

INFORMATION SOCIETY: NEW CHALLENGES FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT: The overall aim of this study is to identify the strengths and the opportunities, the weaknesses and the threats of information society that could enable the national and the international economies to achieve continuous improvement of quality of life both for current and future generations, through the creation of sustainable communities able to manage resources efficiently and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection, social cohesion and cultural diversity. The authors of this paper mean to harness the vast potential of ICTs to achieve the sustainable development aspirations, but also to pay attention to the limits of information society's extending. Recognizing the importance of ICT as valuable assets for economic growth and development, world leaders should align their efforts towards building a development-oriented information society.

Cuvinte cheie: sustainable development, e-commerce, e-government, cultural diversity

Coduri JEL: K32, K39, O11, O52, Q01, Q55, Q56

Technological level that the humanity reached, at confluence between the II-nd and III-d millenium led to creation of new perspectives in approaching day-to-day life. We make reference to the circulation of information first of all, and also to the growth of life-standard as the result of new technologies being used. Free access to information led to a relative equalization of ethic and cultural standards, application of new technologies, made to reduce the cost-price of life, with a direct consequence of traditions' uniformity, including consumption. The present study has the goal to determine to what measure the informational society and new technologies based on information science are compatible with the principles of sustainable development.

Beginning with 1972, when the first report of Club of Rome¹ – *The limits to Growth* – was published and the first UNO Conference, dealing with environment problems was held, numerous interpretations of the concept of sustainable development were proposed, each of them looking for its own examination of interdependencies between the problems of the environment, general welfare and the process of economic growth². A synthesis of these allows delimiting four dimensions of the concept: ecological, social, economic and cultural.

Ecological perspective was put into light for the first time at UNO Conference for Environment and Development at Rio de Janeiro in 1992, reaffirmed at that from Kyoto later in 1997, and retaken on the occasion of Earth Summit held at Johannesburg in 2002. Each time, the participating countries agreed with the necessity of looking for some concrete strategies of development which would permit to satisfy the fundamental needs of population both in a rational use of natural resources and protection of their development potential.

In this sense Romania, in 1999, though relatively late, created National Committee for Environment and Sustainable Development, an autonomous authority of public interest, with the main goal to offer an institutional organized body of consultancy and dialogue between the representatives of state public authorities and those of civil society, over the fundamental problems regarding policies, programs and plans of actual actions and those in prospect, in order to

implement the objectives of sustainable development in social and economic sectors, at national and local levels³.

Electronic commerce represents the exchange of affaire information through Internet, using electronic and computer technologies for this purpose. It became an important recognized part of world economic life after 1996, when UNO General Assembly, at its 51st session, adopted the Law of UNCITRAL type regarding the electronic commerce and the Guide of its incorporation⁴. This action opened the way to apparition of some compatible settlements in different states-members of UNO, so that international communications network of the Internet could generate the global market.

Practicing electronic commerce as an alternative to the traditional one, contributes to a considerable reducing of use and consumption of natural resources through dematerialization of production and consumption, replacing real traffic with a virtual one, typed documentation – with the electronic one. Activities of distribution, marketing, sell and supply of goods carried through electronic ways, like fax, telephone, voice-mail, e-mail, Internet etc, lead to elimination of many consumption stages of resources in the circulation of goods: storage and commercialization spaces, energy, combustible, instruments, equipment, transport etc.

The information society seems to have a sustainable character, but there are some limits in reality.

First of all, reduced consumption of resources per equipment unit provokes reduction of market prices, thus demand being stimulated. To satisfy the growing demand of goods consumption of resources at production phase is accelerated, the phenomenon which is known as “boomerang effect” or “ricochet effect”.

Negative effects are also possible at consumption phase, thus, the more improved the equipment is, the more functions it performs – the more energy is consumed. For example: processor Pentium III(1GHz) consumes 26,1 – 29,0 W of energy maximum, Pentium IV (1,5 GHz) consumes 54,7 – 57,9 W of energy, whereas Intel 2001 (2GHz) consumes 71,8 – 75, 3 W of energy.

More than that, not only fabrication and use of informative equipment in big quantities provokes great harm to the nature, but also the fact that it is thrown away after use, as it contains harmful chemical elements, such as chrome, nickel, cuprum, cadmium and halogen components.

Forecasts made for dematerialization of production and way of life people got after online services grew in their importance seem to be as unreal as the presumption regarding reduction of production of industrialized products (Table1). First of all, the components of industrialized society have a positive influence both on labor production and on the equipment. As the result, the production of industrialized goods accelerates, to nature’s detriment.

Table no.1

***Evolution of manufactured production (mil.EURO)
and the income-quote of Internet affaires in total enterprise’s income (%)***

| | 2004 | | 2005 | | 2006 | |
|----------------------|------------------|-------------|------------------|-------------------------|-------------------------|------------|
| | mil. EURO | % | mil. EURO | % | mil. EURO | % |
| Germany | 1578058.6 | 2,7 | 1636306.1 | 3,1 | 1767561.0 | 4,4 |
| Great Britain | 683308.1 | 2,3 | 682555.0 | 4,1 | <i>unavailable data</i> | 6,0 |
| Ireland | 108243.2 | 11,6 | 113031.8 | 10,1 | 118641.3 | 9,1 |
| Norway | 683308.1 | 2,7 | 64497.1 | 3,9 | 86039.6 | 6,4 |
| Romania | 34041.9 | 1,3 | 4864.1 | <i>unavailable data</i> | <i>unavailable data</i> | 0,4 |

Source: www.eurostat.ec.europa.eu

With all this the consumer's needs were not and will never be satisfied wholly. In this sense, Internet makes goods from all over the world to be accesible, people having the possibility to chose the more convinient ones from the point of view of price-quality-utility correlation, indifferently of the distance of manufacturer's country. Another consequence can be followed in this situation: the growth of goods transported leads to the reduction of supply and transport traffic, thus people will order more and cheaper products through Internet (Table2).

Table no. 2

***Evolution of Index of Inland Passenger Transport Volume relative to GDP (IIPT/GDP)
and of Index of inland Freight Transport Volume relative to GDP (IIFT/GDP)
indexed to 2000 year values (%)***

| | 2000 | 2001 | | 2004 | | 2005 | | 2006 | |
|----------------------------------|------------|--------------|-----------------------------|--------------|-----------------------------|--------------|--------------|--------------|--------------|
| | | IIPT/GDP | IIFT/GDP | IIPT/GDP | IIFT/GDP | IIPT/GDP | IIFT/GDP | IIPT/GDP | IIFT/GDP |
| UE (27 countries) | 100 | 99,1 | <i>unavailable data</i> | 105,4 | <i>unavailable data</i> | 105,5 | 96,5 | 107,5 | 94,9 |
| Germany | 100 | 99,9 | 100,9 | 104,7 | 101,4 | 106,2 | 99,7 | 110,1 | 98,3 |
| Spain | 100 | 104,0 | 98,4 | 128,1 | 96,0 | 130,1 | 94,5 | 129,6 | 91,1 |
| Lithuania | 100 | 90,0 | <i>unavailable data</i> | 106,2 | 120,2 | 116,7 | 145,4 | 118,5 | 151,3 |
| Portugal | 100 | 108,4 | 99,8 | 143,5 | 107,3 | 148,6 | 110,7 | 153,8 | 112,0 |
| Romania | 100 | 106,3 | 95,6 | 145,0 | 88,3 | 174,1 | 89,1 | 171,3 | 87,1 |

Source: www.eurostat.ec.europa.eu

Beginning with 1999, a series of new settlements appeared in the European Commission, referring to the electronic commerce and ways of improvement. Among some important directives which were later transposed to national legislations of states-members we can name the Directive regarding the communitarian framework for electronic signatures no.1999/93/CE and the Directive referring to some juridical aspects with regard to services of informational society, especially electronic commerce at internal market no.2000/31/CE², the Directive regarding the data of personal character and private life no. 2002/58/CE⁵, modified by the Directive no.2006/24/CE⁶, the Directive regarding competition no.2002/77/CE⁷.

The main romanian normative acts that reglementate in a special way this material are: the Law of electronic signature nr.455/2001⁸, the Law regarding electronic commerce nr.365/2002, republished on the base of modification and competition Law nr.121/2006⁹, the Law regarding juridical regime of notarial electronic activity nr.589/2004¹⁰, the Law nr.135/2007 as of filing documents in electronic form, the Order of the Ministry of Communications and Information Technologies regarding the procedure of assenting the online payment instruments, of the type Internet applications – banking, home – banking, mobile – banking nr.218/2004¹¹, the Law nr.451/2004 regarding temporal mark, the Law nr.260/2007 regarding registration of commercial operations by electronic means.

Out of paragraph 18 of Directive no. 2000/31/CE preamble results that the services of information society include a large range of economic activities that take place on-line, especially selling goods on-line.

Alongside with the services that result in electronic contracts, the services of information

society also include commercial communications, services of information supply, services of supply in a system “point to point” etc.

On the contrary, goods delivering or services supply that require physical presence of addressee are not considered to be the services of information society. The Article 2 ph (2) pct.c) of the Law assigns that goods offer or services that require a simultaneous reception of an unlimited number of persons (point to points) do not make part of the services of information society. Telephone services, fax or telex (pct.e), commercial activities carried though these services, exchange of information through electronic mail if they are not of commercial nature, contractual relation between employee and his employer are not considered to be the services of information society either.

The legislaiton is evidently surpassed by the technological level people reached by the year 2008. Telephone is a way of communication that presupposes the same type of contact among the participants of commerce act as, for example, the Skype technology used in Internet. If calculating the goal and principle of technological indiscrimination, we can't make a difference between the way that presupposes scanning and transfer (handing over) of documents through the Internet to reach the addressee and that by the “classical” fax, the technology of the end of the XXth century.

On the other hand, the Law of type UNCITRAL regarding electronic commerce has at its base the principles of indiscrimination referred to electronic messages and technological neutrality, founded on the theory of functional equivalence. The Law of type UNCITRAL regarding electronic signature and guide of incorporation was also drawn up on the basis of the principles of indiscrimination and technological neutrality. Unfortunately, its late apparition in regard to the one of national settlements, including those of community states, had no impact as to the compatibility of national legislations.

From the economical point of view, however, it is considered that ICT allows replacing real traffic with the virtual one: TV set, computer, video-conferences; electronic messages make us travel less, having access to information, possibility to resolve different problems, and also to work at home. In reality, the communicability of the contemporary man grows, increasing substantially the traffic of real goods, and people's life is as mobile as never before (Table2).

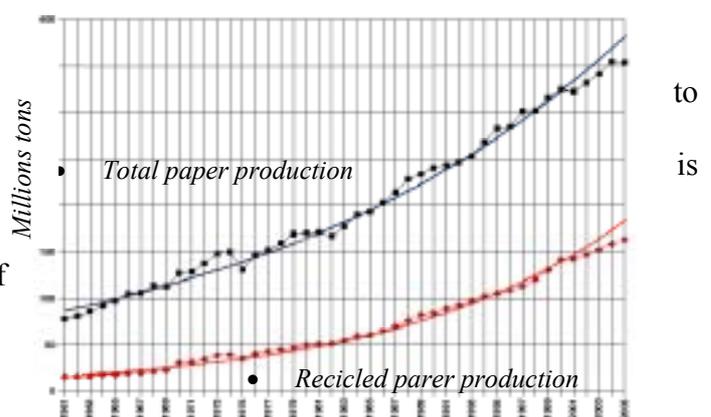
Thus, dematerialization is out of the question, TIC provoking traffic growth, both of goods and people, transport and consume of natural resources.

Use of computer, both at home and at work determined appearance of a new concept, known as “paperless office”, that engages (is included) in the concept of sustainable development. Once, computer appeared, the necessity to register information on paper diminished or even disappeared in some cases, thus, typed documentation was substituted with the electronic one by the way of scanners instead of Xeroxes, sending electronic letters and faxes instead of those on paper, storing, keeping and transfer of information on electronic support instead of maps.

At the same time, if we follow statistic data, we can observe, that world production of paper and paperboard has increased greatly since 1961. At that time it was of about 77 million tons per year, being doubled by 1978. By 1999 it reached 316 million tons. Thus, paper production has steadily increased, at an average of about 3 million tons a year. Large areas of forests continue be felled, and single species of trees are planted on those places, thus biodiversity affected.

A study made by Food and Agriculture Organization in 2005 showed that 46% of

Fig. No.1 Global paper production 1961 - 2005



Source: <http://faostat.fao.org>

global paper production refers to that of recycled paper production which increased with approximately 12% a year. Per capita consumption of paper has also increased from 25 kilogrammes in 1961 to 54 kilogrammes¹² in 2005 (Figure 1). This increase can be explained by the fact that it has become much easier to print out multiple copies using Xeroxes, faxes, e-mail and so forth. However, since about 2000, global use of office paper has a negative trend. Instead of printing out documents people prefer to read them on the screen.

Social perspective of sustainable development refers to health, education, availability of working places, social equity, elimination of any forms of discrimination among all social layers and distribution of material goods among these in an optimal and equilibrated way.

If we make reference to information society, then social perspective of sustainable development is found in such concepts as e-learning, e-health, Telework etc.

Social sustainable development is understood like access to information given to all people in the world, elimination of “digital gap”, as well as special attention given to strategies concerning public access to Internet, free software products and information contents.

It is considered that information society will appear automatically in case when the country reaches welfare, measured in development of traditional infrastructures, health protection, and education quality. At the same time, new technologies represent a decisive factor in the growth of welfare.

The concept of E-learning presupposes a type of technology supported education/learning which reduces in-person interaction. *E-learning* can be used both by universities and companies, which can offer courses, programs of study, and trainings to students or employees.

Organizations and individuals can benefit from E-learning in different aspects. First of all, it allows people to avoid travelling and reduce paper consumption, thus having a positive impact on the environment. Secondly, the fact that highly-instructed specialists can share their knowledge makes it possible for students to attend courses not limited by physical, political or economic boundaries. Anyone who is interested has the possibility of getting information that was made internationally available by recognized experts. This can lead to reducing the higher education costs, making it much more affordable and accessible to the masses.

The concept of E-health appeared in the intersection of medical informatics, public health and business. It refers to health services and information delivered through the Internet and related technologies. The term comprises a range of services that are at the edge of medicine/healthcare and information technology: electronic medical records, evidence based medicine, consumer health informatics, telemedicine, health knowledge management, m-health etc.

E-health makes it easier for doctors to get patients’ medical records, to have immediate access to test results from the laboratory, and send prescriptions directly to pharmacists. With the help of special monitors patients with heart problems can lead a normal life, their doctors being informed of any condition change. E-health services facilitate access to healthcare, as the geographical position is of no importance any more.

Telework is a large concept, which presents a way *for companies* to modernise work organization by involving and keeping valuable employees, by hiring employees otherwise not available, by enabling offshore outsourcing and ensuring non-stop business; *for workers* to combine work and social life, giving them more possibilities to accomplish their tasks. Telework increases employee productivity and flexibility, reduces absenteeism, eases the working parent's burden, gives an opportunity for marginalized groups of people, such as parents with small children, the disabled and people living in distant areas to be engaged.

When speaking about access to Internet and reducing “digital gap”, it should be mentioned that in developed countries there appeared many places of free Internet access, the so-called public hot-spots, at schools, parks and libraries, and also in cafes, hotels and airports as a way of attracting clients by administrators. The private initiative in this field is made to be felt by creation of open-source programs of Linux or Open Office type, as well as by financial support of Internet access

through apparition of some initiatives (of the German “Digital Chancen” one).

Nevertheless, there exist some negative tendencies in the process of creation of social-sustainable information society. First of all, introducing TIC in poor distant regions has a short-term effect, because attractiveness of these regions is anyway reduced once access to TIC is reached by more developed regions, which are nearer to development centers. Secondly, the use of new technologies is rather expensive, the cost of a computer representing only 16-20% of the total expenses: paper acquisition, place service, specialists’ salary, school education costs etc. Thirdly, it is inadequate to speak about TIC access for all, when a significant part of Terra’s population has no access to drinkable water, electric energy, canalization, etc.

Economical perspective of sustainable development presupposes rational use of production factors (reduced level of unemployment, rational use of the ground and natural resources, limitation of informational asymmetry on international markets, support of projects of rentable investments etc), creation of values, optimization of goods and services distribution in society, improving life and work conditions.

The use of TI allows reducing both cost and time of transport and supply, leads to the growth of mobility of people, goods, and money on the world level. Thus, information society can rightly be considered a world society with international market.

Thanks to IT the contemporary man is much more informed and he can quickly and at optimal costs organize his movements, both with the purpose of tourism and work. This allows valorizing human capital, growth of working productivity and getting sustainable performances at national level.

On the other hand, a large use of IT, especially in banking sectors, those of assurance and tourism, replaces labor. The problem is whether the labor can be useful in the sphere of IT, otherwise, it will not lead to the growth of welfare; on the contrary, it will lead to accentuation of unemployment and its consequences, the growth of pressure on the budget, the state being obliged to give unemployment help. Another problem is the fact that IT sphere evaluates in an alert tempo, thus permanently confronting with deficiency of qualified specialists, though IT disciplines have been introduced in university curriculums, and special courses are organized for the unemployed.

Mobility of money resources is, first of all, connected with the growth of daily export volume at the world level, secondly it depends on the growth of accessibility of banking transfer operations, and also on the growth of attractiveness of stock exchange transactions and foreign currency selling operations. Thus, holders of money resources look for optimal locations regarding their investments, both under the aspect of profitableness and fiscal one. Of the most well-known fiscal paradises we can name Cayman Islands, Normand Islands, Liechtenstein etc.

It is worth to mention the affirmation of Nobel Prize Laureate, Robert Solow, done in 1987: “Today we can see computers everywhere, with the exception of statistic data made with regard to their productivity”. The phenomenon was named “Solow Paradox” and gave way to numerous discussions in scientific circles. The lack of positive effects after informational technologies at their first stages had been introduced can be explained by a rather high cost of IT equipments, thus productivity multifactor and annual growth indices evaluate initially in different directions.¹³

Besides, at PIB calculation, such countries as the USA, Denmark and Sweden use the so-called hedonic indices that refer to performance characteristics of any modern computer, in correlation with the one that was used some years before. For example, from 1995-2000 operational memory of the processor grew annually with 41%, that of RAM memory – 49%, hard disk capacity grew with 65%. As a result, using these hedonic indices, calculated costs are much higher than those in a store, and implicitly, PIB value is much more bigger than in the countries which do not use hedonic indices in their calculations. “Deutsche Bank” carried out comparative analyses of statistic data form the USA and showed that if conventional methods were used at PIB calculation, this would be with 0,6 – 0,8 % less.¹⁴

New practices of carrying out economic activities raise problems, dealing with security and trust. Thus, out of the two well-known models of electronic commerce – B2C (business to consumers, realized between merchants(trademen) and B2B(business to business, realized between companies and tradesmen or companies and suppliers) – the second one proved to be more successful, taking into consideration the following: first of all, the problem of goods and services payment through Internet is not resolved up till now, the majority of consumers preferring to pay cash; secondly, the problem of goods and services quality offered though Internet.

Political perspective of sustainable development means assurance of democracy, liberty, and human rights. In this succession of ideas, one of the conceptions the majority of politicians prefer is electronic government, which consists in functioning of democratic principles that would permit organization of political and social manifestations in Internet. Thus, it becomes possible to get access to some information that was inaccessible before, to take an active part at elections, to have direct contacts with politicians and state people.

Impediments to set up an electronic government are both of subjective and objective nature. The first category includes people's unwillingness to discuss and contact directly political leaders, as well as the fact that just a small part of population is co-interested in political and social activity of the country. The studies of Eurobarometer group show that 53% of European population considers they should have a bigger access to contact with deputies by means of Internet, whereas 20% - are contra.

Profitability of electronic form of government depends on population's interests: the more people are involved in this form of government, the more efficiently new infrastructures will function. Theoretically, parallel functioning of traditional infrastructure and the electronic one is possible; they do not exclude but complete each other. However it is very expensive to keep them both.

On the other hand, accentuated activeness of citizens and their willingness to communicate with representatives of State organs and political parties may provoke blocking in functioning of electronic systems. For example, the volume of electronic correspondence in the USA Congress was of 49 million electronic messages per day in 1999, and it grew to 117 million messages per day in 2001, this leading to blocking the electronic systems of the institution. Respectively, it is possible to imagine the flux of electronic messages in European Parliament, if we take into consideration that 626 of deputies represent the interests of 375 million of European citizens. To avoid this kind of situations there were installed systems of filtration of electronic messages, making acceptable only the messages sent by a certain category of people (electoral circumscription, city, people of a certain age etc.)

On the one hand, these measures are reasonable and allow an efficient communication between the citizen and his political leader, but on the other hand, the principle of sustainable political development is violated, these limitations demonstrate that IT does not represent an adequate way for creation of free atmosphere of contact between deputies and electors. Besides, it is worth to mention, that population's interest for the use of Internet and active participation in political life of the country is more accentuated in the countries where the use of Internet is less spread.

Cultural perspective of sustainable development takes into consideration such aspects as identity, national dignity and cultural diversity as elements of national wealth. Cultural durability means finding a compromise between cultural diversity and common values, where Internet can serve as a way of creation of the world virtual community with common values and understanding. The importance of this aspect is accentuated by the fact that certifies gradual reduction of cultural diversity. For example, more than 6 thousand of different languages are spoken all over the world today, but every second week a language disappears, taking with it a unique culture of fairy-tales, myths and ways of thinking.¹⁵

Cultural homogenization has appeared much before the Internet, but it (the Internet)

accelerates reduction of differences by propagation of dominant cultures: way of life – American, clothes – Italian, spoken language – English etc.

Electronic commerce could intensify cultural diversity on the Internet. Studies showed that people's availability to be engaged in electronic commerce grew once they were offered goods and services on the Internet in their mother-tongue. However, actualization and translation of sites into rare languages is very expensive, thus only groups of population that have sufficient financial resources can make their languages circulate through the Internet.

More than that, Internet, possessing an enormous power of propagating the information everywhere, is neither efficient in saving cultures that are in danger. The majority of sites that will contain the name of a disappearing culture are created neither by the representatives of that culture nor for them, they giving only the quotations from special literature, handicraft descriptions or selling souvenirs.

Ever since Middle Ages there exist notions of vertical cultures (characteristics of different regions) and horizontal cultures (when the representatives of a culture work at large distances from their mother land and their culture). Nowadays, much knowledge about vertical culture is being lost, whereas new horizontal cultures are created on the Internet.

Interesting parallels between biodiversity and cultural diversity can be made. Thus, a study shows that of 25 countries which possessed the biggest cultural diversity, 16 also possessed the biggest diversity of plant-species, 14- possessed the biggest diversity of animal-species.¹⁶

Ethic perspective of sustainable development includes the system of social, religious, educational, health, reproductive values etc.

In fact, new mass media means like TV, cinematography and press are obliged to respect rigorous and well-defined standards, whereas there are no such standards for the Internet, anyone can spread any kind of information all over the world! It is sufficient for the information to be legal in a country so that it could be spread in all states, even if it is illegal or harmful there. Thus, if anyone is interested in drugs or special psychoactive components he can find a lot of information on the Internet. Much of this information is even on the official sites of public authorities and contains not only warnings, but also indications about getting, preparing and buying drugs.

To create a sustainable information society, special measures should be established so that they correspond to every dimension. The paradox is that measures which are adequate for one dimension can have grave consequences for another one. For example, large use of ICT promotes social dimension, but it is a burden for ecology; spreading of cultural diversity confronts with the measures for economical dimension to be promoted. Thus, provocations of information society in the context of its sustainable development have to be harmonized in a complex approach through elaboration and support of some integrated concepts.

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