and the market sector) and in part it overlaps with e-Government, see also Kubicek and Westholm[115].

newsletters—all one-way relation tools; the information stage covers “passive” access to information on demand by citizens as well as “active” measures by government to disseminate information to citizens. At the *consultation level* (“eEngaging”) governments interact with citizens to a greater extent, through on-line forums, web-based complaint management, e-mail, newsgroups, polling, chats with individual political or administrative representative etc. At this level citizens and governments engage a two-way relationship in which citizens provide feedback to government, based on the prior definition by government of the issue on which citizens’ views are being sought. The third level is defined as *active participation* (“eEmpowerment”). Here, citizens enter into a partnership with government and actively engage in the policy-making process. “eEmpowerment” acknowledges a role for citizens in proposing policy options and shaping the policy dialogue, although the responsibility for the final decision or policy formulation rests with government. Lastly, at the on-line elections stage, citizens eVote on referenda or candidates.

In most cases eDemocracy features the delivery of existing formal or informal functions of democracy via electronic tools, even though, as has been stated above, attention has been given to potential developments that would distance themselves from today’s democratic processes. Many eDemocracy experiments are already in place, including governmental information websites, the Scottish on-line petition option, the opportunity for Czech citizens to comment on draft bills on-line, or eVoting (or postal voting) experiments in the UK, Ireland and Switzerland. On-line voting experiments, in particular, seem to have a significant impact on raising participation especially at a time when it otherwise seems to be falling [116].⁶¹ From what has been said above it is clear that, even though the levels of eDemocracy partly overlap with those of eGovernment, eDemocracy should be treated as a separate (but related) concept.

eGovernment and eDemocracy are both included in “eGovernance”, often erroneously thought of as a synonym of “eGovernment”. On the contrary, because eGovernance embraces eGovernment and eDemocracy, it is in fact their hyperonym. Rogers Okot-Uma [118] stresses that, while eGovernment is focused on the improving the efficiency, effectiveness, transparency and accountability of government services through use of ICTs, eGovernance can be perceived to include eDemocracy, eGovernment and eBusiness.⁶² Moreover, eGovernance has its “own” drivers (which, therefore, are indirect drivers of eGovernment). According to Theodore Venter [119], these are products, philosophies and positioning (on the side of “what eGovernment is” and “why it should exist”) and people, processes and partners (on the side of “how it functions”). Also, in terms of citizen-government relations, eGovernance implies a more active role for citizens. In the hierarchical model of governance, centralised information flows from a single source down through the system to designated recipients, where it is passively received and acted upon. Today, governments increasingly use new communication means to provide citizens with stacks of information, present accomplishments, and campaign; while citizens, at the same time, are becoming

⁶¹ Although higher participation generally deemed better than lower participation, some specifications, directly related to e-Democracy, should be considered. First, those who vote electronically may not be representative of those to whom voting matters enough to incur the costs of doing it conventionally. Second, the public aspect of conventional voting is an important component of conferring “democratic legitimacy.” Third, if electronic means (used by one group) are used in place of other means (used by another group), the fact that one group is numerically larger is irrelevant. Finally, and most importantly, if governments use electronic information systems to tell citizens what to believe, the nexus of democratic accountability moves away from the polling mechanism to the information system that told citizens how to vote in the first place. It is here (i.e. in the provision of alternative information and in the enforcement of standards of unbiasedness and accuracy) that the “democracy” in “e-Democracy” either stands or falls.

⁶² For a definition of e-business the reader is re-directed to the paper on e-commerce

more aware of the potentialities offered by these technologies, and use them to interact with public administrations. There are clearly many definitions of eGovernance. The PRISMA project takes a decidedly pragmatic approach, seeing eGovernance and eGovernment as concepts partially emerging from increasing expectations that the way we are governed should meet modern standards of efficiency and effectiveness (particularly that government should “do more for less” year on year), as well as pressure for more transparent and accountable government [120]. It is clear then, that eGovernance is not just about eServices but also about the management and institutions of society and the economy and the distribution of power among the actors involved. If they are successfully to meet these expectations, governments must also use the new technologies to become more democratic, transparent, open and accessible. Much recent debate has focused upon the need for eGovernment to adopt the approaches of eBusiness, including reengineering structures and processes. However, many recognise important distinctions between government and business, including the fact that governments and citizens cannot choose each other and that citizens are not mere customers for government services but also vote, pay taxes and obey (or not) laws. Therefore, a specific “government-process-reengineering” approach may be more appropriate, learning from, but also informing business (for example in terms of social responsibility), in the context of public, private and non-profit sector partnerships. In general, most SER is in accord on the fact that eGovernance comprises (at least) the two concepts of eGovernment and eDemocracy. Hence, developments of eGovernment and eDemocracy represent a transformation of eGovernance itself.

This section began with the premise that the impact of ICTs on government-citizen relationships is undeniable and is increasing as technology develops and people demand greater transparency, accountability and effectiveness from their administrations. It was argued that the use of terms such as eGovernment, eDemocracy and eGovernance is often imprecise and, based on recent FP5-funded SER, some clarification of these terms’ meanings was suggested. It remains irrefutable that numerous legitimate definitions of eGovernment (eDemocracy and eGovernance) still exist, most being variations of the above themes. Amongst the many definitions, two seem appropriate syntheses of the issues raised here. Firstly, Leitner [121] contends that

eGovernment is the key to good governance and a modern public sector. eGovernment is not only key to modernising public administration, but also to renewed public governance. If ‘eGovernment’ means the use by public administrations and by other institutions of the public sector of new information and communication technologies to improve both its relations with the users and its internal functioning – and that is precisely what it means the phenomenon existed long before the word was invented. eGovernment builds on New Public Management (NPM) in the sense that it is functional and outcome-focused but it clearly goes beyond NPM. It is about the production processes themselves in which administrative services are generated, not just their management. It engages innovative and comprehensive approaches to administrative modernisation.

Secondly, the recent UN report on eGovernment [122] states:

“We put “e” in front of “government” to recognise that a public administration is in the process of transforming its internal and external relationships with the use of modern information and communication technology (ICT).”

“Government - a public organisation - is part of a broader governance system. It is a means to a goal. These days, government is seen

predominantly as a public organisation set up by a society for the purpose of pursuing that society's development objectives. This comprises articulating the society's development-related demands, proposals and needs, aggregating them and implementing responsive solutions. Enjoyment of public consent constitutes the source of government's legitimacy. Transparency is a condition sine qua non for government's accountability vis-à-vis its oversight body."

"ICT is about communication among people: the quintessence of human society. We have always used communication to inform, learn, define concepts and viewpoints, deliberate and reach agreements, in private and in public life. One can put the electronic features of modern ICT into this timeless communication process and benefit from doing so. If this is done in the context of public administration, it is bound to have an impact on the creation of public value. Indeed, eGovernment at its best can be viewed as the process of creating public value with the use of modern ICT."

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4.8 eHealth

The desire for optimal health, perhaps more than other desires, is a driving force for human activity. It is therefore unsurprising that the study of how technology can be used to improve people's health has become a crucial aspect of Europe's political agenda [123][124][125]. In fact, the improvement of healthcare delivery as a result of last century's developments in medical technology is well known. Discoveries such as electrocardiography, band-aid and insulin, open-heart surgery, the heart-lung machine, oral polio vaccine, computerized axial tomography (CAT) Scan, deoxyribonucleic acid (DNA) cloning, magnetic resonance imaging (MRI), the artificial heart, unique blood substitute, etc., have changed people's attitudes and increased demand for up-to-date medical treatment [123]. Moreover, as noted by Huynen and Martens [126] human health relies on a multiplicity of factors (socio-cultural, economic and ecological), which go beyond sheer delivery of care. What exactly, then, is meant by "eHealth"? Where does the "e" fit? As in many other instances, the boundaries of a new concept, especially when relating to the use of new Information Communication Technologies (ICTs) can be blurred.

People recurrently consider the "e" as a mere substitute for "tele-". For instance, when we discuss eHealth we often refer to "telemedicine". In fact, "telemedicine", a far older phenomenon than "eHealth", generally refers to the remote delivery of healthcare, in any form (long distance consultations by phone, telegram, messenger, etc. or the use of advanced robotics) [123][127].

On the other hand the range of activities and services covered by the concept of "eHealth" is extensive, encompassing "telemedicine". The European Commission generally describes eHealth as the use of ICTs to perform three broad activities [128].⁶³

1. Delivery of healthcare—including both the process (e.g. scheduling systems, logistics, managing information, hospital administration systems—including accounting, inventory and payroll, etc.) and actual care from a provider (e.g. a doctor) to a patient.
2. Provision and exchange of medical information—including provider-to-patient, provider-to-provider, patients' self-information gathering (e.g. on the web) and patients' search for second opinions
3. Trading of health products (and sponsoring private medical providers, which could have beneficial effects on patients' access to care)

Chief goals of these activities (hence, of eHealth) are the critical objectives of healthcare: improving quality and access, while containing costs [123][129][130]. Thus, eHealth is one of the tools Europe (and the world) has at its disposal to improve healthcare and, in so doing, to advance human health. Figure 3 illustrates the correlations between human health, eHealth, and healthcare, as well as their components⁶⁴. The figure shows a cycle, in which eHealth, possible thanks to technological improvements, helps achieve the critical objectives of healthcare, which in turn benefit overall human health.

⁶³ Link to www.europa.eu.int/information_society/eeurope/ehealth/whatishealth/text_en.htm

⁶⁴ The reader should note that the above section of Figure 1 ("Human Health" triangle) is as presented in [126] and quoted in [129].

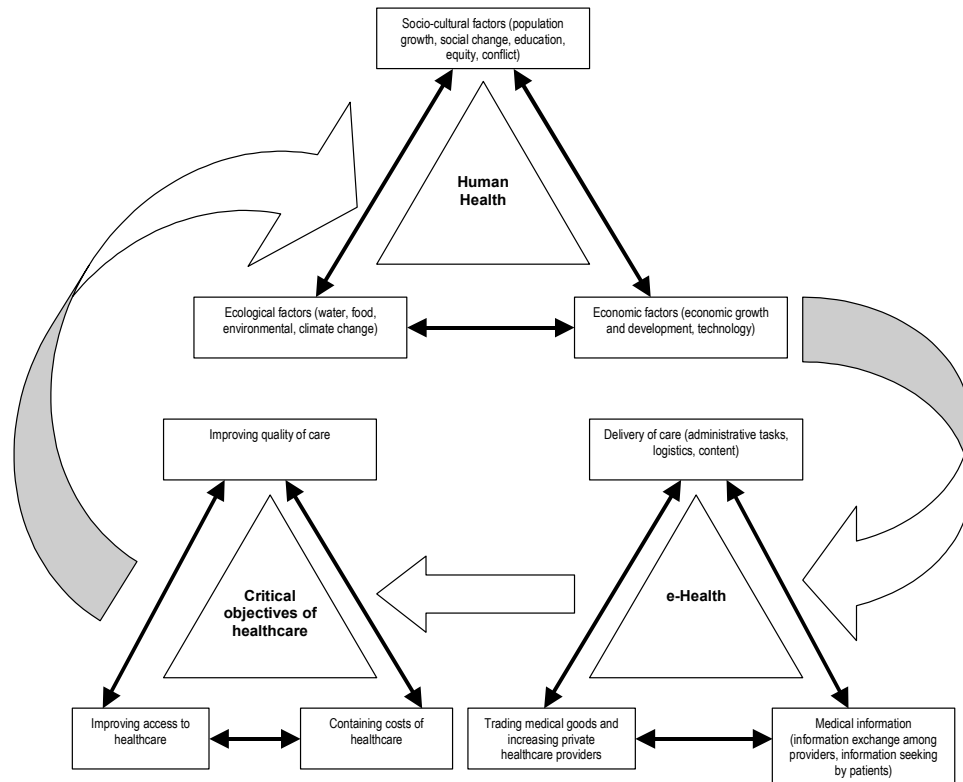


Figure 4. eHealth in the context of a general human health system

Despite the numerous eHealth services potentially available, and their potential to better human health, findings of the Statistical Indicators Benchmarking the Information Society (SIBIS) project suggest that in 2003 just over 36% of European Internet users searched for on-line health-related information, half of whom sought a second medical opinion—a finding consistent with the 2001 and 2002 Eurobarometer surveys [131][132][133][134]. The most obvious explanation is likely to be people’s reluctance to give and receive (in this case literally) vital information and care through electronic means [123]⁶⁵. SIBIS findings from the same source suggest that trust in the electronic medium is not high for private health insurers and pharmaceutical companies [131][132], which might be one reason why the purchase of medicinal drugs on-line remains scant. The issue of the reliability of on-line-provided medical information is serious and has been addressed by the European Union. By the end of 2002, the Commission had drafted a set of quality criteria for health related Websites (HRWs), in accordance with the eEurope 2002 initiative. All HRWs ought to: be transparent and honest, clearly state the sources of all information provided, have a data protection policy in accordance with community Data Protection legislation, be accountable—that is (1) get user feedback, and appropriate oversight responsibility, (2) responsible partnering with individuals and organisations who themselves comply with relevant codes of good practice, and (3) editorial policy (a clear statement the procedure for selecting the content), and be accessible (i.e. pay attention to guidelines on physical accessibility as well as the general easiness to find, possibility to search, readability etc.) [128].

Today eHealth is still the result of a “technology-push”, and awareness raising among the general population is still required. Particular attention is being given

⁶⁵ This phenomenon is consistent with other SIBIS findings, which indicate that privacy and data protection concerns in Europe exceed 70% and have an impact e-Commerce and e-Government too [135][136][137].

to sections of the population, such as the elderly, who are supposedly less amenable to fast technological changes, but who, at the same time, would be primary beneficiaries of most improvements following the extensive application of ICTs to healthcare [138]. Several initiatives to maximise the benefits of eHealth are underway in different European countries. Many deem the introduction of electronic health records imperative for fostering eHealth [129]; a number of case studies and success stories in eHealth are now known [123]; and countries such as the UK are moving ahead with eHealth strategies to improve the quality of their current public health service [139][140].

Because of patients' increased demands, longer life expectancies and the anticipated "elderly boom" resulting from the 1960s "baby boom", eHealth is currently at the top of Europe's political agenda. Healthcare systems must adapt to ongoing changes while preserving Europe's social prerogative of and pride in inclusiveness.

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4.9 eRegions

Traditionally, the impact of information society and knowledge economy are assessed in global or national terms. But as globalisation and the effects of new information and communications technology have affected us all wherever we live, they are also restructuring and reshaping the regions, though in a variety of ways and often with highly differentiated results [141]. Therefore, there has been growing recognition in the last few years that ICT changes should also be examined at the regional level, as well as at the global, European or national levels which have traditionally been the focus of attention within the Information Society. The term eRegions is typically used within the context of Europe to refer to the capability of different regions to adapt to the Information Society. It is used to highlight geographical areas where access to, participation in and progress towards the Information Society can be focused and measured.

It is worth noting that the term “eRegions” is not common. Instead, discussions and research on this topic tend to use phrases such as “regional perspectives”, “the regional focus” or “regional initiatives.” Essentially, however, these all refer to the same basic premises. The context in which regional perspectives have evolved has paralleled the growing recognition that unequal access to ICTs affects the capacity of different regions to adapt to the information society. According to the European Commission [142], there are striking differences in economic performance between different parts of Europe, particularly between the central and peripheral regions. As the economic position of countries converges, the divergences tend to be located increasingly within individual countries rather than between them [141]. Various research initiatives⁶⁶ point in the direction that even though countries in the EU may to some extent be converging in terms of economic indicators, at the regional level divergence is more likely to take place, and that some of this may be due to ICT adoption, although the effects of this must be seen together with wider economic forces, such as globalisation, increasing competition, de-regulation of markets, etc. Inequalities among regions stem from lack of awareness of what ICTs can offer as well as matching skills; insufficient telecommunications infrastructure and Internet connectivity; expensive Internet access; lack of adequate legal and regulatory frameworks leading to a lack of trust; shortage of requisite human capacity; inadequate use of local language and poor coordination at regional level [143][144][145].

New technologies can be both an instrument of social integration on a global scale and of exclusion for those regions that do not ‘catch up’ or use them at all. The main ways in which these technologies impact are by increasing the locational choice of firms, by offering new and often high-skilled jobs and new ways of working, and by providing solutions to problems of the mobility and access of individuals. This can have important implications for economic and social cohesion at EU as well as regional level [145][146][147]. Several authors have described how these socio-economic consequences may come about.⁶⁷ Castells [149], for example, highlighted the theme of disconnected locales by pointing to the global trend towards building dedicated ICT networks, which bypass the general public systems and directly link major business centres. He described this phenomenon as ‘splintering networks’, feeding on Graham and Marvin [150] who explained how networks (both ICT and physical) polarise places and societies. This includes so-called ‘glocal nodes’ as specific areas within,

⁶⁶ See for example Digital Europe project.[148]

⁶⁷ As quoted in Millard [141]

normally, large cities that link up around the planet with equivalent areas anywhere, whilst being loosely integrated, or not integrated at all, with their surrounding hinterland. These splintering networks threaten to contribute to a new, and fundamental, social and spatial cleavage: the digital divide.⁶⁸ Earlier, Graham and Marvin [151] acknowledged that, in a context of enhanced ICT, these processes of differentiation can occur both within and between regions and cities, leading to polarisation and uneven development. These spatial digital divides constitute some of the most profound challenges for European regions in the Information Society [141].

The Digital Europe project, for example, recognised a clearly delineated core super-region within Europe, whether measured in terms of employment, GDP, research expenditure, etc., which stretches as a band from north-west Italy through the south and south-west of Germany, up the Rhine/Ruhr west German corridor, into Flanders, Belgium, southern and central Netherlands, to south-east England and the Ile de France. This corridor was called the 'blue banana' super-region and the project concluded that, measured at the national scale, ICT adoption has tended to weaken this core. At the sub-national scale, however, they found a clustering effect associated with the digital economy and the adoption of ICT which is stronger than that seen with traditional economic activities, although this is often better explained by industry characteristics, such as skill intensity, than purely ICT intensity. The EMERGENCE project [152] researched the shifts in the location of employment within European regions as well as globally that has accompanied the introduction of new ICTs, focussing on the characteristics of these shifts. Attempts have also been made by a range of different bodies to develop systems, processes or indicators by which to measure progress towards an Information Society. For instance:

- BISER [153] focused on measuring progress towards an information society on a regional level;
- MUTEIS [154] focused on local diversity within a wider framework of examining functional and spatial diversity;
- PRELUDE [155] focused on promoting European local and regional sustainability in the digital economy by boosting regional and local innovation supported by ICTs, not least through the creation of clusters of public-private partnerships focused on innovative working at regional and sub-regional levels;
- Regional-IST studied eGovernment and eBusiness adoption at a regional level [156]; and
- Beep also collected examples of good practice in the use of ICTs in regional development, in which it recognises geographic, language and cultural diversity as important assets, complementing trends towards the Europeanisation and globalisation of the economy [157].

Regional perspectives are also apparent within the eEurope 2005⁶⁹ programme, which aims to achieve an "Information Society for All" by overcoming social and geographical differences, highlighting the importance of taking into consideration the specific needs of all social groups and geographic areas of the EU [158]. Across the EU, the Information Society is increasingly the focus of policies on regional development and EU assistance is often delivered at regional level. In

⁶⁸ c.f. key concept paper on Digital Divide

⁶⁹ c.f. Background Section.

2003, for instance, regional and local authorities took initiatives to stimulate the deployment of technological infrastructures in remote, scarcely populated and rural areas [159]. This has also been reflected in the findings of projects such as SIBIS [160].

The OECD focuses on regions in global terms (e.g. Europe, USA, Asia) and uses some country specific regional divisions, for instance in Italy, in order to more accurately reflect socio-economic disparities [149].

Other terms related to eRegions are “eInclusion”, “eReadiness” or “eEuropeRegio”. Essentially, though, all these concepts refer to the ability to cope with the Information Society and can be applied at various levels, including the regional level.

It is clear that the role of regions within the New Economy and the Information Society is becoming ever more important. Rather than heralding the death of distance, as some pundits have proclaimed [161], it seems that locational characteristics are becoming more vital in the eEconomy. The delocalising potential of ICT means that because some accessibility and interaction constraints on location decisions have been removed, this results in more attention in the decision making process becoming focused on other factors, typically internal regional characteristics, like labour markets, institutional structures and quality of life. Thus, the application of ICT leads to the re-prioritising of the specific uniqueness of regions. As a result, activities in the IS become both more fragmented across time and space as well as more intimately coordinated, with each region playing a specific role based more on a re-assessment of its unique internal characteristics than on its physical accessibility [162].

As a result, the EU is promoting policies specifically aimed at regional development in relation to the Information Society. There is also an increasing emphasis on the necessity of public-private collaboration to specifically address regional issues in this context. ICTs are essential for progress and need to be promoted at regional level; furthermore, the approach adopted should reflect the specific needs of the region in question. If the Information Society is to be of benefit to everyone, the digital divide needs to be overcome and access needs to be equal across the globe.

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4.10 eSociety

The growth and development of new information and communication systems such as interactive and multimedia communications and the Internet have become a part of daily life that have undeniably transformed the ways people socialise, work, shop, engage in civic activity and generally operate on a daily basis. There are no clear boundaries within which to define eSociety. While other eConcepts may refer to specific issues (for example, eGovernment, eHealth or eEnvironment), eSociety does not share this sort of delineation.

Traditionally, the concept of eSociety was seen to refer to such things as cyber-café's and online dating facilities. Now it is increasingly seen as far more extensive, encompassing all the dimensions of the information society, such as eHealth, eGovernment and eGovernance, eEconomy, eCommerce, eBusiness and eWork, eLearning, Information Systems and Information Management, etc.⁷⁰ It cuts across all levels of society, changing how individuals, the business community or governments behave, organise themselves and interact, and impacts on all aspects of life: social, economic, cultural, political, legal etc. As a result, it raises issues typical of any society, such as inclusion, exclusion, equality and sustainability.

The Beep project [166] defines eSociety as that part of society affected most by the introduction of ISTs and relates directly to social inclusion. This project recognises that the promises of the information society cannot be realised if too many people are "falling through the net" [167], that is, if they are not in a position to participate in and benefit from the development of eSociety. The SIBIS project also attempted to measure progress towards the Information Society by establishing indicators and statistics on different topic areas [168]. As concluded by the European Foundation for the Improvement of Living and Working Conditions [169], initial adoption of the new technology is almost always associated with inequality, since early adopters, benefiting from access to the new technology, are typically drawn from more privileged groups. Only as the technology becomes more widely available, we would expect to see this kind of inequality diminish. Hence, indicators for an eSociety should not just focus on the penetration of ISTs in society, but also on the distribution across social structures.

JANUS describes eSociety as a society where the digital divide⁷¹ is reduced to a minimum, emphasising the importance of access and IST usage [170]. It is therefore open to include all benefits of the information society, as described above. Elsewhere, eSociety has been defined as one that uses digital media in most relationships [171]. Regardless, both definitions point to the ever-changing nature of eSociety, given constantly evolving ISTs. The second definition also raises the issue of the potential exclusion of people using digital media, depending on the threshold of what comprises "most relationships".

In other contexts, eSociety is given a much narrower definition. For instance, it has been equated to eDemocracy⁷²; that is, the processes and structures that encompass all forms of electronic communication between Government and the Citizen [170]. Similarly, eSociety has been interpreted as the way in which certain social structures, specifically families, deal with the new realities resulting from

⁷⁰ See for example the website of the International Association for the Development of the Information Society (IADIS)[163]; Krakow University of Technology Presentation at the ERIC Seminar in Jyväskylä 2004[165]; or Michael Bloom's presentation at the 2004 Workshop on Intelligent Infrastructure and e-Society[164].

⁷¹ C.f. Key concept paper on the Digital Divide.

⁷² C.f. Key concept paper on e-Government, e-Governance and e-Democracy.

changing technologies, and what form they could take in order to maximise possible advantages. The FAMILIES project [172], for instance, considers family structures and circumstances that facilitate or inhibit the adoption of new IST-based work, the impact of different variants of new work methods on different family types, and the kind of support that would help families to better exploit the new opportunities offered by those methods.

The approach to the study of eSociety is changing. Historically, the social and economic aspects of ISTs have been the focus of much research. Researchers from different disciplines have carried out studies specifically focussing on the social aspects, including the interrelations between technology and society. However, the Economic and Social Research Council (ESRC) [173] argues that "the development of a cumulative body of knowledge in this field has been hampered by its fragmented, interdisciplinary research history, and that rapid innovation has changed technological contexts before knowledge could be consolidated." As a result, new projects are being developed which specifically address the concept of eSociety, in an attempt to overcome the fragmented approach to understanding how new technologies have changed social interaction between people, businesses and governments. For instance, the ESRC eSociety programme [173] advocates a multidisciplinary approach to studying eSociety that includes all those issues raised. It aims to cover such topics as society's acceptance and use of broadband fixed and mobile digital connectivity; to analyse the digital divide and the social inequalities and disadvantages this may entail; to elevate eSociety issues to higher levels of public debate; and to cover topics related to – among others – eGovernance and Government services, intellectual property rights, regulation and content.

It is also worth commenting on the legal implications of the new modes of interaction within the eSociety [171]. In building an integrated eSociety for everyone, where the digital divide is reduced to a minimum, incentives and control mechanisms are necessary to ensure that people trust using the tools of this society. In order to attain this, participants to the eSociety need to know that they are protected, which means that there is a legal framework (general and abstract rules and enforceable sanctions) that governs the eSociety, the same way there is a legal framework governing the "physical society". In developing the eSociety, a legal framework is crucial from two perspectives [174]. Firstly, there are legal implications according to different domains; dependability, network security and countering cyber crime are necessary to increase people's trust and use of on-line tools to shop, vote, get healthcare etc. Similar to the physical world, transactions in the eSociety build upon trust and confidence between different actors, which is enhanced by various instruments, including legal norms. Secondly, there are legal implications in terms of country-boundaries; international fora and agreements for governments and businesses are crucial to promote cyber-security, dependability and counter cyber crime. Common international definitions and sanctions are necessary to fight cyber crime.⁷³ Additionally, policies, procedure and regulations by international organisations will shape the eSociety in this regard.⁷⁴

In sum, the concept of eSociety refers to the impact of ISTs on society, which affects all aspects of life, including in the political, social, economic, cultural and ecological dimensions of society. That is, eSociety affects how information is shared, businesses operate, governments function, education is delivered, and

⁷³ E.g. October 1999 Tampere European Council summit. See: www.europarl.eu.int/summits/tam_en.htm

⁷⁴ For a more detailed discussion and a comprehensive overview of legal issues for the Information Society, see also the website of the European Commission - Legal issues of the Information Society - Computer crime[175].

how individuals, families and communities live. It thus is an overarching concept linking multiple aspects of the Information Society such as eGovernment, eHealth, eLearning, eBusiness etc. Regardless of the absence of a concrete definition, it is possible to say that eSociety is essentially about the changes that new ISTs have brought to human behaviour and interaction on a daily basis.

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4.11 eWork

The effects of technology on work have been topics for socio-economic analysis for decades. The use of computers to “home-work” as opposed to work from the office, for instance, was studied as early as 1975, when the concept of “telecommuting”⁷⁵ first appeared [176]. Subsequent technological progress, such as the development and widespread use of new ICTs, brought along invigorated interest in possible changes in work organisation, and the social impacts of these changes [177][178][179][180]. The current pace of ICT progress, as well as its exploitation, leads many to believe that the success of the IS largely depends on the ability of individuals, businessmen and governments to adapt [181]. Similarly to other instances, the often not defined use of words such as “telework”, “eWork”, “eLancing”, “mWork” etc. suggests an involvement of ICTs (in one’s work), but this is just one of the aspects that matters in these new forms of work. Whereas we do not think there is one definition, or whether there should be one definition, it is important that the term is clearly defined when used. However, it is possible to offer a framework for thinking based on work done by socio-economic projects in IST.

According to the definition provided by the EMERGENCE project, “eWork is any type of work which involves the digital processing of information and which uses a telecommunications link for receipt or delivery of the work to a remote employer or business client” [182].⁷⁶ The definition is further elaborated in terms of whether the form of eWork involves employees or outsourcing, and whether it involves individual or collective forms of work. This allows for the creation of an easy-to-read two-by-two cell matrix, where the different forms of eWork can be grouped (Table 2) [184][185].

Table 2. The EMERGENCE Typology of De-localisation Enabled by eWork. Source: Huws, U. & O’Reagan, S., 2001

| | | Contractual | |
|-------------------|--|--|--|
| | | Internal/employees | Outsourced |
| Type of workplace | Individualised (away from “office” premises) | Employed tele-homeworkers Mobile employees | Freelance teleworkers or mobile workers |
| | Collectivised (on shared “office” premises) | Remote back office/call centres Employees working tele-cottages or other third party premises | Special business service supply companies Outsourced call centres |

This typology was designed as an organising tool for constructing a large employer survey to determine the extent to which any form of telemediated relocation of work was taking place, regardless of whether or not it was home-based. Because the focus of the survey was on the physical location of employment, it was specifically designed to avoid the definitional confusion, which may arise when workers are engaged in virtual team working over a distance from a fixed site. For surveys of individuals (for instance labour force surveys) a different approach is needed. The STILE project⁷⁷ identified several key dimensions of work which can be independently cross-tabulated with other variables in order to construct a range of different definitions of eWork to fit

⁷⁵ Telecommuting is a specific term for telework where telework is introduced for the purpose of replacing the daily commute by a telecommunications link.

⁷⁶ For further reading about eWork, see: Huws, U., Korte, W., and Robinson, S[183].

⁷⁷ See http://www.stile.be/Newsletters/Newsletter_no_4.pdf for the full text of the questionnaire toolkit

differing research agendas. These include the *location* of work, the *use of ICTs*, the *intensity of ICT use*, and the *amount of time spent working at the remote location*. Optional supplementary questions make it possible to address, for instance, the nature of the tasks carried out remotely, the extent to which the arrangement is voluntary, arrangements for reimbursement of expenses as well as a range of other variables.⁷⁸ Based on the successful addition of ‘teleworking’ questions to the UK Labour Force Survey in 1997 (now collected annually), this approach was experimentally adopted in Ireland and Hungary as part of the work of the STILE project and is likely to form a permanent component of public data collection in the EU.

In general, the use of ICTs in work has the potential to boost the flexibility of work deployment, a transition that has been noted throughout the years [186]. SIBIS, one of JANUS’ ‘core projects’, points out four key dimensions of work where ICTs play a significant role in terms of flexibility. As shown in Figure 5, these dimension are place, time contract and content. Flexible work can be organised in (at least) three of these dimensions, namely place, time and contract [187][188][189].⁷⁹ The term ‘flexible work’ describes the range of employment practices that differ from traditional full-time jobs.

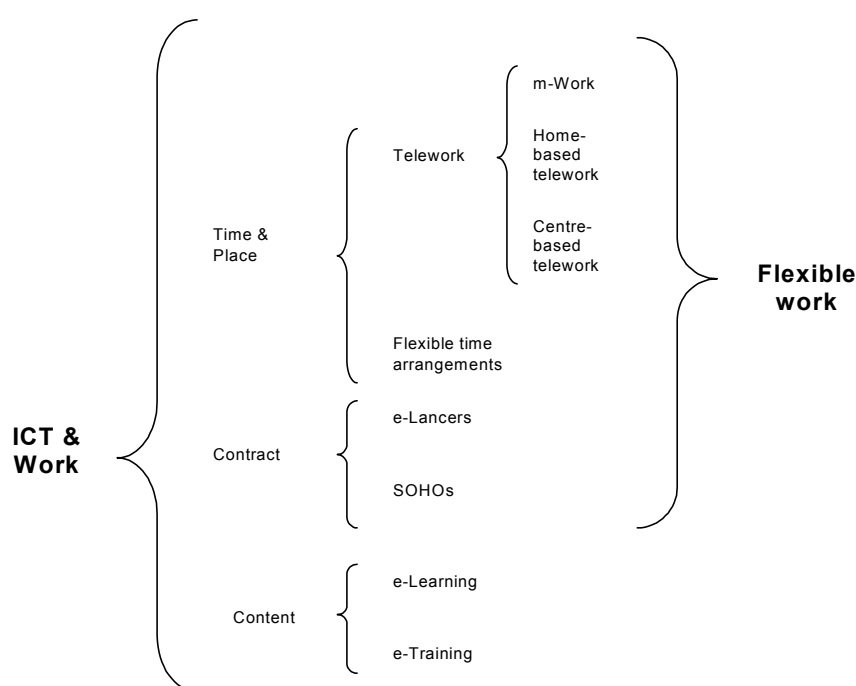


Figure 5. The Dimensions of Flexible Work

Telework and mobile telework (often referred to as ‘m-Work’) are forms of eWork that indicate the separation of the location where work is carried out from the location where the work products are being integrated into the production process [188][189]. Telework is ‘a method of organising and/or performing work in which a considerable proportion of an employee’s working time is: (1) away from the firm’s premises or where the output is delivered, and (2) when work is done using

⁷⁸ Cristina Oteri and Francesca della Rata, *Working at a Distance: How to know about it*, STILE Project Deliverable 5.3, available online at <http://www.stile.be/wp5/D5.3%20Final%20report.pdf>

⁷⁹ Even though all four dimensions pertain to the ‘flexibilisation’ of work patterns, work ‘content’ is generally understood as the skills that are applied in the production process. Hence, the impact of ICTs is chiefly on learning and training. See also Gareis *et al.*[188].

information technology and technology for data transmission, in particular the Internet” [190][191].⁸⁰ The out-of-office location can be the worker’s home (for home-based teleworkers) or centres created specifically for this purpose (such as so called “tele-cottages”). m-Work, instead, is the use of on-line connections (predominantly e-mail) during business trips. It is the ultimate expression of locational flexibility, because it enables workers to cooperate with staff members or business partners while travelling.⁸¹ Although the impacts of technological developments on work delocalisation are undeniable,⁸² a simple cause-effect relationship (i.e. “ICT *hence* delocalised work”) is questionable. Telework, for example, is a subset of home-based work, a social phenomenon initiated long before the invention of computers. Indeed, it has been suggested that telework is an extension of the “take-away” phenomenon, which more commonly applies to food or films [192].

Time flexibility takes a variety of forms, including the use of asynchronous communication media, computer-supported collaborative technologies and computer networks to enable coordination among co-workers or production processes in different time zones (in fact a facet of place flexibility) [188][189]. Other forms of time flexibility comprise agreements such as “variable hours”, “restructured hours”, “reduced hours” and increased leave options. “Variable hours” arrangements consist of “flexitime”, “time accounts”, which is taking time off to compensate for extra time worked, “annualised hours schemes”, in which employers agree with employees on a total number of working hours per annum without enforcing minimums or maximums per diem, etc. “Restructured hours” include “compressed working week” agreements such as 4/10 or so-called “nine-day fortnight” plans, which allow employees to work four days a week 10 hours a day, or nine days every two weeks. “Reduced hours” arrangements refer to part-time, job-share, term-time working, phased retirement etc., all of which can be facilitated by modern technologies. Finally, time flexibility comprises increased leave options (e.g. sabbaticals, career breaks, maternity leaves) [193].

Contract flexibility includes a variety of contractual arrangements, particularly outsourcing, use of agency workers or casual labour. However, it is self-employment in a SOHO and “eLancing” that reveal whole new horizons in terms of contractual possibilities. Self-employed in SOHOs are freelancers and other self-employed persons whose workplace is the same location as their home, and who transfer work inputs and outputs by electronic means: they use ICTs for interacting with clients, collaborators and suppliers. While many self-employed in SOHOs are in fields which have traditionally had a large share of home-based workers (e.g. journalists) and see the key innovation in the new tele-mediated communication practices, “eLancers” are a novel kind of freelancer. Malone and Laubacher [194] first described eLancers as self-employed workers (1) who use

⁸⁰ SIBIS classifies teleworkers as “supplementary”, “alternating” and “permanent” according to the time spent at the third location as opposed to the office. It must be stressed, however, that SIBIS only considers those teleworkers for whom the third location is their home, see Gareis *et al.*[188].

⁸¹ Communication does not have to literally take place “on the move” (e.g. in a train), but can also occur at a stationary place (e.g. a hotel), see Gareis *et al.*[188].

⁸² The spread of the Internet, for example, is a key ingredient to a successful spread of new ways of working in general, and of telework in particular. For instance, the positive correlation between Internet usage and home-based telework is unambiguous: countries with low Internet usage, such as most East European countries, display a lower share of home-based teleworkers than countries where Internet usage is more pervasive. Moreover, not only Internet usage directly relates to the extent of telework practice; it also relates to perceptions of non-teleworkers on the feasibility of their occupations for telework. Individuals from countries with low Internet usage and, therefore, limited teleworking, are less likely to deem their profession feasible for teleworking than persons from countries where Internet penetration is extensive. For example, data from the SIBIS project show that Bulgaria, with just over 25% of Internet usage, has 4% of home-based teleworkers, and 10% of non-teleworkers believing their job would be suitable for telework; on the contrary, in the Netherlands, where Internet usage totals roughly 75% of the population, there are 21% of employees are home-based teleworkers and 41% of non-teleworkers believe their job would to be suitable for telework. See Gareis *et al.*[188][189].

ICTs predominantly or exclusively for all stages of the work process, (2) whose working life is organised in a sequence of projects of varying duration –a few hours to several months, (3) who market their services on the open market via electronic means such as the Internet, (4) who collaborate with other eLancers for complex tasks, creating virtual organisations⁸³, and (5) who work where it suits them best (often in their own SOHO)⁸⁴.

eWork has been described as a new paradigm. Yet, despite the stacks of information available, the idea of eWork has often appeared muddled because of its many facets, and the different definitions given to them.

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⁸³ Virtual organisations are temporary networks of individuals, small companies or parts of larger corporations that: (1) are set up for a specific purpose (such as developing a product); (2) are made up of participants that are not located together in a central office facility, but each at a separate location, sometimes even across national borders; (3) put an emphasis on the core competence of the participating parties, which means that everybody does only what he can do very well; (4) rely heavily on communication via ICTs such as e-mail, Internet-based file transfer and messenger services; (5) have no common legal structure such as that of a company, joint venture or strategic partnership; and (6) rely on self-management and self-responsibility, made possible by a shared common goal; present a single identity towards customers, i.e. products and services are marketed just as if the organisation was a traditional company. See also [195].

⁸⁴ It must be noted that e-Lancing in the narrow sense is a very new concept, which concerns a small minority of workers. For this reason SIBIS further categorised e-lancers according to the activities they perform on-line: (1) starters are those who attract new business through ICTs or deliver work results through the Internet; (2) advanced e-Lancers who attract new business through ICTs and deliver work results through the Internet; and (3) occasional e-lancers are those who communicate with their clients exclusively by electronic means. See Gareis *et al.* [188] and RAND Europe *et al.* [189].

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4.12 Immaterialisation

Unlike other concepts presented in this glossary, “immaterialisation” is a very recent notion, to which less attention has, as yet, been given. Debates over the nature of immaterialisation are less than a decade old and are not as broad as other Information Society Technology (IST)—related areas.⁸⁵ Moreover, perhaps because it is not yet recognised as a legitimate area of study, strong disagreements among researchers have not yet become apparent. However, the lack of a well-established field of research should not hide existing and potential misunderstandings surrounding the meaning of immaterialisation already at this early stage. This short paper seizes the opportunity of developing a clearer definition of immaterialisation at a time when it is most needed—its infancy.

Immaterialisation is one way mankind struggles against the unsustainable increase of “the material and energy flows from nature through technosphere back to nature”, termed “societal metabolism”[196]. In other words, immaterialisation is a contributing factor to sustainable development. Many commonly accepted aspects of today’s lifestyle express people’s insatiable appetite for consumption. To the extent that these behaviours rely on limited natural resources, we appear to have given birth to a contradiction that must be resolved [197]. Modern debate over the sustainability of human economic and welfare developments dates back to the 1970s [198], but the concept of immaterialisation has come into serious discussion only recently, thanks in part to Malaska’s “Total Environmental Stress” (TES) theory [199] and the discussions it triggered [196][197][200].

According to Malaska changes in TES are attributable to more people (rate/A), more output per person; (rate/B), and/or more material used per unit of output (Rate/C). Hence, a simple formula (noted by Malaska as being the expansion of a logical tautology, i.e. definitely true) states that:

$$\text{Rate of Change of TES} = \text{rate/A} + \text{rate/B} - \text{rate/C}$$

Where:

rate/A=growth rate of population;

rate/B=growth rate of Gross Domestic Product/capita;

and

$$\text{rate/C} = \text{rate of change of resource productivity} \cdot \left(\frac{\text{Gross Domestic Product}}{\text{Material Flow}} \right)$$

Malaska then goes on to postulate three conditions which, together, will ensure that TES does not increase (i.e.: TES<0):

$$\text{Rate/A} < 0$$

$$\text{Rate/B} < 0$$

$$\text{Rate/C} > 0$$

From what is presented above, one would expect a decrease in material intensity of consumption (immaterialisation) to produce a decrease in “Rate/B”. This, in

⁸⁵ For further reading about eWork: Huws, U., Korte, W., and Robinson, S.[179].

principle, allows a distinction between consumption-related immaterialisation and resource productivity increases ($\text{rate}/C > 0$), which can be attained by using more eco-efficient technologies (i.e. technologies that produce more and better goods from fewer natural resources). The term “dematerialisation” typically refers to the exhaustion of fewer resources in producing a given bundle of goods and services, while immaterialisation refers to a change to a new bundle of goods and services whose production exhausts fewer natural resources [197][200].⁸⁶

Malaska, pursuing some suggestions made by Greiner *et al.* (1996), added a fourth factor to the equation—the annihilation of the “rebound effect”. This effect, more precisely called “rebound effect by sustainable development promoters”, is the possible excessive growth of world GDP-related material consumption as a consequence of dematerialisation achievements developed under market frameworks inadequately tuned to social and environmental externalities [201]. In other words, the rebound effect is the risk that increases in material consumption might negate or offset the resource savings brought by dematerialisation [199].

Without underestimating the relevance of the TES theory, which remains a milestone in the study of sustainability worldwide, it is true that the use of the terms “immaterialisation” and “dematerialisation” to describe two very different phenomena has led to some confusion. Moreover, some weaknesses of Malaska’s theory have been highlighted [196] and the scope of the term “immaterialisation” has been extended by two projects, “Achieving Sustainability by using Substitutive Information Society Technologies” (ASSIST) and Terra 2000 [197][200].

ASSIST provides a new understanding of immaterialisation by broadening its scope, and redefines rebound effects more specifically in terms of immaterialisation (“Rebound-I”) and dematerialisation (Rebound-D). While the substitution from material to less material clusters of satisfiers for human needs and wants remains at the core of the definition of immaterialisation, ASSIST places new emphasis on culture, informed consumer choices, lifestyle and Rebound-I.

Immaterialisation is a change in lifestyle (defined by patterns of consumption behaviour deriving from culturally informed perceptions and values), generated by a switch from physically based clusters of satisfiers for human needs and wants to alternative clusters of satisfiers that reduce the material element of the consumption involved. Thus, immaterialisation is a culturally determined, more often than not IST-led, switch in consumption behaviour, which allows consumers to increase the satisfaction of their desires (within their constraints), and probably at a lower cost. The possibility of spending less to meet similar desires allows people to spend more on all commodities; this income effect is referred to as “Rebound-I”. It is distinct from the “Rebound-D” substitution effect, resulting from technological changes that make environmentally scarce goods and services *relatively* less costly. While the Rebound-D effect means that the reduced price of dematerialised goods will increase the demand for these goods, thereby potentially wiping out all eco-efficiency gains, as Malaska and Greiner *et al.* feared, Rebound-I is the potential increase in material consumption as a consequence of consumers’ additional money to spend on goods which may or may not be immaterial [197][200].

⁸⁶ It is noteworthy that even the use of the term “eco-efficiency” can cause misunderstandings. For example, in his paper “Reducing Societal Metabolism”, Stephan Moll, defines eco-efficiency as a decrease in material intensity of consumption, which is immaterialisation.

As long as the contradiction between insatiable human consumption versus shrinking natural resources remains unresolved, immaterialisation is bound to remain on the top of political agendas across the world. In fact, immaterialisation is part of any answer to the dilemma, albeit hardly a panacea. It is clear that immaterial consumption cannot satisfy several basic human needs, such as food, drink and shelter. It follows that, today, immaterialisation is particularly important in developed nations and that, in the future, it will be so in the developing world, as their burgeoning middle classes shift consumption patterns away from basic needs towards the “[...] subtle and intricate absurdities of more sophisticated or ‘advanced’ economies” [200]. The nature of the needs that immaterial goods can satisfy has led some to describe the process of immaterialisation as an example of the importance of the service sector in today’s economies and the increased value consumers attribute to services as opposed to material goods [202]. In general, although immaterialisation per se is not a very recent phenomenon⁸⁷ (despite the fact that related research is), the birth of new ISTs and people’s increased use of them has the potential to push the process of immaterialisation ahead at an unprecedented speed. In turn, this process will limit environmental stress, also known as “societal metabolism”.

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⁸⁷ For example, the practice of watching a football match at a local bar may be considered as the immaterialisation of the process of physically walking or driving to the stadium, and the bar or the mega-screen might be considered as an “immaterial stadium”, see for example[203]

5 Glossary for Socio Economic Research in IST

The final glossary contains descriptions of all background concepts, key concepts and other terms of interest that are key to understanding socio economic research in the IST Programme. Its intend is to grow to become a more complete and a widely accepted “definition of terms” glossary for IST. The concepts are presented in alphabetical order. Additionally, a list of terms of art and their definitions is included.

5.1 Terms of interest

Table 3. Final Glossary for Socio-economic Research in IST

| Term | Definition |
|---------------------------|---|
| B2B | Business to Business – relates to transactions between businesses |
| B2C | Business to Consumer – related to transactions between business and consumer |
| Cyberspace | Word invented by the writer William Gibson in his play "le Neuromancien". It describes the virtual space in which the electronic data of worldwide PCs are generated and circulate. |
| Dematerialisation | Reducing the material ‘footprint’ of production, esp. through ICT Related to Immaterialisation |
| Digital Divide | the gap between businesses, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of purposes”. OECD (2001). Term used to refer to division of citizens in terms of their ‘proximity’ to the Information Society. It is a multi dimensional term that has been introduced in a range of studies and refers especially to divisions along ethnicity and income lines (though it may also have geographical and other dimensions). The division can combine: Motivation –groups differ in terms of their reasons to engage with the IS Access –wealth, infrastructure penetration, etc. may result in differential technical (outside the individual’s capability) ability to participate in the IS. Skills – differences in the possession of ICT skills. See: Key concept paper |
| Digital economy | Economy realised with the help of ICTs, and based around the implications of digitised information (low reproduction, transport costs, easy search, etc.). ” refers to an economy supported by intensive availability and use of ICT. The term is predominantly used in the United States as a synonym of eEconomy. Related to: eEconomy |
| Digital SME | An SME that exploits ICT to its full potential in a holistic manner, e.g. changing products and services, changing markets, changing relationships with customers, new types of value chain and forms of cooperation and alliance, new organisational and management configurations, new ways to manage knowledge, etc. There are three sub-categories: An SME whose products and services are predominantly digital An SME which uses digital methods as the primary means of carrying out core operations – marketing, sales, service etc., e.g. a pure dot.com An SME that exploits the benefits of digital methods to a significant extent. See: Key concept paper |
| Digitally literate | A person who is IT skilled to a level that makes it possible for him/her to participate |

| Term | Definition |
|--|---|
| <p>eBusiness</p> <p>eCommerce</p> <p>eDemocracy</p> | <p>in work and in society that involves the use of computers and internet.</p> <p>The processing business transactions through the use of ISTs, and Internet in particular. An eBusiness is not merely a business with a website; it uses technology to redefine old business models to maximise customer value. The integration of the Internet and other ISTs into business processes is what distinguishes an eBusiness from a regular business.</p> <p>Related to eCommerce.</p> <p>See: Key concept paper</p> <p>The processing of electronic transactions through electronic communication - that is, buying and selling goods or services online. eCommerce is understood to include all <i>external</i> business processes of electronic commercial transactions on the Internet, including shopping, selling, negotiation, contracting, digital financial transactions and (credit card) payment, invoicing and sometimes delivery of products and services.</p> <p>Related to eBusiness</p> <p>See: Key concept paper</p> <p>Broadly, Electronic Democracy (eDemocracy) refers to the processes and structures that encompass all forms of electronic communication between Government and the Citizen. Specific services fostering G2C interaction include: Email; comment, consultation; Email updates/lists; push technology; search; chat rooms; broadcast; personalisation. In a narrower perspective, eDemocracy refers principally to the processes and structures that encompass all forms of electronic communication between the Electorate and the Elected. As is typical of Electronic Governance, in order to enable all citizens and diverse communities of practice, expertise, interest, inter-dependence and conviction to plug in, it is essential to have basic access, to the requisite technology, which is affordable, in addition to having a literate population able to use the technology. eDemocracy is normally defined in relation to two main processes: eVoting (i.e. choosing representatives or between alternative policies) and eParticipation (i.e. citizen involvement in the process of government through information, consultation and debate).</p> <p>Related to eGovernance and eGovernment</p> |
| <p>eEconomy</p> <p>eEmployees</p> <p>eEmpowerment</p> | <p>Economy based on the wide use of information, knowledge and ICT (broad definition)</p> <p>Economy based on network technologies and B2B/B2C models (narrow definition)</p> <p>It is much broader than the related terms digital economy and Internet economy.</p> <p>Related to Information economy, Intangible economy, Internet economy</p> <p>See: Key concept paper</p> <p>Establishment have eEmployees if their managers employ any of the following:</p> <p>Home-workers using a telecommunications link to transmit work electronically who are engaged in customer services, telesales, DP/typing, software development/support, accounting, management/ training/HR, or design/editorial/creative work</p> <p>Multilocal workers (i.e. working partly from home and partly from the office or from clients' premises or on the move) in any of the above functions who use a telecommunications link to transmit work electronically, excluding mobile sales representatives</p> <p>Office-based staff working in back offices, call centres or other distant sites</p> <p>Staff working in a telecentre owned by a third party (non-domestic facility equipped with PCs and telecom links)</p> <p>Related to telework and eWork</p> <p>Government electronic interaction with citizens through <i>active participation</i>. Citizens enter into a partnership with government and actively engage in the policy-making process. "eEmpowerment" acknowledges a role for citizens in proposing policy options and shaping the policy dialogue, although the responsibility for the</p> |

| Term | Definition |
|-------------------------------|---|
| eEnabling | <p>final decision or policy formulation rests with government. Lastly, at the <i>on-line elections</i> stage, citizens eVote either to deliberate or to choose their representatives.</p> <p>Related to eDemocracy and eGovernment</p> |
| eEnabled self-employed | <p>Government electronic interaction with citizens at information level. Citizens may have access to governmental information through websites, search engines or electronic newsletters—all one-way relation tools; the information stage covers “passive” access to information on demand by citizens as well as “active” measures by government to disseminate information to citizens.</p> <p>Related to eDemocracy and eGovernment</p> |
| eEngaging | <p>Self-employed people who rely on the use of ICTs in order to carry out their business but who are not supplying digitised business services (ie who are not eLancers)</p> <p>Government electronic interaction with citizens at <i>consultation level</i>. through on-line forums, web-based complaint management, e-mail, newsgroups, polling, chats with individual political or administrative representative etc. At this level citizens and governments engage a two-way relationship in which citizens provide feedback to government, based on the prior definition by government of the issue on which citizens' views are being sought.</p> <p>Related to eDemocracy and eGovernment</p> |
| eEnvironment | <p>The impact of ICT (or IST) on the environment, for good or ill. On the positive side, ICT can help with market internalisation of environmental externalities, implementation of environmental policy and mobilization of civil society activities around environmental issues. It can also provide or facilitate technological responses to environmental problems (including substitution and amelioration). On the other hand, it can increase the efficiency and thus lower the user cost of environmental exploitation (including extraction) and thus worsen environmental problems through so-called 'rebound effects.'</p> <p>See: Key concept paper</p> |
| eEurope | <p>On 8 December 1999 the European Commission has launched an initiative entitled "eEurope: An Information Society for All", which proposes ambitious targets to bring the benefits of the Information Society within reach of all Europeans. The initiative focuses on ten priority areas, from education to transport and from healthcare to the disabled.</p> |
| eEurope Initiative | <p>See eEurope</p> |
| eGovernance | <p>EGovernance seeks to realise processes and structures for harnessing the potentialities of information and communication technologies (ICTs) at various levels of government and the public sector and beyond, for the purpose of enhancing Good Governance. As a concept eGovernance can be perceived to be contextually inclusive of Electronic Democracy (eDemocracy), Electronic Government (eGovernment) and Electronic Business (eBusiness).</p> <p>As an initiative at a national, governmental, or community level, eGovernance can be perceived within the context of a country's national information infrastructure (NII) which, in turn, can be perceived to be part of the emerging Global Information Infrastructure (GII).</p> <p>Related to eDemocracy/society, eGovernment, eBusiness</p> |
| eGovernment | <p>The use of ICT to improve the efficiency, effectiveness, transparency and accountability of government. This can be divided in various ways. One popular scheme divides communications with different parties:</p> <ul style="list-style-type: none"> • Citizens. This can be further divided to separate G2C (information access, eDemocracy, service delivery, etc.) and C2G (e.g. tax filing, census, etc.) or by ministry/sector of government activity (e.g. tax, health, safety, transport...) • Business. Again, can divide G2B and B2G, or divide by sector of government activity. • Other government agencies at the same 'level.' This means inter/intra- |

| Term | Definition |
|-------------------------------|---|
| | <p>agency communication.</p> <ul style="list-style-type: none"> • Other levels of government. This means communication between e.g. federal and regional/local government. • The wider public sector. This can subsume the 'other level' type, and can also be interpreted to include NGOs as well. • Foreign governments and supranational entities (including EU) <p>The latest European Commission definition of eGovernment is "eGovernment is the use of Information and Communication Technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies. (European Commission, 2003 'The role of eGovernment for Europe's future' Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Brussels, 26.9.2003, COM(2003) 567 Final.)</p> <p>Includes eGovernance and eDemocracy</p> <p>See: Key concept paper</p> |
| eHealth | <p>Any health related service provided / accessed remotely, usually via the Internet. Ranges in form from information provision, remote diagnosis and monitoring, to information transmission.</p> <p>Related to telemedicine.</p> <p>See: Key concept paper</p> |
| eLancing; eLancer | <p>Self-employment involving the delivery of digitised business services to clients using a telecommunications link; a person who works in this way</p> |
| eLeadership | <p>The scope and nature of government efforts to promote the networked world within a country and to promote the country as a regional or global centre in the networked world. (The current regulatory and institutional environment for eBusiness is rated under eBusiness Climate, below.) Key elements include:</p> <ul style="list-style-type: none"> • Priority given by government to promoting the development of an eSociety on a national level. • Extent of demonstrated progress on eGovernment, including efforts to automate governmental processes. • Quality of partnerships between industry leaders and government to improve eReadiness. • Level of effort to promote access for all citizens. |
| eLearning | <p>Using digital technologies to support both formalised educational and training activities as well as informal learning in a range of different settings. This can take place in real time (using video link or continuous connections to simulate a virtual presence) or asynchronously (using sporadic transmission to exchange pieces of information.) It can be referred to education or more general skills improvement and training. It can take place at a distance or in the same place.</p> |
| Electronic marketplace | <p>Often considered a synonym for B2B, an eMarketplace is a business destination which provides a broad offering of products, services and content, as well as avenue for business transactions including exchanges etc.</p> |
| Employability | <p>This term unifies both health perspective and labour market perspective. The former refers to the promoting individual's well-being through sound health and safety practices and reintegrating and rehabilitating the groups of workers most at risk of exclusion such as older workers and physically impaired workers. The latter refers to individuals' possession of the skills and the existence of retraining opportunities in the socio-economic context needed to allow people to change / get jobs, be self-employed. The concept of employability is relevant to determine whether or not someone is employable in today's competitive marketplace and knowledge economy, and if rehabilitative training is necessary (e.g. after the spell of illness or occupational injury, to help people with disabilities prepare for, obtain and maintain employment).</p> |

| Term | Definition |
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| ePayment | Whether government sites allow on-line payment of user charges, licence fees, etc. |
| eRegion | <p>Refers to the capability of different regions to adapt to the Information Society. It is used to highlight geographical areas where access to, participation in and progress towards the Information Society can be focused and measured. Location is still vital as the differences between places are becoming, if anything, more rather than less, important in the eEconomy. The delocalising potential of ICT means that even though some accessibility and interaction constraints on location decisions have been removed, other factors, typically internal regional characteristics, like labour markets, institutional structures and quality of life, are looked at much more closely in the decision-making process. Thus, the application of ICT leads to the re-prioritising of the specific uniqueness of regions.</p> <p>Related to Regional Cohesion and Digital Divide</p> <p>See: Key concept paper</p> |
| eSociety | <p>A society where the social structures (e.g. families) maximise possible advantages of the new Information Society and (therefore) a society where the digital divide is reduced to a minimum. It cuts across all levels of society, changing how individuals, the business community or governments behave, organise themselves and interact, and impacts on all aspects of life: social, economic, cultural, political, legal etc. As a result, it raises issues typical of any society, such as inclusion, exclusion, equality and sustainability.</p> <p>Related to eDemocracy, Digital Divide and social inclusion</p> <p>See: Key concept paper</p> |
| eOutsourcing | Outsourcing using a telecommunications link for receipt or delivery of digitised business services |
| eVoting | <p>eVoting (sometimes called electronic voting, online voting, or Internet voting) is an election system that uses encryption to allow a voter to transmit his or her secure and secret ballot over the Internet. Critics of electronic voting express concerns about Web security and the lack of equal access to the Internet for all citizens leading to a Digital Divide (SearchCRM.com).</p> <p>Related to eDemocracy</p> |
| eWork | <p>Any work which is carried out away from an establishment and managed from that establishment using information technology and a telecommunication link for receipt or delivery of the work. An establishment uses eWork if its managers do any of the following:</p> <ul style="list-style-type: none"> • Outsource, using a telecommunications link, customer services, telesales, DP/typing, software development/ support, accounting, management/training/HR, or design/editorial/creative work • Employ home-based teleworkers in any of the above functions, • Employ mobile teleworkers in any of the above functions, excluding mobile sales representatives • Have a remote back offices which is a call centre dealing with any of the above functions • Have employees working in a telecentre owned by a third party, which is a call centre. <p>Related to telework.</p> <p>See: Key concept paper</p> |
| Flexible work | <p>Working schemes giving the employee different options regarding the time and/or place of work rather than having strict working hours and places.</p> <p>Related to eWork</p> |
| G2B | Government to Business - related to transactions between government and business |
| G2C | Government to Citizen - related to transactions between government and consumer |

| Term | Definition |
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| G2G | Government to Government - relates to transactions within government |
| Globalisation | Globalisation refers to the process of ongoing and often rapid increase in world-wide flows of various kinds, including people, traded goods and services, finance and ideas |
| Globally networked knowledge society (GNKS) | <p>The GNKS represents a looked-for future improvement to the Information Society in which access to networks will become globally ubiquitous and information will mature to knowledge.</p> <p>This term is introduced by Terra 2000 to distinctively describe the subject of study, in which global, networking and knowledge are key elements useful to focus beyond the term information from a policy perspective.</p> |
| ICT | Information and Communication Technologies concerns the technologies for storage, processing, representing and transmitting information between humans, between humans and machines and between machines. |
| ICT literacy | The possession of basic skills in operating digital information and communication technologies, e.g. the knowledge how to operate standard word processing programmes using a personal computer, how to use e-mail and how to retrieve information on the world wide web. |
| Immaterialisation | <p>Reducing the material 'footprint' of consumption, especially through ICT</p> <p>Immaterialisation is characterised by a 'switch' in consumption behaviour from more material to less material.</p> <p>Related to dematerialisation</p> |
| Information | Structured and formatted data that remain passive and inert until used by those with the knowledge (see below) needed to interpret and process them. The cost of replicating information is the cost of making copies. |
| Information Economy | <p>The Information Economy is concerned with the penetration of information (codified knowledge) into the economy. This includes the increasing 'information-richness' of production and distribution e.g. ICT and the automation of production processes using computers. It also includes the increasing information-content of goods and services, the substitution of information for goods and services and realignment of roles and responsibilities organised around easy access to masses of information. The OECD uses "information economy" to highlight the impact of rapid ICT growth and development on many economic and social changes.</p> <p>Related to eEconomy, Intangible economy, Internet economy</p> |
| Information Society | <p>The IS is 'powered' by the Information Economy, but involves rapid, broad and deep access to and exchange of information among all elements of society.</p> <p>See background section</p> |
| Intangible Economy | <p>That portion of the economy engaged in development, production and distribution of intangibles (sometimes 'information goods and services')</p> <p>See eEconomy, Information economy, Internet economy</p> |
| Internet economy | <p>That part of the economy that is dependent on and building wealth on the Internet.</p> <p>See eEconomy, Information economy, Intangible economy</p> |
| IST | <p>Abbreviation of Information Society Technologies. This represents the collective domain of society and technologies affected by the introduction of new technologies.</p> <p>It is also the name of IST Research Programme, part of the Framework Programme for European Research, managed by the European Commission DG Information Society.</p> |
| IST Proposition | <p>The new technologies of the Information Society (ISTs) seem likely to offer scope to enable economic growth, and to allow a more equitable distribution of wealth, without necessarily increasing consumption, pollution and energy use.</p> <p>This is the proposition tested explicitly by Terra 2000, and implicitly by other projects, analysing whether and/or under which circumstances a positive outcome could be expected, and/or how the positive effect could be maximised.</p> |

| Term | Definition |
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| Knowledge | A cognitive capability to understand and use information for intellectual or physical action. |
| Knowledge (based) economy | That portion of the intangible economy engaged in the production, distribution and use of knowledge. However, the importance of ICTs does not define knowledge-based economies – rather, increasing importance of knowledge makes ICTs more attractive, and ICT availability makes knowledge (or at least information) easier to incorporate in goods, services and business processes. |
| LFR (Less Favourite Region) | This term refers to regions in the European Union which are lagging behind in terms of development or which are (in need of) undergoing (economic) restructuring. These are known as Objective 1 and Objective 2 status regions respectively. Related to eRegion |
| Networking | Networking refers to the virtual and physical connections between people and/or systems that enable communication (information exchange), measured in both quantitative and qualitative terms. Mere connectivity (being able to transmit messages) is necessary but not sufficient for networking. |
| Network Economy | The Network Economy refers to the economics of network development and provision and to the impact of networking on the operation of the economy. Related to eEconomy |
| Network externalities | Positive feedback leading to rapid growth in some areas, uneven distribution across regions, sectors, and potential changes to 'divides.' Possibility for bias for or against certain kinds of technological change, and too much or too little volatility in response to technology shocks. |
| Network Society | The Network Society is a focused look at the Knowledge Society that considers the question of how knowledge propagates, creates new structures and interacts, i.e. to the creation, diffusion and operational aspects of knowledge. |
| Network Theories | Range from the more instrumental human-computer interface approach, which only sometimes considers the effect of technology on its users, to the intellectually speculative actor-network theory, which proposes a fundamental re-assessment of the boundaries between human and non-human nodes in social and technological networks. It is not appropriate here to develop the structure of network theories, which have a large and complex literature. Not unlike system theories, they provide a foundation for how to think about a collection of issues that requires a substantial period of reflection and personalisation before the individual researcher or practitioner can effectively employ them. Internet resources for the examination of actor network theory may be found at Martin Ryder's site at City University of Denver, Colorado ⁸⁸ |
| New Economy | Can refer to specific sectors, or to the economy as a whole, transformed by new technology and the new dynamics and types of economic interaction that they facilitate. |
| Regional Cohesion | A focus on the new role of regions in the New Economy and Information Society. It recognises geographic, language and cultural diversity as important assets, which can complement trends towards the Europeanisation and globalisation of the economy. Related to eRegion |
| Social disadvantage | An adverse outcome of social and economics processes (e.g. social exclusion, the adverse effects of the free market) with individuals and / or groups of people experiencing some observable difficulties |
| Social exclusion | The term relates to those individuals and groups of people whose quality of life and ability to fully participate in society is severely curtailed. Although doing it this way is not necessarily correct in sociological arena, for the purpose of simplicity and consistence it is defined as an opposite of social inclusion – it is visible in terms of distance / gap, it negates a sense of belonging / creates the sense of alienation, |

⁸⁸ www.carbon.cudenver.edu/~mryder/itc_data/act_net.html, and Gary Perlman's site www.acm.org/~perlman/ offers a resource guide for the human-computer interface literatures (accessed 22 June 2003).

| Term | Definition |
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| Social Inclusion | <p>and it is a process that adversely affects particular groups / individuals in a society. In the real life, it is manifested when individuals and / or group(s) of people are experiencing (usually a combination of linked) problems such as unemployment, poor skills, low incomes, poor housing, high crime environments, bad health, at a higher than average rate. The normal cause and effect path does not apply to the concept of social exclusion: its causes are interconnected, and its effects themselves become causes of further exclusion; for example, poverty is both a key cause of social exclusion and its key effect.</p> <p>It is also defined as a process whereby any person becomes marginalized in society on the basis of ethnicity, gender, disability employment status or any other attribute.</p> <p>Participation of all European citizens in the digital economy because they have the information tools and skills that are necessary. Achieving social inclusion depends on mitigation of the digital divide (between the 'haves' and 'have-nots'). It encompasses not just technology literacy, skills and competence but also access, affordability and awareness issues.</p> <p>A complex, context-dependent social phenomenon that is discernible and defined at three levels:</p> <ul style="list-style-type: none"> • Proximity (defined as a "distance" or "gap", either social or economic) • A sense of belonging / acceptance / positive reciprocity/ having positive interactions with the rest of society • The process conducive to the enhancement of capacities, capabilities, and competencies of groups and individuals. |
| Sustainable development | <p>Sustainable development means achieving a quality of life (or standard of living) that can be maintained for many generations because it is:</p> <p>Socially desirable, fulfilling people's cultural, material, and spiritual needs in equitable ways</p> <p>Economically viable, maintaining adequate levels of welfare without undue inefficiency, volatility or progressive increase of debt over time</p> <p>Ecologically sustainable, maintaining the long-term viability of supporting ecosystem. Because the future is uncertain and technology continues to develop, sustainable development must be resilient and flexible as well</p> <p>Related to eEnvironment</p> |
| Sustainability | <p>Sustainability means the extent to which a system (the physical environment, societal system, economy, culture, etc.) <u>can be sustained</u> (continue to function effectively and coherently) and the extent to which a system <u>sustains human life</u> (see definition of sustainable society). There are many definitions. Most deal with nature, the economy, society, culture or, most often, some combination of these. Most are not about maintaining life precisely as it is today; rather, they envisage substitution away from scarce resources, adaptation to changing circumstances and resilience in the face of shocks. They deal with rates of change rather than levels, and fairness (equity) among generations and regions in addition to efficiency. Many see sustainability as a continually evolving process. It is certainly a property of systems rather than their individual components.</p> <p>Related to Sustainable development and eEnvironment</p> |
| Sustainable society | <p>A society is sustainable if it is capable of helping its members (and, though them, the world) to enjoy fulfilling (other adjectives possible) lives into an uncertain future</p> |
| Telecommuting | <p>Teleworking with the objective to avoid the commute to the office.</p> |
| Tele-Learning | <p>eLearning using telecommunication means to get access to learning facilities at another location.</p> |
| Telemediated | <p>A service or employment relationship is described as 'telemediated' if it involves content which is transmitted by means of telecommunications</p> |
| Telemedicine | <p>Telemedicine is the location independent and technology mediated delivery of care to patients where critical medical expertise is combined with appropriate ICTs. The term care is used broadly and comprises for example, the transmission of</p> |

| Term | Definition |
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| <p>Teleservice</p> <p>Telework</p> | <p>information to provide that care. It also includes the diagnosis, treatment, monitoring, and education of patients using systems that allow ready access to expert advice and patient information. It involves a spectrum of technologies including facsimile, medical data transmission, audio-only format (telephone and radio), still images, and full-motion video. Robotics and virtual reality interfaces have been introduced into some experimental applications. Telemedicine should be understood as a process, not just a technology that enhances the proximity of the expert knowledge and the patient.</p> <p>A service provided from a remote location using the telematics infrastructure.</p> <p>Work carried out using the telematics infrastructure at a place other than that where the results are needed. This can take place in real time (using continuous connections to simulate a virtual presence) or asynchronously (using sporadic transmission to exchange pieces of information).</p> <p>More specifically, the following organisational forms of telework can be distinguished:</p> <ol style="list-style-type: none"> 1) Permanent home-based telework: employees who spend more than 90% of their working time at home 2) Alternating home-based telework: employees who spend at least one full working day but less than 90% of their working time at home 3) Mobile telework: Frequent business travellers who work at least 10 hours per week away from home and the main place of work and use online communication links to their business when doing so 4) Telework of self-employed: freelancers or self-employed whose main place of work is at home or who claim not to have a main place of work and who use ICT as a major means of exchange with their client(s) 5) Supplementary telework: Type of home-based telework where employees do not spend regular working hours at home, but carry out additional tasks or only occasionally work from home <p>Related to eWork</p> |
| <p>Virtual and Smart Organisation</p> | <p>Virtual and Smart Organisation (VSOs) are effectively networked digital SMEs. The goal of these organizational structures is to distribute decision-making authority by flattening the traditional pyramidal organizational hierarchy and moving from a top-down, linear, station-to-station, command-and-control structure, to an organization structured as a multi-dimensional capabilities matrix.</p> <p>Related to Digital SME</p> |
| <p>Virtual Communities</p> | <p>Social communities of interest using computer-mediated communication to interact with individuals at a cyberspace location. 'A vast array of motives may govern the formation of these virtual communities, in principle they may embrace every human interest and pursuit – even pursuits that cannot be conducted on the Internet can be discussed, analysed, annotated, and promoted using the Internet – e.g. windsurfing or mountain climbing</p> |
| <p>Virtuality Theories</p> | <p>Propose that the processes of Information Society interaction that occur outside of the traditional communication channels may convey new potentialities or realisations of human experience. Turkle (1995) argues that the capacity to filter one's identity through computer-mediated communication provides a new range of freedoms and terrors for individuals and suggests that information society technologies provide a tool for self-authoring of identity. Mitchell (1996) indicates that the 'spaces' that information society technology users pass through in the course of communicating with one another or searching for information are partially defined by traditional understanding of architectural spaces such as the piazza or the drawing room while the same technological medium provides entirely new architectural potentials. (Rheingold (1993) draws attention to the unique capacities for 'assembly' and 'connection' that support what he contends is the construction of a new form of social community, the virtual community. The three authors cited here all are making the contention that the capacities offered by information society technologies provide the basis for augmenting existing human capacities that amount to the creation of unique forms of human experience.</p> |

5.2 Terms of art

Table 4. Final Glossary for Socio-economic Research in IST

| Term | Definition |
|----------------------|---|
| Best Practice | The best examples of practice, e.g. which methods, tools, organisation, systems, technology, etc., were used to achieve the excellent performance seen. Such examples should also imply ease of transference to other situations and contexts where users have similar objectives and should facilitate learning by them. Best practice needs to be reserved for rigorous frameworks of performance measurement where all stakeholders can agree the indicators and agree their application. |
| Case Study | Description of a specific situation and application of methods in a particular context, typically in a programme or a project through qualitative methods. |
| Good practice | <p>Good practice is highly successful practices which represent leading edge experience, though not necessarily the best, ideal or unproblematic. Good practices are also those which can provide useful learning experiences for others, likely to stimulate creativity, ingenuity, self reflexivity and the transfer of good ideas. Good practice is thus defined in a qualitative sense, i.e. that:</p> <ul style="list-style-type: none"> • the case has a beneficial impact on its environment and in relation to its espoused objectives, as demonstrated and documented by the case, and as validated by an expert team, owner of the case and ultimately by the user of the knowledge base • the case provides relevant and useful learning points and lessons, which act as a reservoir of ideas, guides, checklists, etc., of good practice which others can use as input to their own learning and implementation processes. |
| Model | A model is a simplified description of reality. A model is a system of postulates, data, and inferences presented as a mathematical description of an entity or state of affairs |
| Objective | A desired end-point, a desired outcome or result of a set of action |
| Policy lever | A class of policy actions that can be chosen to help to achieve a specific end, which is relevant and may have substantive impact. |

6 Next steps

As explained in the introduction, this glossary consists of words or expressions and the special or technical meanings that they have in the Information Society. However, because of the dynamic nature of both language and the Information Society this Glossary is subject to change. The key concept papers discussed how terms have evolved over time and how they might have had different connotations in history as they have at present. Hence, although named 'final glossary', the definitions will inevitably change in the future due for example technological developments. This glossary will thus require regular updates in the future. For this reason, and to allow the glossary to be valuable for socio-economic research in the Information Society, the list should be kept on-line in electronic format, and improvements will be implemented regularly. This effort has functioned as a starting point for a better understanding and a common language for IST research.