"Digital Divide" in Eastern European Countries and its Social Impact

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Abstract

"Digital divide" is a concept coined a decade ago by Larry Irving, Jr., former US Assistant Secretary of Commerce for Telecommunication and Communication, in order to focus public attention on the existing gap in access to information services between those who can afford to purchase the computer hardware and software necessary to participate in the global information network, and low income families and communities who cannot. Some progress in closing the "digital divide" has been made[20]. Until recently, however, attention has not been given to how to solve the Eastern Europe "digital disparity". The goal of "digital inclusion" should be one of the most important concerns of our time because Information and Communication Technology influences many aspects of our lives.

This paper provides a comparative study of different *"Digital Divides"* existing between emerging democracies (or new market-oriented economies) from Eastern Europe as well as between them and developed countries (e.g. Western Europe, USA). Several factors which influence the *"digital divides"* will be analyzed and evaluated. Several factors like the organizational failure of the Council for Mutual Economic Assistance, suppressed in 1990, whose main goal was to organize economic specialization and cooperation of member countries[16], multi national security for the acquisition of high technology, governmental priorities, restricted access to PCs, PC versus mainframe technology and current influencing factors like disparity of the cost of PCs and Internet access world wide, language barriers, 90% of information resources located in the western hemisphere will be analyzed and evaluated. Some possible solutions like considering Non Profit Organizations that could enable "have-nots" to receive free or low cost, new or used computers from "haves" and computer training programs in the Eastern European Countries are considered.

Introduction

"Digital divide" is a concept coined a decade ago by former US Assistant Secretary of Commerce for Telecommunication and Communication, Larry Irving, Jr., in order to focus public attention on the existing gap in access to information services between those who can afford to purchase the computer hardware and software necessary to participate in the global information network, and low income families and communities which cannot.

Today, it is obvious that there are many "digital divides" – at local, national, regional or world levels, each such divide having its specific background, phenomena, evolution trends, perspectives as well as its specific bridging solutions and initiatives. In order to reduce and close this divide between "haves" and "have-nots", many initiatives were launched. Hundreds of reports and papers were produced and published in order to evaluate specific situations and to highlight solutions. For example, as early as 1993 and the famous Delors report, The European Commission (the ruling body that is made up of representatives of its member countries; The European Commission embodies and upholds the general interest of the Union and is the driving force in the Union's institutional system. Its four main roles are to propose legislation to Parliament and the Council, to administer and implement Community policies, to enforce Community law (jointly with the Court of Justice) and to negotiate international agreements, mainly those relating to trade and cooperation[24]) highlighted the emergence of the Information Society and the important economic and social changes it implied[23]. That led the following year to a report on "Europe and the global information Society". This report stressed that Information Society is affecting every economic sector and could be compared to the industrial revolution. In 1995, a high-level expert group (European Commission 1997) was formed to analyze the social aspect of the Information Society. It took time to get a concrete plan from the Commission on the Information Society and not until December 1999 was an initiative presented by M. Prodi called "*eEurope - An Information Society for All*" (European Union, 1999). The impact of the IS on economy and employment had forced the Commission by June 2002 to consider "*eEurope 2002 an information Society for All*" a political priority for the European Union (European Union, 2000). Thus, some progress in closing the "digital divide" has been made, especially in industrialized countries from Western and Central Europe, but in developing countries from Eastern Europe the goal of "digital inclusion" should be one of the most important concerns of our time. This paper emphasized the benefits that can be gained from it, such as new sources of jobs, but also stressed that it represents a cohesion challenge for Europe.

Despite the Internet's democratizing potential, there is a very real danger that the world will be divided into the "information rich" and the "information poor". For example, in 1997, the UN Administrator Committee on Coordination stated[5]:

> We are profoundly concerned at the deepening mal-distribution of access, resources and opportunities in the information and communication field. The information and technology gap and related inequities between industrialized and developing countries are widening: a new type of poverty – information poverty – looms.

Research Methodology

We collected data from a wide variety of sources that provided both a historical and comparative viewpoint. Then we analyzed the data and presented some basic facts regarding the digital divide that exists in the world today along with the negative effects that it has upon nations and the people groups who are the most impacted by the resulting informational and economic poverty. We present former and current actual factors of the West-East and East-East digital divide. We also discuss and point out the valiant efforts that some are making for the tearing down of the wall of economic isolation and silence that currently divides the "haves" from the "have-nots".

1. Digital Divide in the World

The 2001 U. S. Internet Council's (USIC) report asserts that the Internet is firmly rooted in regions that encouraged and fostered its early growth, while the regions showing the greatest increase in Internet growth today include the world's wealthiest—North America, Europe, and parts of East Asia, such as Japan, Korea, Taiwan, Hong Kong and Singapore. Northern Europe is much more connected to the Internet, USIC officials report, than southern and central Europe[22]. The Dutch and Scandinavians lead all of Europe in penetration rates and use of the Internet in everyday life. In addition, unlike the U.S. digital divide, which is primarily income-based, the European digital divide appears to be geographic, USIC officials say. The report states that Southern Hemisphere regions, such as Latin America, Africa, the Middle East and India lag much further behind, although nations like China, India, and South Korea made significant strides in 2001.

Even among highly developed nations, there exist vast differences in the availability of home Internet access. The report cites that the Western and Southern European countries of France, Italy and Spain continue to trail total European online adoption, with Internet penetration rates of around 30 percent. The Nordic region, which includes Norway, Sweden and Finland, remains in the lead with access rates of between 60 percent and 70 percent. A recent report from the International Data Group's[25], IDC tech arm states that Germany and the United Kingdom are still leading in terms of absolute number of users, with 30 million and 20 million, respectively. International Data Group (IDG) is the world's leading technology media, research and event company. Founded in 1964, IDG had 2001 revenues of $3.01 billion and has more than 12,000 employees worldwide.

The U.S. Internet Council's 2001 report notes that the Internet also is making inroads in poor and war-torn countries in Central and Eastern Europe. "While still stifled in much of the region due to poverty and weak telecommunications infrastructure, the Internet is making steady inroads in several countries" the report states. "Russia, in particular, has tripled its number of users in the last two years, for a total of 4.2 million, with ongoing quarterly growth of between 7 percent and 10 percent." The majority—3.8 million users—reside in urban areas. "Although lagging behind other countries in this region, Croatia, recently ravaged by war, has been singled out as having a bright future in the Internet economy.", the report notes. IDC predicts that more than 1 million Croatians, or 22 percent of the population, will be online by the end of 2004, "making it one of the more advanced Internet countries in Central Europe." [22]
According to the Forrester Research[26] firm in Cambridge, Mass., Internet use in Europe has climbed till 2002 to 39 percent, or about 116 million users, and continues to hold the most appeal for men and women 35 and younger. Forrester's April 2002 report, entitled "Europe's Future

Online Consumers," compiled from a survey of more than 29,000 Europeans 16 and older in Austria, Belgium, Finland, France, Germany, the UK, Italy, Ireland, Netherlands, Norway, Spain, Sweden, and Switzerland, suggests that the Internet appeals mostly to young, well-educated Europeans. The report notes, however, that other demographic groups and "technology pessimists" have been slow to embrace the Internet in part due to high costs and lack of interest. The Pew Internet and American Life Project[27] published in *Who's Not Online* that 57% of those not online have no intention of going online. The research firm Ipsos-Reid[28] found similar international statistics: 33% of those people have chosen to not go online. Among the biggest reasons were: lack of need (40%); no computer (33%); no interest (25%); lack of knowledge for use (25%); and general cost involved (16%) [20].

1.1 Some Basic Facts

Between 1988 and 1998, the worldwide number of Internet accessing computers rose from about 100,000 to about 45 million[14].

The number of people accessing the Internet rose from about 3 million in 1994 (most of them in the USA), to about 300 million by early 2000. According to Nielsen/ Netratings[29] as of February 2001 there were 429 million online users worldwide (at the end of the year the number of users climbed to 530 million) and will continue to grow in the next five years, according to a new report by the Computer Industry Almanac Inc.[30] As you can see in the *Figure 1"2001 Global Internet Users"*, the Internet Use is dominated by North America[21].
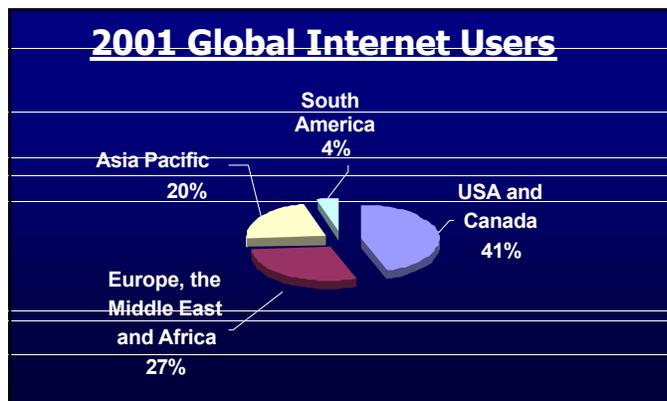

Figure 1

About 20% of the world population is actually using Internet at home or at work[4]. But in the USA, only home Internet usage grew, in one year, from 37% (in January 2000) to 58% (in January 2001) of its population. It is estimated that by 2005 1 billion people would be connected worldwide to Internet [6].

Approximately 50% of the people in the USA have computers, compared to only around 0.016% of the people in Africa (3,000 times less than in the USA) [14].

A current low performance computer (priced US $ 1,000) may be purchased by people earning an

average salary, after only 1 month of work in USA, but after 10 months of work in Romania and after 48 months of work in Bangladesh (supposing all earned money would be invested in this computer!) [14]. Paying, in addition, US $ 0.02 – 0.2 per minute for *accessing Internet through a telephone line* is seen as a luxury by people earning US $ 10 – 100 per month!

90% of the *Information resources* are located in the Western hemisphere countries. Internet allows *free or costly access* to these information resources for every potential interested user[14].

As of December 2000, approximately 50% of Internet usage is in the English language. (See Figure 2.) There were (in January 2001) more than 1 billion pages on World Wide Web. Registered domain names rose from about 627,000 (in 1996), to nearly 18 million (in 2000). Experts estimate that traffic on the Internet doubles every 9 – 12 months[6].
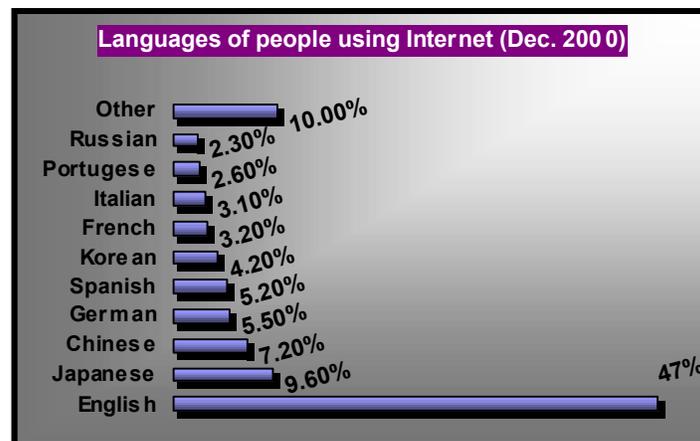

Figure 2

2. Digital Divide in Central and Eastern European Countries

For a decade, the countries of Eastern Europe (EE) were facing the huge challenge of transition from a (more or less) autocratic and centrally planned economic system to a democratic and market-based system. This trend has improved the lives of millions of people. "Many people have increased political participation, achieved macro-economic stabilization and restored growth. Despite these achievements, in emerging democracies millions of people are excluded from the political and economic system and continue to live in poverty" [7].

The events in EE and the former USSR countries coincided with the rise of the Internet as a new and efficient communication tool. The breakdown of the Iron Curtain in 1989 created a demand for the free, uncensored exchange of ideas as well as for less restricted movement of peoples and ideas[19].

The rapid transition from socialism and centrally planned economy to capitalism and free-market economy brought hope, optimism and also confusion to citizens of EE and former USSR countries. New long-term goals of these countries have produced a huge unprecedented demand for information resources. In these countries, information is no longer tightly controlled by

governments, as a mean to maintain their political and economic power[19]. In addition, Personal Computers (PC) and the Internet totally changed the way of accessing, obtaining, processing and transmitting information. Thus, PC and the Internet became a very valuable tool for democratization of communication in these countries.

The "Digital Divide" exists in Central and Eastern European countries in many forms:
- between the most industrialized countries of the world (USA and Western Europe) and EE countries (i.e. the so-called *"West-East Digital Divide"*)
- between EE countries (i.e. the so-called *"East-East Digital Divide"*)
- between different population groups within each EE country.

3. Former Enablers of Digital Divides in Eastern European Countries

All countries of EE and former USSR – the so-called "socialist countries" – were members of the former Council for Mutual Economic Assistance (CMEA) which was suppressed in 1990. CMEA's main goal was to organize the economic specialization and cooperation of member countries. The same goal was applied to the computer industry after 1960. This industry was based initially, in all involved countries, on local know-how and technologists; later, some foreign technologies were allowed in Romania, Bulgaria and Hungary[16]. It is to be noted that the CMEA integration in computer technology was successful only partially and only at the beginning of its activity. After 1980, when economic crises worsened in most of these countries, the CMEA programs totally failed. Thus, computerization differences between EE countries accentuated.

The acquisition of high technologies by these countries was for a longtime blocked by the so-called *Coordination Committee on Export Control* (COCON). The main goal of this body – consisting of NATO countries, Japan and Australia – was to prevent the Eastern bloc from obtaining Western technology that could be militarily useful. Thus, for example, Romanian organizations were allowed to import only computers made in Eastern Germany, USSR or Bulgaria.

In all former socialist countries, computers and communication technologies were applied *very selectively*, according to governmental policies. Absolute priority was given to governmental, military, industrial and research sectors, over the civilian, non-governmental, education and health care sectors.

EE and USSR countries that specialized in computer manufacturing developed mostly large computer systems (like mainframes and minicomputers), whose access and use could be easier monitored and controlled (restricted) by the authorities. Microcomputers have been produced in such small quantities that, for example, in Romania, the official goal of "university computerization" was only a slogan. Importing a PC (even from an EE country) was almost impossible for citizens, because the very restrictive custom policies and import taxes. According to Carl Builder and Steven Banks, "The communist block failed not primarily or even fundamentally because of its centrally controlled economic policies or its excessive military burdens, but because its closed societies were too long denied the fruits of information revolution that was developed elsewhere over the past 40 years." [18]

4. Some Effects of the Multiple Transitions in EE and Former USSR Countries

On-going political, social and economic reforms in EE and former USSR countries enabled them to better perceive and understand huge *West-East and East-East European Digital Divides* as well as to initiate some actions in order to bridge them. They discovered that communication is a strategic factor for the functioning of market economy and for the market globalization[15]. But development of information technology and computerization of economy are dependent on computing industry, telecommunications infrastructure, educated and trained information professionals and information users. Conversion of the Internet from a dedicated military and academic research network to a global information infrastructure enabled considerably, during the last years, the growth of informational flows between different countries and regions of the world. After 1994, the number of Internet Services Providers grew rapidly also in EE countries. According to Esther Dyson – one of the US leading "cyber-gurus" – *the EE countries are adopting the Internet technology faster than Western Europe*[17]. Their highly literate populations are able to make use of this technology to join the developed world.

5. The "West-East Digital Divide"

5.1. Some Factors of West-East Digital Divides in Europe

Transition speed and macro-economic restructuring of each transitional country are dependent on specific political, social and economical particularities. Lack of adequate financial support for hardware purchasing and operation – within very problematic economic environment – seems to be a general influencing factor. But other aspects may also be taken into consideration, such as:
- Lack of adequate education and training of users for electronic information technology;
- Lack of adequate quantity and quality of provided software, hardware maintenance and consumables (paper, ink, etc.);
- Absolute priority given by citizens to their daily problems;
- Web sites languages distribution on Internet.

For example, in Romania, despite the century-long predominant interest of students and other learning people for the French language, after 1994, the new generations begun to choose predominantly the English language - as the studied foreign language in high-schools, colleges and universities - in order to be able to navigate on Internet. In addition, in Romania, education and training for English language are wider and better supported by foreign organizations than the education and training for French language.

5.2. Basic Facts of the West-East Digital Divide in Europe

"EE countries lag behind Western Europe in all measures of Internet access and usage."[3]. For example:
- The number of Internet users per 10,000 inhabitants was in 1998, in respect to USA, about 12 times lower in Slovenia (the most advanced EE country in this respect) and about 8,000 times lower in Moldova (the less advanced EE country in this respect)[3,6].

- The number of telephone lines per 100 inhabitants was in 1998, in respect to USA, between about 2 times less in Croatia (the most advanced EE country in this respect) and about 25 times less in Albania (the less advanced EE country in this respect) [3,6].

5.3. Barriers to Internet Usage Development in EE Countries

The actual barriers to Internet usage development in EE countries are the following[8]:
- Scarcity and low quality of existing telecommunications infrastructure[3].
- The tele-density rate (number of telephone lines per 1,000 people) is lower in EE and former USSR countries than in Western Europe[3]. The average waiting time for a telephone line may be at least one year or even more[3].
- Lack of competitive markets enabling consumers to have a real choice and to have their fundamental "consumers' rights" fully observed. Due to the influence of European Union, actual telecommunications national policies of these countries are focused on privatization and competition[3]. But, even if and when the state monopoly providing telecommunications services was suppressed, competition may be underdeveloped or even not existent, due to the fact that a private monopoly replaced the former state monopoly (i.e. situation of Romania).
- Alternative access technologies to Internet (such as wireless, satellite, cable modem, etc.) are underdeveloped and also expensive[3]
- Drastically limited budgets allocated for research and developments as well as for information technology (because all concerned countries are financially struggling, the transition to capitalism being, till now, very costly).
- Inadequate content and language of most available foreign Web sites (without a right content, the new electronic technology is considered as simply electric energy consumers!). Romanians, for example, are accessing only free Web services, avoid all advertising texts and need following Web sites categories: tele-working, distance learning, on-line education and training, directories, dictionaries, data bases, job advertisements, etc.
- High costs of access and use of telecommunications infrastructure as well as expensive costs of acquisition, operation and maintenance of computers, their peripherals and consumables. These costs are much too high, comparatively with population incomes and even with the budget of governmental agencies[3].

For example, some consequences of these very high costs in Romania include:
- People who do have costly Internet access (usually home or in cyber-cafes) severely restrict their on-line time, fearing astronomically high bills. Unlike what is happening in developed countries, Romanians accessing Internet count each minute of Internet connection (selecting most advantageous time intervals, if possible!) and each printed sheet of paper, etc., in order to avoid any unnecessary expense.
- People interested in Internet prefer by far (if it exists) the free access of Web at work, at school or at university.
- Pirated software, much cheaper, is preferred to the copyrighted software.

However most of new software developed in industrialized countries is totally inaccessible for students, jobless people, and others.

o Use of printers, scanners, and other computer peripherals is very limited.
o Some companies imported second-hand computers and printers and are selling them to the young people unable to buy a new computer.
o Free-access computing rooms in schools and universities are very scarce. If such rooms do exist, their computers are generally outmoded low-class models (often ridiculed for their primitive capabilities). Faculty and staff members are always busy with support and repair problems. Existing computers are used mainly only in relation with taught topics.
o Unlike Romanian public libraries, some foreign cultural centers existing in Romania are offering costly public access to Internet.

5.4. Some Opportunities & Potential Enablers of Future Bridging of West-East Digital Divide

• The growing number of young and technologically educated people interested in electronic information technology.
• The traditional emphasis on science and technical education and training, at all levels.
• The rapid development and dissemination of different magazines, journals and broadcastings dedicated to possible applications of electronic information technology.
• Public libraries may provide public access to the worldwide Digital Library, already created by the Western countries. (Sharing involved costs between interested partners seems to be the optimal solution.)
• Education and training of all educators in order to make them familiar with concepts, models and methods of Information Technology and Information Science.

For example, by 2000, there were in Romania about 100 Internet Service Providers (ISP, including 2 wireless ISP), 36,000 Domain Name Services (DNS) hosts, and about 100,000 institutional Internet subscriptions. Only about 2% of the Romanian population had access to the Internet home, but many more people are accessing the Internet at work, in schools or in cyber-cafes. Only few academic and public libraries are offering public access to the Internet. Institutional Internet subscriptions are made by governmental agencies, mass media, companies, schools and universities, some libraries and associations.

6. The "East-East Digital Divide"

6.1. Factors of East-East Digital Divides in Europe

In addition to the factors mentioned under Section 3.1. it is to be noted that EE and former USSR countries have different political, social, cultural and economic backgrounds. The actual transition succeeded differently in each such country, in accordance to its specific features.

6.2. Basic Facts of the East-East Digital Divide in Europe.

The number of Internet users per 10,000 inhabitants in 1998 in EE and some of the former USSR countries is shown in Figure 3.
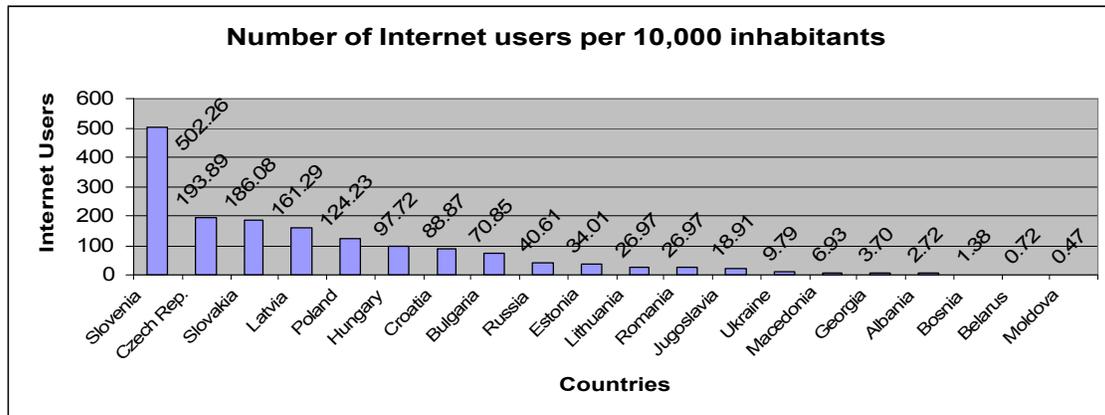

Figure 3

It should be noted that, if for the USA, the value of this indicator was about 6000 (in 2001[6]), its values are *over 10 times higher* in Slovenia, Czech Republic, Slovakia, Latvia, Poland than in Macedonia, Albania, Bosnia and Moldova Republic.

The number of telephone lines per 100 inhabitants (urban / rural lines)[3,12] in 1998 in EE and some of the former USSR countries is shown in Figure 4.
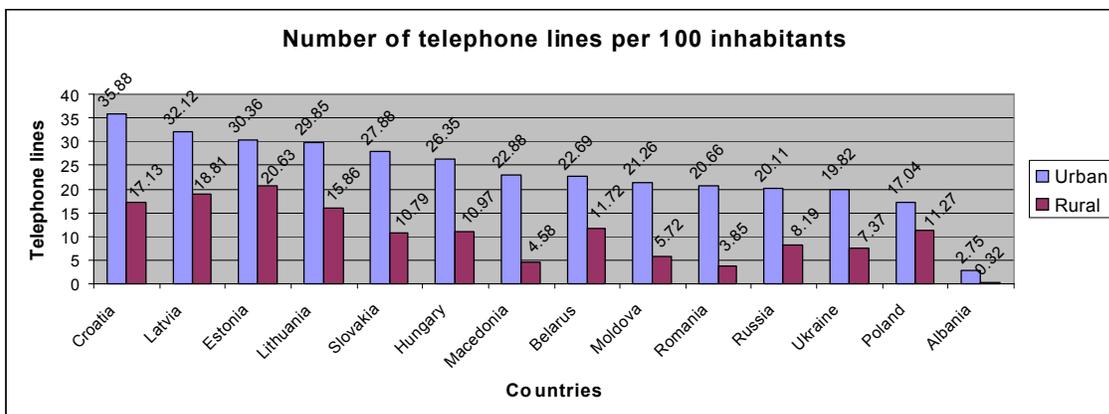

Figure 4

If for the USA, the overall value of this indicator was 65 (in 1998[6]), its values are inferior to the US value between *about 2 times* (in Croatia) and *25 times* (in Albania). But its values are *over 10 times lower* only in Albania, in respect to Croatia, Latvia, Estonia, Lithuania and Hungary.

The number of Internet hosts in 1998 in EE and some of former USSR countries[3,12,13] is shown in Figure 5:

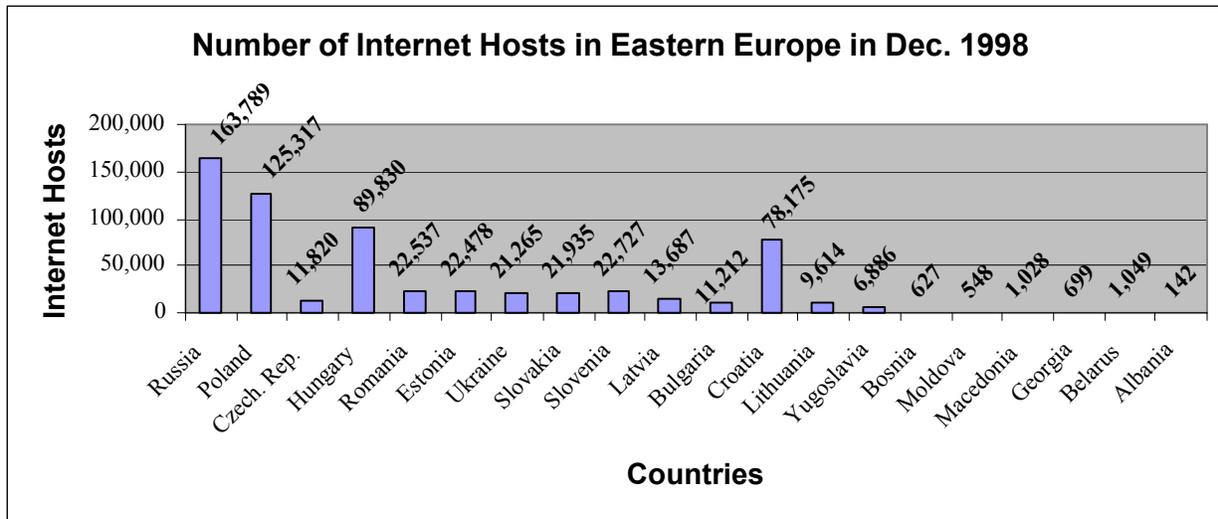**Number of Internet Hosts in Eastern Europe in Dec. 1998**

Figure 5

The values of this indicator are *over 100 times higher* in Russia and Poland, with respect to Belarus, Macedonia, Bosnia, Moldova Republic and Albania, but this indicator has to be correlated with the number of their inhabitants.

7. Conclusions: How to Bridge "Digital Divides"?

According to Digital Partners, "successful poverty-alleviation initiatives will be Internet focused, scalable, catalytic, bottom-up and collaborative" (Web site of Digital Partners[1]) "The hundreds of 'Digital Divide' projects initiated by large American companies and by American government[9,10,11] are intended to prevent the unavoidable world anger of people excluded from progress", acknowledged Craig Smith, a philanthropic adviser of cyber-elite[14].

A basic short and medium term solution could be philanthropy. It could enable "have-nots" to receive free or cheap, new or used computers from "haves". For example, Soros Open Society Foundation from New York distributed gifts of US $ 36 million, in 35 countries, within about 250 "Digital Divide" projects[14].

While there are many other philanthropic foundations initiating such actions, there is no organized way to access such philanthropic institutions. The application process itself seems to be time consuming and bureaucratic. Successful partnerships are the result of mutual trust, mutual desired objectives and mutual understanding. Poor "have-nots" have not to be seen as dishonest, unskilled, uneducated or even tricky people asking for assistance and being unable to offer something in exchange. In the USA and other industrialized countries, used computers are replaced in companies and universities after only 1-3 years of use. They could be collected, transported and offered – free of charge or at a symbolic price – to needing "have-nots". Perhaps the UNO could coordinate such actions to benefit both donor and acceptor countries. But the real valuable long-term solution obviously must be the sustainable development of each country. The UNO and its institutions (United Nations Program for Development, United Nations Industrial development Organization) could help indeed.

The most important contribution that the paper brings to engineering education are the analysis of data and basic facts regarding the digital divide that exists in the world today along with the negative effects that it has upon nations and people groups, especially on Eastern European peoples and the analysis of efforts needed in order to bridge in EE the current digital divide. For East Europe, bridging the digital divide will open up a world of education opportunities through distance learning education and research.

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