THE EVOLUTION OF THE DIGITAL DIVIDE IN EUROPE

Carmen Boje, Gary Steffen, and Nicolae-George Dragulanescu

Indiana University Purdue University Fort Wayne, Indiana; Email: bojec@ipfw.edu
Indiana University Purdue University Fort Wayne, Indiana; Email: steffen@ipfw.edu
University Polytechnics, Bucharest, Romania; Email: nicudrag@artelecom.net

ABSTRACT

During the last several years, Information and Communication Technologies (ICT) have become increasingly more accessible and more affordable to the public. However, there is still a growing gap between the "haves and have-nots".

Eurostat, a European community survey, focuses on the magnitude of the digital divide in different countries of Europe. Although Internet usage and participation in e-commerce grew, the gap between groups is widening. Possible explanations are: different levels of education, age differences, economy and degree of urbanization. One of the many ways to close the gap is to make the Internet available for use in schools, public libraries, and work.

1. DEFINITION

The "digital divide" has been defined as a gap, between individuals, groups and enterprises that have access to information and communications technologies (phones, TV sets, computer, Internet) and those who do not. In other words, it is *the gap between the have´s and the have not´s* (De Munster, 2004), (Lor, 2003). For the last ten years the term 'digital divide' has become a familiar way of expressing the wide variations in access to ICT across the world (Orbicom, 2005).

2. INTRODUCTION

Despite increasing levels of ICT usage in all regions and within all sections of society, the digital divide in Europe still exists, says a new report by Eurostat (Demunter, 2005a). Eurostat took a close look at the situation in most European Economic Area (EEA) countries to determine how much of this so-called digital divide persists within the EEA, and how it is evolving (Farrell, 2005).

Eurostat interviewed 204,029 people for its survey and the resulting report said that despite efforts by European Union (EU) countries, a gap remains between users and non-users or between 'haves' and 'have-nots'.

Use of computers and Internet is highest in the Nordic countries, especially in Sweden

and Iceland at more than 80%. The lowest rates are reported in the candidate countries (Bulgaria, Romania and Turkey). Within the EU, Internet use drops below 25% in only one Member State, Greece. In most of the new Member States, about one in three individuals uses the Internet (Demunter, 2005a), (Farrell, 2005) (see fig 1).

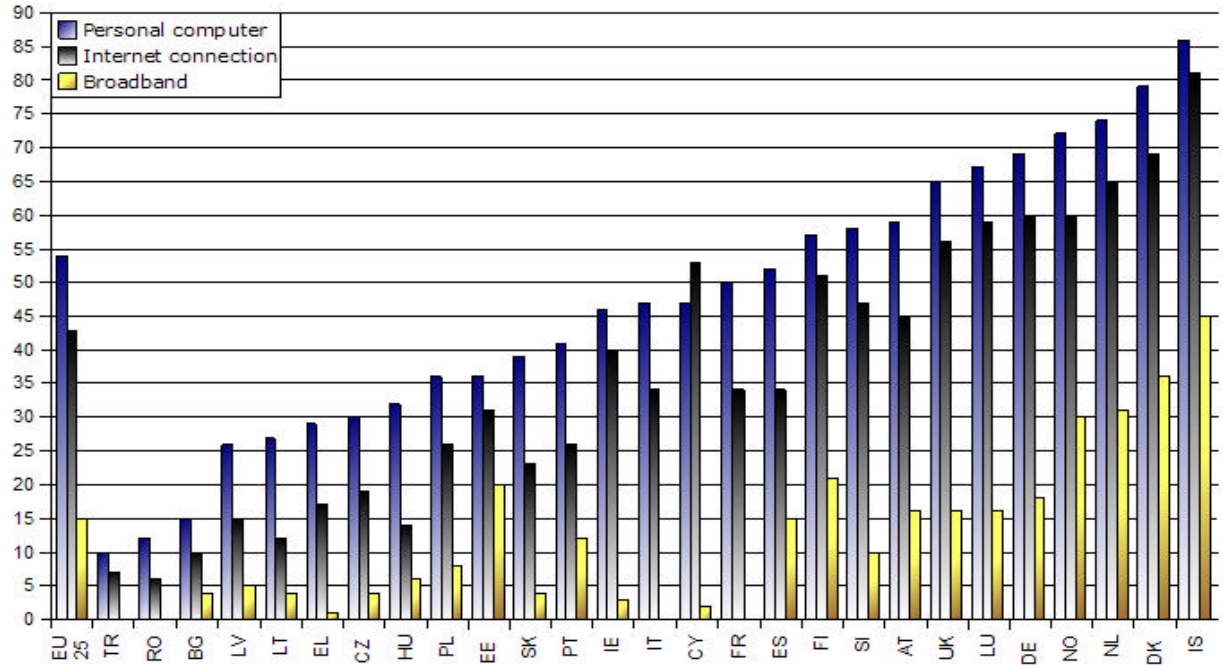

Fig. 1 - Percentage of households with a PC, internet connection and broadband, by member state

Source: Eurostat, Community survey on ICT usage in households and by individuals
Graph: EurActiv.com[1]

[1] **Abreviations**

EU or EU-25 (European Union, including the 25 Member States);

AT (Austria), BE (Belgium), BG (Bulgaria), CY (Cyprus), CZ (Czech Republic), DK (Denmark), DE (Germany), EE (Estonia), EL (Greece), ES (Spain), FI (Finland), FR (France), HU (Hungary), IE (Ireland), IT (Italy), IS (Iceland), LV (Latvia), LT (Lithuania), LU (Luxembourg), MT (Malta), NL (Netherlands), NO (Norway), PL (Poland), PT (Portugal)SI (Slovenia), RO (Romania), SK (Slovakia), SE (Sweden), UK (United Kingdom) , TR (Turkey).

Table 1: Individuals' use of computers, Internet and e-commerce (2004)
(as percentage of total number of individuals aged 16 to 74)

Table 1 – Households' access to ICTs (2004)
(as percentage of total number of households with at least one member aged 16 to 74)

	EU25	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT	LU	HU	NL	AT	PL	PT	SI	SK	FI	UK	BG	RO	TR	IS	NO
Personal computer at home																												
All households	54	30	79	69	36	29	52	50	46	47	47	26	27	67	32	74	59	36	41	58	39	57	65	15	12	10	86	72
With dependent children	70	51	:	91	52	43	:	:	61	62	52	38	44	76	60	:	80	52	61	84	50	85	82	22	:	11	94	92
Without dependent children	46	17	:	62	21	19	:	:	34	40	43	19	13	60	18	:	51	22	26	34	30	48	57	11	:	8	74	62
Densely-populated areas	58	33	81	70	44	39	59	53	:	51	52	32	41	61	40	74	59	42	48	64	48	59	63	:	:	:	n/a	74
Intermediate areas	57	28	82	67	n/a	26	50	54	:	45	54	23	n/a	70	36	74	59	:	38	61	39	56	74	:	:	:	87	71
Thinly-populated areas	44	27	75	67	33	22	41	43	:	41	38	20	18	76	25	73	58	25	32	54	35	52	62	:	:	:	83	71
In Objective1 regions	42	28	n/a	63	36	29	47	:	46	42	n/a	26	27	n/a	32	78	55	36	41	58	:	48	61	n/a	n/a	n/a	n/a	n/a
Outside Objective1 regions	64	42	79	70	n/a	n/a	59	:	n/a	50	47	n/a	n/a	67	n/a	74	59	n/a	n/a	n/a	:	59	66	n/a	n/a	n/a	n/a	n/a
Internet connection at home																												
All households	43	19	69	60	31	17	34	34	40	34	53	15	12	59	14	65	45	26	26	47	23	51	56	10	6	7	81	60
With dependent children	55	33	:	82	46	23	:	:	51	43	57	22	18	66	25	:	62	34	39	67	29	77	71	14	:	7	91	84
Without dependent children	38	11	:	53	17	12	:	:	30	30	49	10	6	53	9	:	38	19	16	28	19	42	48	8	:	6	66	49
Densely-populated areas	46	24	72	61	41	23	40	37	:	38	57	20	20	50	24	64	47	31	32	44	31	53	53	:	:	:	n/a	60
Intermediate areas	46	20	72	59	n/a	19	31	38	:	32	54	11	n/a	62	16	65	42	:	24	54	23	49	65	:	:	:	82	61
Thinly-populated areas	32	15	65	59	26	12	22	26	:	27	45	10	6	72	7	66	44	15	18	43	21	45	54	:	:	:	77	60
In Objective1 regions	29	17	n/a	51	31	17	27	:	40	29	n/a	15	12	n/a	14	65	39	26	26	47	:	40	48	n/a	n/a	n/a	n/a	n/a
Outside Objective1 regions	55	35	69	62	n/a	n/a	42	:	n/a	37	53	n/a	n/a	59	n/a	65	45	n/a	n/a	n/a	:	54	57	n/a	n/a	n/a	n/a	n/a
Broadband connection at home																												
All households	15	4	36	18	20	>1	15	:	3	:	2	5	4	16	6	31	16	8	12	10	4	21	16	4	:	0	45	30
With dependent children	18	7	:	26	29	0	:	:	4	:	2	7	6	18	11	:	20	11	18	15	4	36	22	6	:	:	55	40
Without dependent children	12	3	:	16	12	0	:	:	2	:	2	4	2	15	3	:	14	5	8	6	3	16	13	3	:	:	32	26
Densely-populated areas	19	8	41	20	33	0	20	:	:	:	4	9	7	13	11	36	26	12	20	15	7	25	18	:	:	:	n/a	43
Intermediate areas	16	3	40	18	n/a	0	14	:	:	:	0	2	n/a	19	6	29	14	:	7	14	3	18	15	:	:	:	54	34
Thinly-populated areas	8	2	26	13	15	0	6	:	:	:	1	2	1	19	2	25	9	1	4	5	2	12	9	:	:	:	32	23
In Objective1 regions	8	3	n/a	10	20	0	12	:	3	:	n/a	5	4	n/a	6	30	12	8	12	10	:	16	9	n/a	n/a	n/a	n/a	n/a
Outside Objective1 regions	21	12	36	20	n/a	n/a	19	:	n/a	:	2	n/a	n/a	16	n/a	31	16	n/a	n/a	n/a	:	23	17	n/a	n/a	n/a	n/a	n/a

Source: Eurostat, Community survey on ICT usage in households and by individuals.
Notes: (i) Data not available for BE, MT and SE. (ii) Percentages for EU-25 are based on the available EU countries; different subsets of countries may have been used depending on the subject or breakdown. (iii) Degree of urbanisation: estimates for PL (non-comparable two-category breakdown) and UK (degree of urbanisation only available for 87% of the sampled households).

The acceptance of information technology and the take-up of internet usage and of broadband, in particular by people with lower levels of education, senior citizens and people living in rural areas, are regarded as essential in overcoming disadvantages that these groups are facing on labor markets and in society.

Within the countries, the digital divide is mainly a matter of age and of education level (Demunter, 2005a) as you can see in Fig. 2.

While more than 80 % of higher-educated EU citizens use a computer and three quarters of this population group use the internet, people with a lower level of education are only about one third as likely to use any of the two (Only 25 % of those who had not completed secondary school used the Internet and 52 % for those who attained a secondary school diploma) (Demunter, 2005a), (see Fig. 2).

The gender gap, which was considerable in the early days of the internet, is no longer so prominent (Demunter, 2005a), (see Fig. 2).

Considering the degree of urbanization, computer and internet usage are still about 12 % lower in thinly-populated rural areas throughout the EU (Demunter, 2005a), (see Fig. 2).

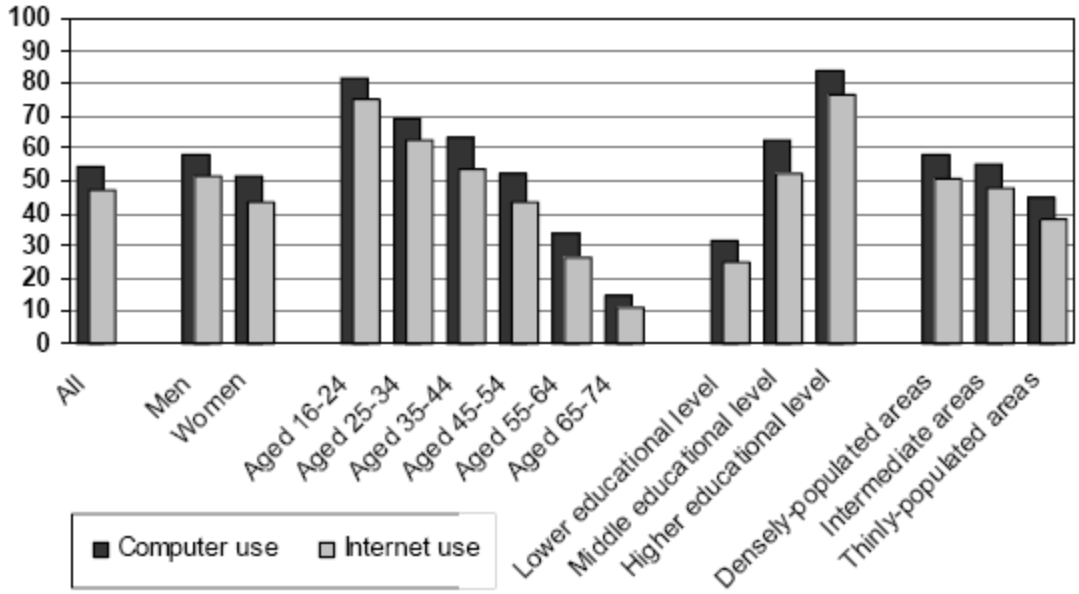

Figure 2: - Individuals' use of computers and Internet (2004), EU-25
(as percentage of total number of individuals aged 16 to 74)

Source and graph: Eurostat, Community survey on ICT usage in households and by individuals

In all age groups, about 5 % of the population start using the internet each year, but this takes place at a much lower level for senior citizens and people with a lower education level. For the latter, the growth in internet usage is more sluggish than for the average. Growth rates are also slower for less prosperous regions than for those that already have good infrastructure (Demunter, 2005b).

The largest gaps between higher and lower educated groups were found in Portugal, Slovenia and Spain, with a gap of 70, 68 and 61 percentage points respectively. Gaps were smallest in Lithuania, Sweden and Germany, which recorded a difference of 11, 24 and 25 percentage points respectively (Xinhuanet, 2005).

In all member states for which data was available, the highest proportion of internet use during the first quarter of 2004 was recorded for students; the average for the EU was 85 % (Demunter, 2005d), [13] (see Table 2). The highest ratios were registered in Finland (97 %), Sweden and Denmark (both 96 %), with the lowest in Greece (55 %), Ireland (57 %) and Italy (74 %). Across the EU, employees generally registered the second highest proportion of internet use. The highest levels were observed in Sweden (86 %), Denmark (83 %), the Netherlands and Finland (both 82 %); the lowest were in Greece (28 %), Lithuania and Hungary (both 33 %) (Demunter, 2005d), (Tilak, 2005), (see Table 2).

In nearly all member states a lower proportion of the unemployed, as compared to the employed, used the internet in the first quarter of 2004 (Demunter, 2005d), (Tilak, 2005), (see Table 2). Just 40 % of the unemployed used the net, compared to 60 % of those with a job. Eurostat said low

internet use was caused by "missing infrastructure or access; missing incentives to use information and communications technologies; lack of the computer literacy or skills necessary to take part in the information society." (Demunter, 2005a).
Internet use amongst the unemployed ranged from 8 % in Lithuania and 10 % in Latvia to 86 % in Sweden and 76 % in the Netherlands (Tilak, 2005).

Table 2: Internet usage by individuals (2004)

	Total	Employment status				Level of education		
		Students	Employees	Unempl.	Retired	Low	Medium	High
EU25*	**47**	**85**	**60**	**40**	**13**	**25**	**52**	**77**
Belgium	:	:	:	:	:	:	:	:
Czech Republic	32	81	39	14	3	24	28	74
Denmark	76	96	83	65	34	64	76	91
Germany	61	94	74	57	23	51	61	76
Estonia	50	92	59	32	7	42	45	69
Greece	20	55	28	13	1	4	28	48
Spain	40	90	52	37	6	16	61	77
France	:	:	:	:	:	:	:	:
Ireland	34	57	42	17	11	16	38	59
Italy	31	74	42	29	6	13	51	71
Cyprus	32	81	35	49	7	13	30	61
Latvia	33	79	41	10	2	19	29	64
Lithuania	29	87	33	8	1	27	21	38
Luxembourg	65	94	76	42	32	41	75	87
Hungary	28	87	33	17	3	13	45	68
Malta	:	:	:	:	:	:	:	:
Netherlands	69	90	82	76	54	:	:	:
Austria	52	93	63	43	15	32	54	78
Poland	29	81	36	17	6	28	23	67
Portugal	29	91	37	15	3	14	73	84
Slovenia	37	86	48	19	4	16	36	84
Slovakia	46	83	53	24	6	22	52	76
Finland	70	97	82	62	20	54	71	89
Sweden	82	96	86	86	45	70	79	94
United Kingdom	63	94	74	51	24	28	69	87
Bulgaria	16	58	19	6	1	7	14	37
Romania	12	51	19	8	1	1	10	50
Turkey	13	53	27	21	3	4	30	60
Iceland	82	100	85	:	29	75	84	96
Norway	75	99	85	63	33	43	74	91

* EU25 excludes Member States for which data is not available.
: Data not available

In all member states the lowest proportion of internet use was observed for the retired. In thirteen member states less than 10 % of the retired used the internet, while only in the Netherlands (54 %), Sweden (45 %), Denmark (34 %), and Luxembourg (32 %) was the proportion more than a

quarter. These gaps are consistent with those found by age, where the proportion of internet users among those aged 16 to 24 was three times higher than for those aged 55 to 74 (Tilak, 2005).

ICT is on the increase in all groups

The following graphs (Fig. 3) show the evolution of the gap over time by comparing the 'upper' and 'lower' subgroups for selected points (Demunter, 2005a).

The results show that, although Internet use is growing within all of the groups considered (age, educational level, region, enterprise size), the difference or gap between groups tends to remain stable over time in terms of percentage points. However, the probability of being on the Internet is growing at a slower rate, the relative divide is actually widening. Youths highly educated and households in economically more prosperous regions are consolidating their leading position in the information society.

Among enterprises, the gap between small and large enterprises is closing in terms of percentage points, partly because large enterprises are close to saturation point (Demunter, 2005a). Almost all larger companies are using the internet, and the smaller ones are closing the gap at a fast pace.

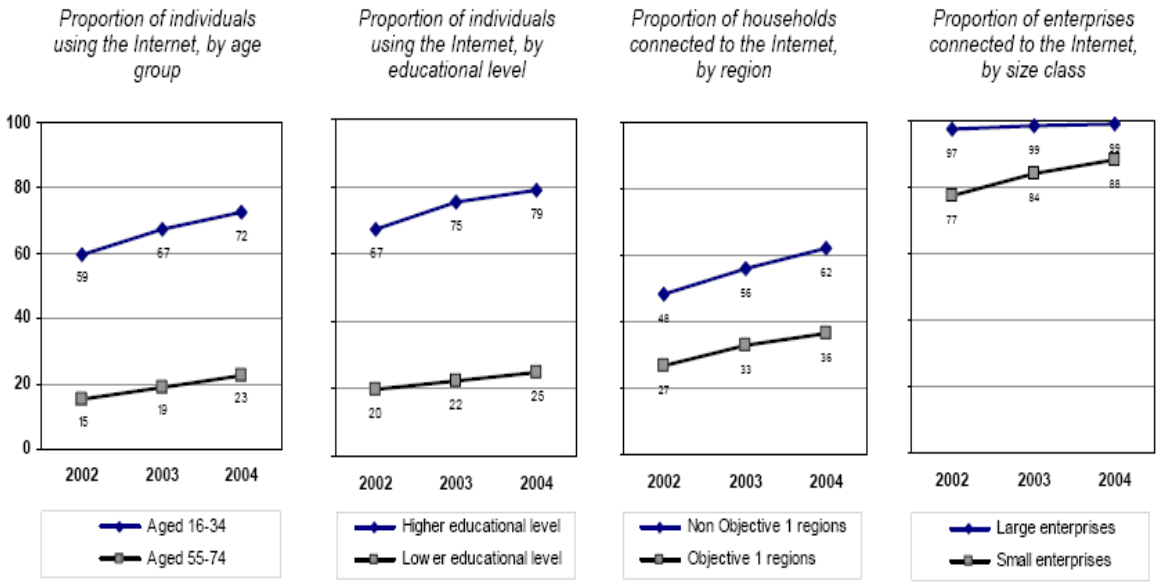

Fig. 3 - Evolution of the digital divide (2002, 2003, 2004)

Source and graphs: Eurostat, Community survey on ICT usage in households and by individuals and Community survey on ICT usage and e-commerce in enterprises.

3. HOW TO BRIDGE THE DIGITAL DIVIDE?

3.1. Philips develops low cost mobile phones (Orbicom, 2005)

Royal Philips Electronics (Philips) has announced the opening of a global research and development (R&D) centre in Shanghai, China. The ULC Design Center will be focused on the development of ultra low cost (ULC) mobile phones for emerging markets with Philips' Nexperia Cellular System Solutions.

The new centre, the company said, is part of an initiative to address growing consumer demand for low-cost mobile communications in China, India, Africa, South America and Eastern Europe. Phillips hopes to drive total handset costs in these areas below $15 by 2008.

The ULC Design Center will work closely with Philips' European design facilities and the Innovation Campus based in Bangalore, India, to develop handsets with a retail price under $20.

Citing studies by the World Bank, the company claimed that while 77 % of the world's population lives within range of a mobile network, only 25 % subscribe to a mobile service. By offering handsets below $20, Philips hopes to bring mobile solutions to a customer base that includes approximately 3.3 billion people.

The first ultra low cost handsets based on the Nexperia solution will reportedly offer voice, SMS and basic multimedia capability with a black and white screen, providing basic functionality at a low cost.

3.2. 60% of Europeans to have 3G handsets by end of 2010 (Tilak, 2006), (http://www.3gnewsroom.com/html/about_3g/what_is_3g.shtml, 2005)

3 G is a radio communication technology that will create a "bit pipe" for providing mobile access to internet-based services. It will enhance and extend mobility in many areas of our lives (http://www.3gnewsroom.com/html/about_3g/what_is_3g.shtml, 2005).

In the near future, mobility won't be an add-on: it will become a fundamental aspect of many services. We'll expect high-speed access to the internet, entertainment, information and electronic commerce (e-commerce) services wherever we are - not just at our desktop computers, home PCs or television sets (http://www.3gnewsroom.com/html/about_3g/what_is_3g.shtml, 2005).

3G Wireless combines a mobile phone, laptop PC and TV. Its features includes: Phone calls/fax, Global roaming, Send/receive large email messages, High-speed Web, Navigation/maps, Videoconferencing, TV streaming, Electronic agenda meeting reminder.

3 G supports new, flexible working practices where employees need access to a wide range of information and services via their corporate intranets, whether they are at their own desk or anywhere else: Employees who spend some of their working at home, Accountants that carry out audits at client premises, on-site maintenance engineers who need access to detailed instruction

manuals, mobile emergency services who need a video link with a hospital or doctor for specialized advice.

Sixty percent of Europeans will own a 3G (3rd Generation) mobile phone by the end of 2010, predicts a report from technology market analysis company Forrester Research. While 2004 saw the widespread emergence of commercial 3G services in Europe, 3G will not become the dominant technology for mobile phones until 2010. GSM-only phones will fade out quickly within the next two years, and GPRS will dominate for the rest of the decade. However, despite 3G phone use becoming mainstream, adoption of mobile internet services will remain sluggish across Europe (Tilak, 2006).

The combination of operators that aggressively promote 3G services, above-average consumer interest in advanced mobile phones and services and fierce competition among operators and service providers will put the UK and Italy in the lead for 3G adoption. These countries will see 3G penetration rates of 68 % and 72 %, respectively, by the end of 2010, far ahead of the European average of 61 %.

Tepid consumer interest in Germany and France and patchy UMTS coverage and little 3G promotional activity from operators in Ireland, Norway, and Spain mean that 3G penetration rates in these countries will range from 55 to 65 % at the end of 2010, in line with the European average. Belgium, Finland, Greece and Luxembourg are expected to lag behind in 3G, with mobile penetration rates ranging from 45 to 55 %.

Regulation, in the form of phone subsidy bans and coverage requirement policies, will affect 3G uptake also. For example, Belgium forbids operators to package phones with subscriptions. The Swedish regulator obliges operators to cover almost 100 % of the population, while the Finnish regulator sets the same requirement at just 35 %. Regulators can also influence uptake via the number of 3G licenses that they choose to make available.

3G will reach critical mass towards the end of this decade and will help make mobile internet service access capabilities ubiquitous but will only have a limited impact on actual regular mobile internet usage. Mobile internet functionality will remain the norm, but just half of mobile users will use it. This year, 90 % of phones in use will be mobile internet-capable. But 93 % of internet access runs on GSM or GPRS, not on the superior 3G alternative. 3G internet-enabled phone penetration will grow rapidly, helped by replacement mobile phone sales, operators' 3G pushes and phone manufacturers' volume shipments of 3G phones. By 2010, 200 million Europeans will have a 3G phone that is internet-ready.

3.3. Wyse, Comat and ICICI Bank develop blueprint for bridging the digital divide in India (Parthajit , 2005a)

Wyse Technology, the global player in network-centric computing, Comat Technologies, Ltd, an e-governance company based in Bangalore, and ICICI Bank, a private bank in India, have jointly announced an initiative to deliver electronic access to vital educational, financial and social services in select rural areas in the state of Karnataka, India. The official kick-off of the project to deploy these 'Rural Business Centers' (RBCs) was done on June 16, 2005. The companies

emphasized that it marks the first step to deliver the benefits of connectivity and information access to remote and rural areas.

In a bid to bridge the digital divide, the pilot deployment in Karnataka is expected to empower rural citizens with reliable access to government, as well as private sector services, including public records, social services and banking.

The goal of this public-private partnership is to bring access to social, educational and financial services directly to rural communities across the nation, in a secure, simple, and reliable manner, it was noted.

3.4. Quanta Computer to manufacture $100 Laptop (Tanner, 2005b)

MIT Media Labs announced, in December 2005, that it has chosen Quanta Computer of Taiwan to manufacture the '$100 Laptop' for MIT's One Laptop Per Child (OLPC) initiative. The OLPC board chose Quanta after reviewing bids from several manufacturers.

Quanta agreed to devote significant engineering resources from the Quanta Research Institute during the first half of 2006. The company hopes to bring the product to market by the fourth quarter of 2006. The initial launch will reportedly involve 5-15 million units, with plans to ship 1m units each to China, India, Brazil, Argentina, Egypt, Nigeria, and Thailand. Quanta will also be exploring the development of a commercial version of the laptop.

OLPC is a non-profit organization created by faculty members of the MIT Media Lab to design, manufacture and distribute inexpensive laptops in an attempt at bridging the so-called digital divide in poorer countries. The machine will be run by a hand-crank and will have internet access through mesh networking. The corporate members of the organization are Advanced Micro Devices, Brightstar, Google, News Corporation, Nortel and Red Hat.

3.5. European Space Agency Space-based solutions for digital equality (http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=11243)

The European Space Agency and the European Commission have decided to give joint consideration to the use of space-based technologies to help bridge 'the digital divide'. An initial action plan has been put in place to define society's needs and point to potential space-based answers.

In line with the strategic vision adopted by the European Union, the European society of tomorrow will be a 'knowledge-based society' in which access to knowledge is for all. Information outreach must therefore be considered as a major objective for Europe.

This means extending access to electronic communication services to everyone, notably in those regions of our continent which up until now have been disadvantaged or neglected (rural and mountain areas, islands, far-flung outlying regions). Equal access to the latest information

technologies will spell improved services - in terms of public health (telemedicine), education, the spread of the internet - and will encourage fruitful exchanges and economic development. The enlargement of the Union adds a further dimension to the digital-divide issue.

To the extent that the development of telecommunication infrastructures focuses on the most easily-accessible users in the major metropolises and the most developed areas and disregards a large slice of the population, there is a major risk of creating a lasting electronic divide in Europe constituting an obstacle to harmonious continent-wide development. Since satellites deliver uniform coverage over vast areas and can be deployed without pre-existing terrestrial infrastructures, they are well-suited to delivering equal quality of service, everywhere and for everyone.

Thanks to their global coverage, satellites can also help tackle the digital divide problem beyond Europe's borders - in other regions of the world currently ill-equipped to do so, Africa being a case in point.

Research and development activities covering both satellite systems and ground equipment are currently under way with a view to optimizing the space infrastructures for these new services and achieving significant cost reductions.

In its White Paper on Space Policy, the Commission has placed this issue - satellites contributing to bridge the digital divide - at the forefront of Europe's strategic priorities in the run-up to 2007.

4. CONCLUSION

Science and technology have undergone revolutionary changes in past century. Only a few decades ago, all telecommunications services were delivered over copper wires. Recently, the world has witnessed the exponential growth of mobile telephony and the widespread commercial deployment of the Internet. Today, the new technologies, services and applications have led to a digital age of ICT in which access has become a key component of peoples' lives. The rapid rate of ICT change and its importance in the development of the economic, social, financial and educational sectors is opening new opportunities from e-commerce to Tele-education and Tele-medicine (http://www.itu.int/ITU-D/digitaldivide/, 2005).

At the same time, these changes pose fresh challenges, especially for those in the developing world. Nearly half the world's inhabitants have yet to make their first basic telephone call. Even fewer have used the Internet. The vast majority of the more than 6 billion people who inhabit our planet have been completely shut out of the digital revolution and the promise it holds. As the pace of the technological revolution increases, so does the digital divide. The digital divide concerns governments, the private sector, multilateral organizations, financial institutions, non-governmental organizations and everyday citizens. Together, we have the power to close the digital divide by uniting our resources under a common framework designed to foster the growth of information communications technologies world-wide. The International Telecommunication Union (ITU), a specialized United Nations agency, is already implementing such a framework -- the Valletta Action Plan (http://www.itu.int/ITU-D/digitaldivide/, 2005).

To fill the gap created by the Digital Divide at local, national or international levels does not just mean providing computers to people who need them. It also means that people need to be trained in how to use them, and more importantly, they must understand how to access and use the information. Access not only includes knowing where and how to locate information, but also how to understand it, and how to use it wisely.

Solutions would include greater involvement from governments, corporations, non-profit organizations, small and mid-sized businesses and individuals, working together in providing technological access points, computers, peripherals, internet access along with educational and economic assistance. ICT access points could include schools, libraries, and corporations, internet café's, educational and governmental workforce training programs.

REFERENCES

Baltac, V. (2001), "Vulnerabilitate si riscuri in contextul Noii Economii", Vulnerabilitatea sistemelor in contextul Internet, paper presented at the "Sectia de Stiinta si Tehnologia Informatiei a Academiei Romane".

Demunter, C. (2005a) "The Digital Divide in Europe", Statistics in focus, Industry, Trade and Services, 38.
http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-NP-05-038/EN/KS-NP-05-038-EN.PDF

Demunter, C. (2005b) "Internet Activities in the European Union", Statistics in focus, Industry, Trade and Services, 40.

Demunter, C. (2005c) "Internet use in European: Security and Trust", Statistics in focus, Industry, Trade and Services, 25.

Demunter, C. (2005d) "The digital divide in Europe, 85% of students used the internet in 2004, only 13% of the retired used the internet", Eurostat news release, 143.

De Munster, Irene L. (2004) "The digital divide in Latin America: a case study"; World Library and Information Congress: 70th IFLA General Conference and Council, Buenos Aires, Argentina, 22-27.
Programme: http://www.ifla.org/IV/ifla70/prog04.htm

Digital Divide, International Telecommunication Union (2005), http://www.itu.int/ITU-D/digitaldivide/

European Space Agency, (Last Update: 03 May 2005) "Space-based solutions for digital equality", http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=11243

Farajallah, Mehd and Le Guel, Fabrice and Pénard, Thierry (2004) "Union Européenne élargie et nouveau voisinage: de la fracture numérique à la coopération numérique?", CREM[1], Université de Rennes 1, MARSOUIN.

Farrell, N. (Friday 11 November 2005) "Europe has digital divide, EU notes haves and have nots", http://www.theinquirer.net/?article=27615

Garland, C. and David, C. and Albertone, G. and Allen, S. and Fink, A. and Redpath, A. and Voget, M. and Waterschoot, D. (2003) "E-Commerce and the Internet in European Business", Luxembourg: Official Publications of the European Communities, 2003

InfoSociety, (Sunday 22 January 2006), "Europe's digital divide is slowly narrowing", http://www.euractiv.com/Article?tcmuri=tcm:29-148102-16&type=News

Lor, P. J. "NATIONAL LIBRARIES AND THE DIGITAL DIVIDE INTRODUCTION TO THE PANEL DISCUSSION", National Libraries And The Digital Divide. "CDNL meeting ", vol. 2003), http://www.nla.gov.au/initiatives/meetings/cdnl/2003/09digdiv.pdf

Parthajit, (06/17/2005a) **"**Wyse, Comat and ICICI Bank develop blueprint for bridging the digital divide in India", http://www.digitalmediaasia.com/default.asp?ArticleID=8538

Parthajit, (06/17/2005b) **"**Joint initiative to provide every home with PC, internet access in Jordan", http://www.digitalmediaasia.com/default.asp?ArticleID=3233

PROGRAMME FOR BRIDGING THE RURAL DIGITAL DIVIDE TO REDUCE FOOD INSECURITY AND POVERTY, TWENTY-FOURTH FAO REGIONAL CONFERENCE FOR EUROPE, Agenda Item 11, MONTPELLIER, FRANCE, (5-7 MAY 2004) http://www.fao.org/DOCREP/MEETING/007/J1878e.HTM

Tilak, J. (11/14/2005) "Stark digital divide in Europe – report" http://www.digitalmediaasia.com/default.asp?ArticleID=11247

Orbicom (7-13-2005), "Evolution of the digital divide"; New report to be released in September (Paris), the International Network of UNESCO Chairs in Communications

Tanner, B. (11/14/2005a)**, "**Philips opens global R&D center in Shanghai to develop low cost mobiles" http://www.digitalmediaasia.com/default.asp?ArticleID=11245

Tanner, B. (12/14/2005b) **"**Quanta Computer to manufacture $100 Laptop", http://www.digitalmediaasia.com/defa ult.asp?ArticleID=12039

Tilak, J. (1/20/2006) "60% of Europeans to have 3G handsets by end of 2010", http://www.digitalmediaasia.com/default.asp?ArticleID=12802

World Summit on the Information Society http://www.europe-cares.org/eng/s4_v3.htm

Xinhuanet, (Nov. 14, 2005) “EU study reveals big digital divide in Europe”, BRUSSELS, www.chinaview.cn
http://news.xinhuanet.com/english/2005-11/15/content_3781261.htm