THE COMMUNICATIONS INFRASTRUCTURE OF THE INFORMATION SOCIETY

Nicula Adrian
University ofOradea
Faculty of Economics

This paper aims to briefly present the term of „information society", term used since the beginning of the 90's, which implies the usage of new information technology both to the individual and organizational level with high ease, in all spheres of activities with a significant economic and social impact, making changes in social, cultural, educational, economic, environmental, political, administrative and judicial dimensions, changes that influence the work, study and life conditions of all citizens.
The more and more widely usage of ICT makes any economy become more efficient, more transparent, ensuring increased competitiveness and sustainable development. In terms of how ICT influences economic growth, Romania ranks 47 of the 70 countries analyzed in the Digital economy rankings 2010: Beyond e-readiness. Based on a synthetic indicator, defined by 24 variables in four categories, in order to determine the status of the information society, proposed by Marius Guran, and using the statistical data provided by ANCOM, the paper analyzes the current situation in Romania, answering the question: How digital is Romania in terms of communication infrastructure? Thus the paper presents the communication infrastructure from the point of view of: fixed telephony and its penetration rate per 100 inhabitants and per 100 households, a stagnant rate in the last few years; mobile telephony which reached saturation in recent years; cable TV which shows us that the penetration rate is quite low in Romanian households, mainly due to the low number of subscribers in rural areas, and also that the usage of DTH technology is growing.
Keywords: Information society, communications, telecommunications ICT, measuring
JEL: L96

Introduction

"The information society is the communication society based on ICT" (Dascălu 2001). The information society is based on the main activity of production and consumption of information using ICT. "Essentially the information society is based on the Internet" (Drăgănescu 2002) using the information technology in a creative and productive way, "in all spheres of human existence and activities, with a significant economic and social impact" (Stoica 2000), "the information society brought the Internet market. The new role of information in terms of the Internet opened an era of a more transparent and efficient economy" (Drăgănescu 2002).
"One of the current requirements for the information society to develop, in the context of globalization of the processes and contemporary phenomenon, is the access to information of citizens" (ADR Vest 2012). The development of the information society, through the convergence of the three key factors: information technology, communications technology and multimedia production (Stoica 2000), creates the necessary conditions for ensuring citizens with the access to information that concern them or that influence their work, study or life conditions.
The term of information society refers to a society and an economy where creating, accessing, acquiring, storing, processing, transmitting, distributing and using knowledge and information plays a decisive role (Ghilic 2002). The machine tools of the Information Society are computers and telecommunications, rather than lathes or ploughs. From an economic point of view, the most significant aspect of this new society is a shift in the majority of the labor force from agricultural and manufacturing sectors to the information sector.
The information society is characterized by an explosive growth of digital information, "which has a central economic and social value, value that can profoundly affect both companies and human life" (Ivan 2001), available through ICT products. For the public administrations, both local and central, but also for the governments, this means public services which are more efficient, transparent, faster, closer to the citizens needs and less expensive.

"Businesses are transforming their supply and demand chains, as well as their internal organization to fully exploit ICT. Governments are restructuring their internal functions and the way they deliver services and generally interact with citizens and businesses. People are modifying their consumption and spending patterns, as well as their behavior. In the process, nearly every economic variable of interest is affected" (OECD 2011).

Knowledge based information society means more than the progress of information and communication technology and applications, integrating also the following dimensions: ***social*** (with impact on the health care, solidarity and social protection, employment and labor market, education and continuous training etc. – *telemedicine, teleactivities, teleworking, teleelections, teleensurance),* ***environmental*** (with impact on the resource utilization and environmental protection), ***cultural*** (with impact on the preservation and development of the national and international cultural heritage, promoting cultural pluralism, the need for child protection, the development of the multimedia industry and the production of information content – *museums, art galleries on the internet, digitizing information: digitized manuals, national and international heritage digitization*), ***educational –*** (*develops the competence of conception and work under computerized conditions, the intelligent process management, education and distance learning, virtual libraries, e-Teaching, e-Learning)*, ***economic*** (with the development of new digital economy paradigms and of new knowledge based economy, innovation, entrepreneurial and management culture, citizen and consumer education - *e-Comerț, e-Banking, e-Learning, e-Money, e-Trading, internet online payment, internet businesses*), ***political and administrative*** (concerning electronic government – *e-Government, virtual desk, online car licenses, e-Auction, online tax returns),* ***Legal*** (with impact on current legislation regarding the security of transactions, intellectual property rights, protection of Internet competition, computer crime resulting in specific legislation, information society law) (Romanian Academy).

Measuring the Information Society

From a statistical point of view, there is no agreed comprehensive statistical framework of the information society. One possible conceptual model is presented by the OECD and encompasses the widely agreed elements of ICT supply, ICT demand, ICT infrastructure, ICT products and "content" based on the International Standard Industrial Classification (ISIC) Rev. 4.

Digital economy rankings 2010: Beyond e-readiness realized by The Economist Intelligence Unit, is an annual benchmarking directory which reflects the influence of ICT growth in the economy, comprising 70 countries, with over 100 qualitative and quantitative criteria, designed to help the governments of the studied countries to see the differences between them and to take the appropriate measures, but also to present to the interested companies which would be the most promising location for investing in ITC.

The 100 or more criteria are grouped into 39 indicators and 82 sub-indicators, consisting of 6 categories, the score being calculated as a weighted average, as follows: **1. Connectivity and technology infrastructure** (representing 20% of the score); **2. Business environment** (15%); **3. Social and cultural environment** (15%); **4. Legal environment** (10%); **5. Government policy and vision** (15%); **6. Consumer and business adoption** (25%). In this ranking, the first place is occupied by Sweden, with a 8.49 score, which beat Denmark, Romania being on the 47th place (last of the 27 European Union countries), with a 5.04 score, behind Bulgaria (45th, score 5.05), Hungary (35th, score 6.06) or Slovakia (38th, score 5.78) (Economist Intelligence Unit 2010).

Based on a synthetic indicator that defines the state of the information society in a country, proposed by Marius Guran, defined by 24 variables, grouped into four categories: Socio-educational category; ***Informational category*** (informational infrastructure: telephony, radio, TV); Computer category (automated data, information and knowledge processing and storage infrastructure: PCs, Software/hardware, Internet service providers – ISP, "Host computers" Internet); Economic category (Guran 2002), and also based on the 10 core indicators on ICT

infrastructure, we will briefly present the ***informational infrastructure*** trying to grasp the current situation in Romania.

The informational infrastructure facilitates the revolution of human communications, making it to be more and more cheaper and at more and more greater distances, the realization of the condition for the production of new products, services and even entirely new markets for a sustainable economic development, "the support for the development of new trends and technologies which allow the evolution of society by ensuring digital services (anywhere, at any time), an intelligent environment (at home, at work etc.), making knowledge an asset used in decision and innovation process, as a condition for development" (Guran 2002).

The communications Infrastructure

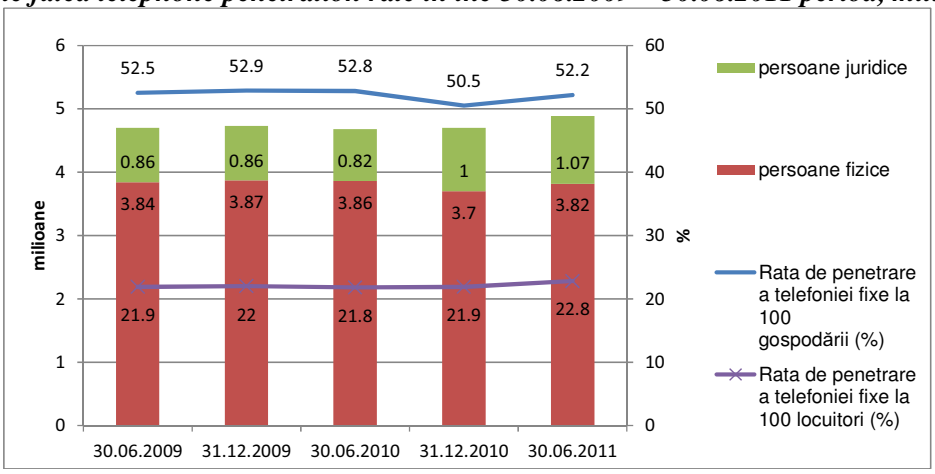
1. Fixed telephony

The number of electronic communication services and network providers in Romania increased from January 1st, 2003 when the monopoly held by Romtelecom, company owned initially by the Romanian government, ended.

The most important providers of fixed telephony services are, according to a report made by Gallup for The National Authority for Management and Regulation in Communications (ANCOM) in April 2010: Romtelecom with 87% of the fixed telephony market, still remaining the leader for the *legal persons* segment of the market, followed by RCS&RDS 21%, Vodafone 4%, UPC 3%, Orange 1%, other providers 2%. However we can notice a decreasing trend of the number of fixed telephony subscriptions for Romtelecom provider, starting with 2003 when Romtelecom had 100%, to 2005-2006 when they only had 57% of the market and then 2009-2010, to 37%. 61% of the households of Romania have fixed telephone services, 72% in urban areas, while in rural areas only 47% of the households have and use a fixed telephone, of whom 66% use Romtelecom, 33% RCS&RDS, 4% UPS, of the above mentioned, 94% use a single separate phone line.

Similar to the case of corporate or legal persons subscribers, also for the households, the number of fixed telephony subscriptions acquired in the last few years from the Romtelecom provider is decreasing from 100% in 2003, to 39% in 2005-2006, 18% in 2009-2010, the highest share being held by the competitor RCS&RDS with 65%.

Fig. nr. 1. The dynamics of the number of access lines / subscribers to fixed telephone services and the fixed telephone penetration rate in the 30.06.2009 – 30.06.2011 period, millions.



Source: http://www.ancom.org.ro/

One of the most important indicators of the telecommunication infrastructure is the fixed telephony penetration rate per 100 inhabitants and also the penetration rate per 100 households, rate that in our country did not increase significantly in recent years, being much lower than the rate for mobile telephony. *The low penetration rate is due to the high costs of fixed telephony*

compared to the average population income, and also to the reduced investments in rural telephony infrastructure.

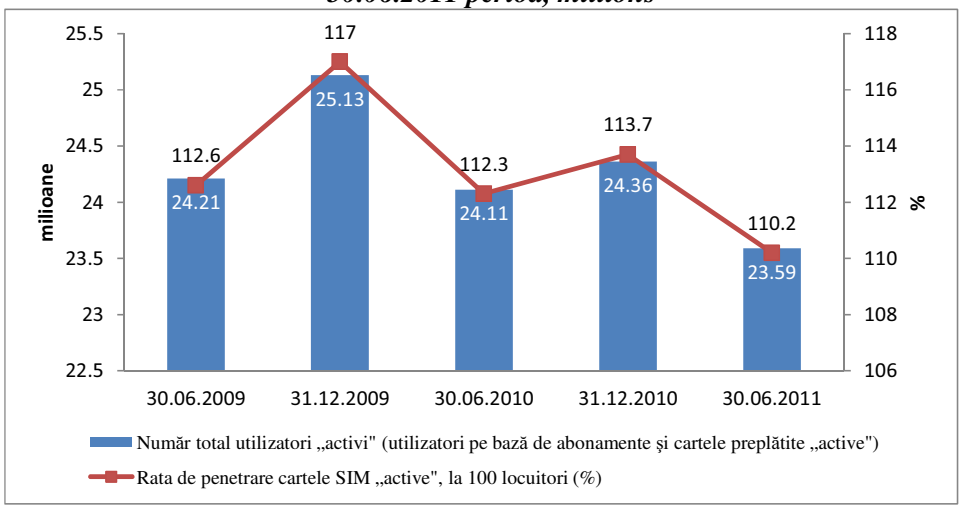
2. Mobile telephony

The main authorized mobile telephony providers in Romania are: Cosmote, Orange România, RCS & RDS, Vodafone România, Telemobil - Zapp. The number of the mobile telephony users

*Similar to the case of the fixed telephony, the most relevant indicator is the penetration rate for the mobile telephony services per 100 inhabitants, rate that is calculated as the ratio between the number of the mobile users and the total country population * 100.*

More and more users prefer a package / an integrated solution to pay only one bill for, the bill not being broken down per services, fixed/mobile telephony, fixe/mobile internet, TV services, data transmission, due to lower costs of packed services, and also due to a much easier use of the services, cost control and contract terms.

Fig. nr. 2. The total number of mobile users and the mobile penetration rate in the 30.06.2009 – 30.06.2011 period, millions

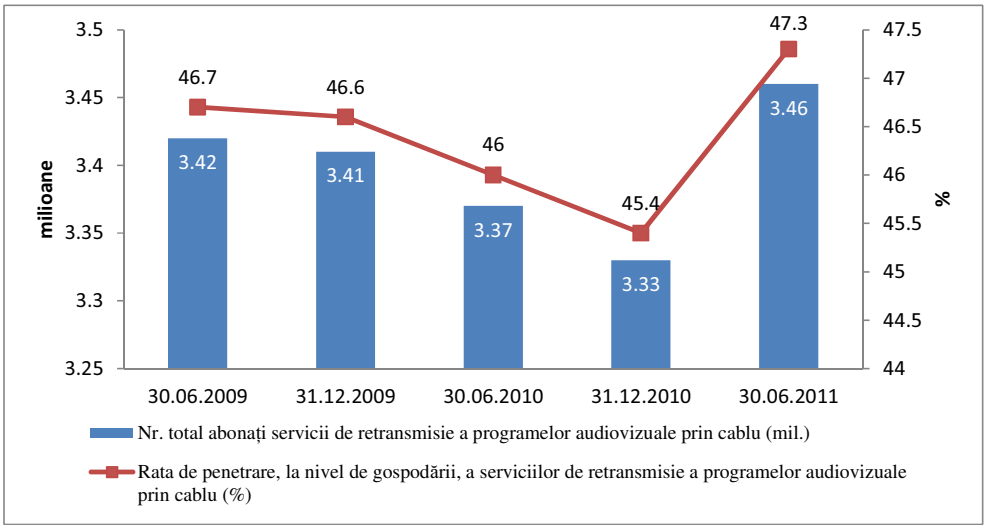


Source: http://www.ancom.org.ro/

3. Cable television

Unlike the television broadcasts that use electromagnetic waves, cable television represents the distribution of TV channels to the final consumer through an optical or coaxial cable.

Fig. nr. 3. The dynamics of the number of subscriptions to services providing retransmission of television broadcasts received via cable networks in the 30.06.2009 – 30.06.2011 period



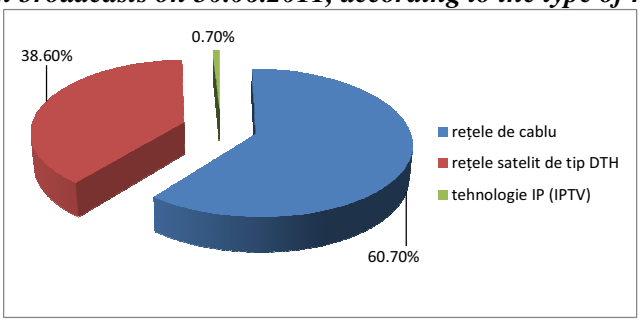
Source: http://www.ancom.org.ro/

The total number of subscribers has not increased significantly in recent years, the penetration rate being relatively low mainly due to the small number of subscribers in rural area, with a penetration rate of only 23,1% in 30.06.2011.

Since 2005 new technologies have emerged such as IP technology and digital satellite television (DTH) used especially for hard to reach locations where cable installation costs would be very high, so the number of subscribers receiving digital programs is constantly growing. At the beginning of 2006 cable networks had 91% of the subscribers and DTH had only 9%, while in 2011, cable networks had 60,7% of the subscribers and DTH raised to 38,6%.

IPTV services means not only online television, but it represents transmitting high image and sound quality programs, through IP internet protocols, offering the user a higher level of control over TV programs, enabling the users to select, record and watch their favorite programs anytime they want. Currently, Romtelecom offers this type of service in 21 counties, being available in three packages: iMaxim, iExtra şi iVariat (Romtelecom).

Fig. nr. 4. The structure of the number of subscribers to services providing retransmission of television broadcasts on 30.06.2011, according to the type of networks



Source: http://www.ancom.org.ro/.

Conclusions

As the report "Measuring the Information Society ITU" shows us, fixed telephony continues to decline from 2005, when market saturation was taken over by mobile telephony, not only in developed but in developing countries to. In Romania mobile-cellular telephony has reached saturation level, penetration rates is over 100% with 10%, from 2009 we are noticing a slight decrease. According to a Digital Agenda study, Europeans prefer complete packages of internet, telephony and television (European Commission).

The fixed and mobile telephony providers offer more and more minutes included in the subscription in order to attract a higher number of customers, including minutes/reductions in the subscription or as an extra feature for calls made, in the same fixed network, or to other fixed networks, in the same mobile network or to other mobile networks, or minutes to make international calls.

For countries to obtain maximum economic and social benefits from using digital technology, they have to make sure that the population has access and can afford fixed and mobile phone connections, that there are investments in infrastructure made to increase the penetration rate for fixed telephony especially in the rural area.

Digital Agenda for Europe is one of the seven flagship initiatives of Europe 2020 Strategy and aims to define the role that using the communication and information technology will have to play in achieving the objectives of Europe 2020 Strategy.

In the context of the Digital Agenda, *Action 101. Roaming,* in order to increase the competition on the roaming services market they made a preliminary agreement for a sustainable solution for the mobile telephony users, Bruxelles, March 28th 2012, so roaming services would be cheaper due to competition, the consumers having the opportunity to choose the network before they leave or when they are already abroad, they would also be informed about the roaming charges when travelling to countries outside EU (European Commission). It is intended that the difference between domestic and roaming charges to approach zero by 2015.

Telecoms networks and services are the backbone of Europe's developing information Society and the digital economy. To improve innovation, investment and competition and increase efficiency in the telecommunications sector, the European Union promotes increased competition and protect user rights in order to ensure a choice of high-quality broadcast services for consumers (European Commission). Regarding broadcasts, EU encourages rapid switchover to digital television. The rollout of digital television across Europe further expands consumer choice, giving people access to more programmes of higher picture and sound quality as well as the possibility to benefit from interactive services (European Commission).

Bibliography

Dascălu, Dan. „Ştiința în societatea informațională - societatea cunoaşterii", 2001. Accessed April 10, 2012. http://www.racai.ro/INFOSOC-Project/Dascalu_st_d01_new.pdf.

Drăgănescu, Mihai, *Societatea Informațională şi a Cunoaşterii. Vectorii Societății cunoaşterii*, studiu pentru Proiectul SI-SC (Societatea Informațională - Societatea Cunoaşterii) al Academiei Române, Bucureşti, 9 iulie 2001. Publicat, p.43 - 112, în vol. coord. Florin Gh. Filip, Societatea informațională - Societatea cunoaşterii. Concepte, soluții şi strategii pentru România, Academia Română, 2002.

Ghilic – Micu, Bogdan. *Guvernare electronică*, Revista *Informatică Economică*, nr. 1 (21)/2002, Editura Inforec, Bucureşti. Accessed April 2, 2012. http://revistaie.ase.ro/21.html.

Guran, Marius. *Sistemul de indicatori pentru evaluarea stării societății informaționale*, studiu pentru Proiectul SI-SC (Societatea Informațională - Societatea Cunoşterii) al Academiei Române, Bucureşti, 9 iulie 2001. Publicat, p.43 - 112, în vol. coord. Florin Gh. Filip, Societatea informațională - Societatea cunoaşterii. Concepte, soluții şi strategii pentru România, Academia Română, 2002.

Guran, Marius. *Sistemul de indicatori pentru evaluarea stării societății informaționale*, studiu pentru Proiectul SI-SC (Societatea Informațională - Societatea Cunoşterii) al Academiei Române, Bucureşti, 9 iulie 2001. Publicat, p.43 - 112, în vol. coord. Florin Gh. Filip, Societatea informațională - Societatea cunoaşterii. Concepte, soluții şi strategii pentru România, Academia Română, 2002.

Ivan, Ion. *Metrici ale societății informaționale*, Revista Informatică Economică, nr.4 (20)/2001. Accessed April 2, 2012. http://revistaie.ase.ro/content/20/ivan.pdf.

Stoica, Marian. *Premise ale trecerii la societatea informațională*, Revista Informatică Economică, nr. 4 (16)/2000, Editura Inforec, Bucureşti.
Economist Intelligence Unit. *Digital economy rankings 2010: Beyond e-readiness*, 29 iunie 2010.
Ministerul Comunicațiilor şi societății informaționale - Agenda Digitală pentru Europa Cadru general de acțiune 2011. Accessed April 12, 2012 http://www.mcsi.ro/Minister/Agenda-Digitala/Agenda_digitala.
OECD, *Guide to Measuring the Information Society*. 2011. Accessed April 12, 2012. http://www.oecd.org/document/22/0,3746,en_2649_34449_34508886_1_1_1_1,00.html.

Romanian Academy. Accessed April 2, 2012. http://www.acad.ro/socinf/pag_com01socinf_prpri.htm.
ADR Vest 2012. Accessed April 10, 2012. http://www.adrvest.ro/attach_files/cap%20IX%20.pdf.
European Commission. Agenda digitală: europenii preferă pachete de servicii complete de internet, telefonie şi televiziune. Accessed April 20, 2012. http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/858&format=HTML&aged=0&language=RO&guiLanguage=en.
European Commission. Agenda digitală: UE ajunge la un acord preliminar referitor la o soluție de roaming durabilă pentru utilizatorii de telefonie mobilă. Accessed April 20, 2012. http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/12/227&format=HTML&aged=0&language=RO&guiLanguage=en.
European Commission. Broadcasting. Accessed April 22, 2012. http://ec.europa.eu/information_society/policy/ecomm/current/broadcasting/index_en.htm.
Romtelecom. Accessed April 15, 2012. http://www.romtelecom.ro/personal/televiziune-digitala/iptv/pachete-principale/.