

## **INTELLIGENT SOLUTION FOR FUTURE DEVELOPMENT**

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**Abstract:**

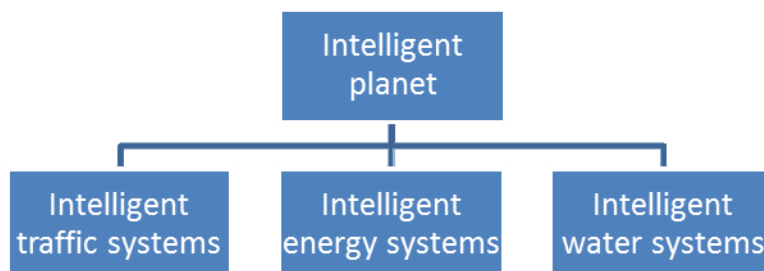
*This paper discusses whether the ability to use intelligent solutions in a locality (a transportation system smarter, faster and more effective interventions in emergencies, a more intelligent management of water and electricity, a more intelligent administration and health and education systems more intelligent one) is a significant part of future development.*

**Key words:** intelligent locality; smart solutions; local development; regional development

### **1. Introduction**

Spectacular development of technology in recent decades has been accompanied by many changes and important information and communication technology. According to the World Information Technology and Services Alliance (Wits, Digital Planet 2009), information and communication technology has a significant contribution in developing the current company driving innovation and creativity. According vision Information Society Technologies Advisory Group (ISTAG) for 2010, new-generation technologies will be characterized by connectivity, mobility and scalability, giving consumers the option of universal connectivity "anytime, anywhere, any".

Technology knowledge society is an integral part of the life of any consumer, the result of exponential growth in the number of users. This is why the telecommunication networks have steadily progressed, and lately even spectacular. They are always created new services and new technologies are developed and new networks to face the market demand for telecommunications services.



**Figure 1.** Intelligent planet

In our society is essential to use intelligent systems, synthesize and apply information to change the way in which entire industries operate. Through this intelligent solution in all important sector of our life we will have an intelligent planet (Figure. 1). So, an intelligent planet means an intelligent traffic system (use real-time traffic prediction and dynamic tolling to reduce congestion and its byproducts while positively influencing related systems), an intelligent energy system (analyze customer usage and provide customized products and services that help to boost efficiency from the source through the grid to the end-user) and intelligent water systems (apply monitoring and management technologies to help reduce the use of water, as well as related energy and chemicals). On the other hand intelligent planet is centered on creating intelligent or sustainable cities.

Globalization, ever more sophisticated technology and exploding bandwidth have made the world a smaller, smarter, more connected place. Yet the systems on which the world depends such as – food and water systems, transport, energy, healthcare – remain inefficient. IBM's Smart Planet initiative aims to foster the thinking, provide the tools and help create strategies that will drive positive change across these systems on a global scale.

## **2. Virtual networks**

For certain geographical areas, the existence of telecommunications networks offer possibilities for remote communication, remove the differences caused by lack of information and isolation. Appropriate use of modern technologies in order to increase the accessibility of quality information can lead to reduced administrative and social costs.

Future developments in localities will have virtual networks, the growing dependence of modern technologies [20], but also the elimination of bureaucracy, to reduce working time in exchange increase free time. In a intelligent locality the time and space restrictions are virtually nonexistent thus contributing to reducing social division. The creation of such places requires the construction of transportation systems, government, education, health and public policy more intelligent and also uses energy and water resources in an efficient manner.

According to the latest in the field [19], unprecedented urbanization that we face is both a symbol of economic and social progress and a huge burden on infrastructure planet. This is particularly a problem experienced by drivers of economic departments, school administrators, police officers and other persons in positions of leadership. Tasks that these leaders have met them - educating young people, maintain safety of citizens, attract and facilitate trade, implement a safe system of public transport are particularly difficult to manage in these times of economic decline. None of these systems is the responsibility of one entity or decision maker, all involving leading institutions, companies, communities and civil society, which are interconnected. For why, we need an infusion of intelligence in how our cities work. This infusion is currently producing the systems, processes and infrastructure that make it possible for physical property to be developed, produced, bought and sold, services are provided, everything from people and money to oil, water and electrons to move and billions of people to work and live. Indeed, almost anything - person, object, process or service to any organization, large or small - can become aware of the prospects digital infrastructure and can be connected in a network.

### **3. Intelligent locality**

In IBM's vision of 2009, requires a intelligent locality: a transportation system smarter, faster and more effective interventions in emergencies, a more intelligent management of water and electricity, a more intelligent administration and health and education more intelligent systems. This vision brings a new level of intelligence on how the world works - how each person, company, organization, government, natural and artificial system interactions. Each interaction is a chance to do something better, more efficient, more productive. But more than that, as all systems are intelligent planet, we have a chance to open up significant new opportunities for progress. Knowledge, application and technology increase the society evolution. The use of them efficiently in our society is an important step of innovation and evolution. Everybody use the new technology and Internet application in everyday, so the dynamics of use and produce knowledge is important for our society. Thus, all this intelligent systems solutions through their impact on our life put their imprint on the individual environment, but also the physical, economic and social environment (Figure 2).

There are five main reasons that could be invoked in support of intelligent systems:

- Flexible

Firstly, information and documentation can take place anytime, anywhere. Information can happens across locations, or intelligent solution takes advantage of information and documentation opportunities offered by portable technologies. People are overtime in go, so they are interested by more flexible kind of inform.

- Collaboration

Secondly, through intelligent solution everyone uses the same content, which will in turn also lead to receiving instant feedback and tips. This solution will reduce cultural and communication barriers between administrations and people by using communication channels that people like.

- Motivation

Thirdly, multimedia resources can make documentation fun. With this kind of evolution, it is much easier to combine a lot of solution for a more effective and entertaining experience.

- Accessible

Fourthly, new solutions are accessible virtually from anywhere which provides access to all the different information and documentations available.

- Portability

Moreover, the possibilities to use these solutions for everywhere make this very interesting.

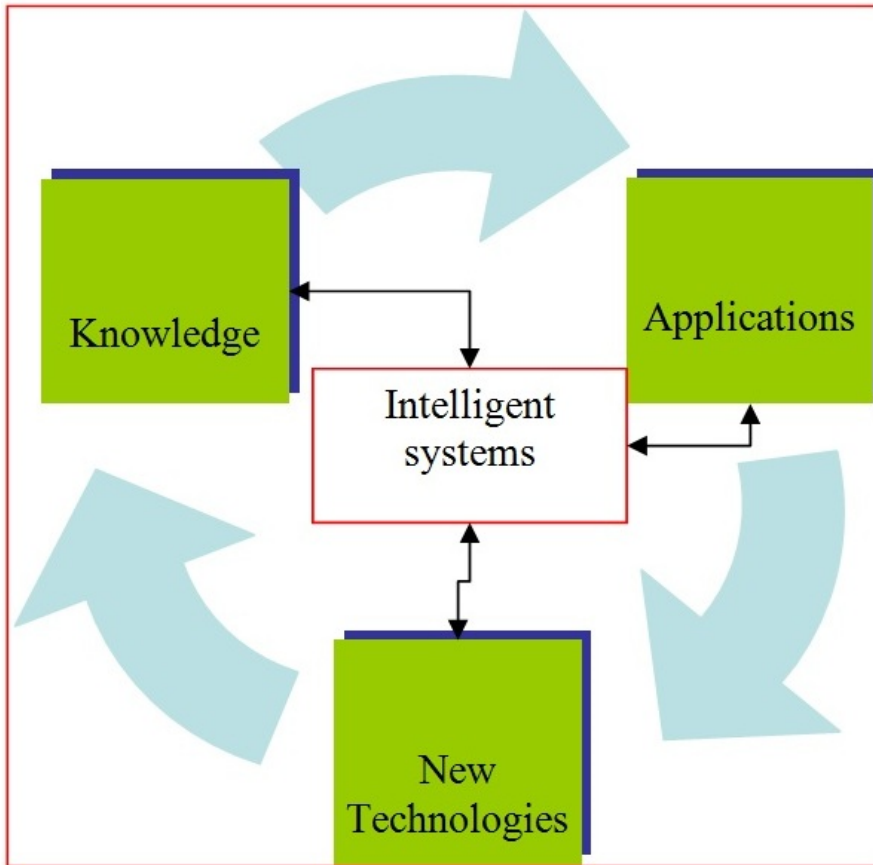


Figure 2. Intelligent systems solutions

Enormous potential of modern information and communication technologies are deployed throughout the world, being implemented in many systems that are interconnected and subject to an infusion of intelligence [9] led and lead conversion important activities from a locality in operations smarter.

For some localities, the modern society which is based on the use of modern information technologies constitute new possibilities for expression of identity and cultural traditions, and for other regions an opportunity to minimize inconvenience related to distance and isolation.

Centers of knowledge, an important step towards the area of intelligence, is the facility to use new technologies in a public place by members of a community. Local knowledge centers, spaces available to citizens, equipped with at least two telephone sets, two computers and a fax enable initiating and receiving telephone calls, facsimile and data communications at a data rate sufficient for functional internet access. Knowledge centers have appeared in all countries, regardless of development, following the desire of removing the negative effects: lack of training opportunities, employment, migration of rural population to urban centers due to lack of access to information on benefits offered by new information technologies. In 2007 there were 700 rural telecentres in Hungary and at present there are around 1000. Important to note is that remote areas (islands) can have such access to modern information technologies. Projects and implementation of knowledge centers exist in most countries, such as those developed and the developing. For centers known to exist in time [20] have to consider how funding and evolution of these in relation

to changes that occur constantly in the society. Centers of knowledge are a real support for localities to build a smart being a window into training, training and knowledge. The next step is to be made is to increase the efficiency of these centers of knowledge thus leading to an increase in the level of training, the knowledge acquired by members of the society which opens perspectives for the knowledge society. The qualitative improvement of knowledge centers become virtual networks, within which is becoming increasingly used in today's society. Each center has its own guidance and the knowledge center focused on areas of activity: medicine (Knowledge Center - Texas Medical Association), education (University of Illinois Educators' Knowledge Center).

We are currently talking more and more interconnected virtual networks of local communities to provide information and online services to citizens and businesses. Networks set up according to the needs of each community, city and ensure, through broadband connections, access to information and electronic services for the main institutions of the locality. Virtual network serving as knowledge centers provide access to telephone services, Internet and computer use, providing a great educational value. By building specific skills, students will be able to contribute actively to the value added of the educational process and to develop personal criteria for the selection and use of information. To adapt new technologies to social needs to be able to exploit the potential must first be possible staff training institutions and enterprises and the population. Appropriate use of modern technologies in order to increase communication, accessibility can lead to reduced administrative and social costs.

#### **4. Solution for future development of our society**

Future developments will have virtual networks, the growing dependence of the applications of modern information and communication technologies, but also to eliminate bureaucracy, by reducing working time in exchange increase free time. In a virtual network restrictions of time and space are virtually nonexistent thus contributing to reducing social division. Thus, virtual networks through their impact on the town put their imprint on the individual, but also the physical environment, economic and social. Modern information technologies lead to major changes on activities, on society, but also the environment that interact. Important component of development is a computerization of their villages, meaning the implementation and use of modern information and communication technologies in all economic sectors and linking them in a virtual network. The concept of virtual network refers to the response to complex social problems, economic and urban policy in relation to use of the true value and implementation of modern technologies. The existence of a single point of access to local knowledge center detailed information that can be stored in the various local institutions may be a first step towards a local virtual network and an intelligence locality.

European Union uses the names of "Telecities", "Cities On Line", "Intelligent Cities", "Digital Cities", etc., for projects in the United States are known as "Freenets. Terms listed above are used for local programs to foster the idea of efficient use of modern technologies, which in turn would stimulate development.

Amsterdam, Birmingham, London, New York are just some of the locations where they see the results of implementation solutions to a location intelligence evolution. They

have implemented various intelligent solutions. Interconnections of all intelligent systems implemented locally go to a intelligence locality.

City of Stockholm, for example, developed a traffic surveillance system, allowing its citizens to decision makers. In Germany, MVV Energie AG, a company providing electricity, created the "market" energy based on the collaboration of all elements that are part of the supply chain, from suppliers and to consumers who wanted a change. In London, the desire of citizens for improved public safety led to the installation (by groups of private and public) has over 10,000 surveillance cameras that provide information 24 hours a day [35].

City intelligence provides a clear on all local issues, on how you can communicate more intelligently the necessary information and people seeking to visit a place, giving them accurate information about climate change, health care, education and banking, those related to transport systems and water management systems and electricity supply, as well as 3D image elements of local interest. In addition, various products made available to guide how best to those who are for the first time in this village but also for those who want to quickly reach a certain point.

According to [12] all developed countries have developed and implemented government policies supported the development and adoption of modern information and communication technologies, strengthening the national information infrastructure, training and attracting specialists in modern technologies, the adult education, cooperation with private sector and encourage investment in this new economic branch, promoting government projects designed to demonstrate the utility of current society services.

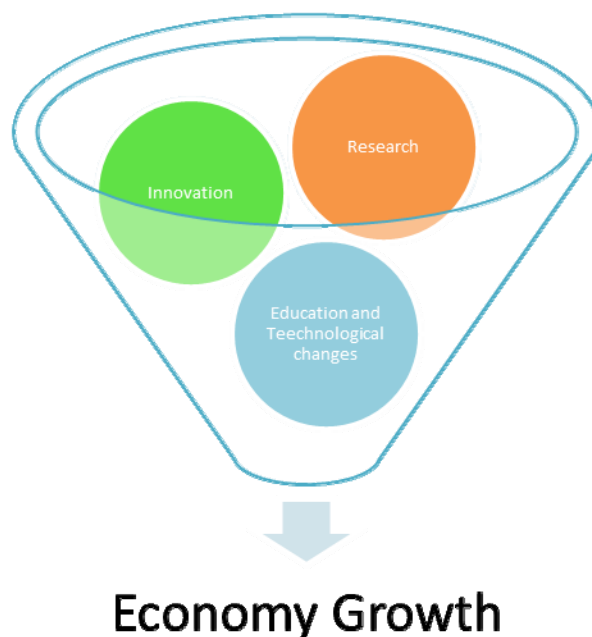
Everybody use the new technology and Internet in everyday for inform about news, for email, for keep in tuck with friend. Intelligent solutions represent the most important result of use efficiently of the new technology and Internet. Intelligent solutions increase the economy rates. The use of intelligent solutions in our society is an important part of evolution and development. The new technology has become a fundamental part of our economic and social infrastructure, yet its potential as an engine for growth, has only begun to be realized. The intelligent solutions can make a serious change in economic performance, employment, education, health care, government, the environment and in the delivery services for everybody.

In addition, the contribution of knowledge-intensive and skills-intensive sectors, such as modern manufacturing and internationally traded services, to overall economic activity in urban and regional economies has increased. During the next 20 years, this trend will continue to gather momentum. As gross domestic product (GDP) is increasingly based on the knowledge, creativity and ability of workers to innovate, the direct contribution of talent to economic value is expanding.

Knowledge society is characterized by the rapidity of change information and knowledge in services and products fields. In this economy is important to remark that the barriers of communication and the physical distance are lowest, the value of knowledge and information depends on the situation they are used but the mode in which they are understand by the citizen is important too.

As a result, investment in innovation, research, education and technological changes have the most central point to economic performance (Figure 3).

The growth of economy can be analyzed by the investments in higher education, innovation and research, and software. Measurement the performance of economy is based on the Gross Domestic Product (GDP) indicator.



**Figure 3.** The factors how determinate the Knowledge Society Growth

In generally GDP is the value of total production of goods and services in an economy during a particular period (normally a year). These traditional indicators guide the policy decisions of governments. But to the extent that the knowledge economy works differently from traditional economic theory, current indicators may fail to capture fundamental aspects of economic performance and lead to misinformed economic policies.[1] The traditional indicators can't measuring the performance of knowledge economy because the knowledge isn't a quantitative product.

In [1] GDP for measuring knowledge economy are needed for the following tasks:

- measuring knowledge inputs;
- measuring knowledge stocks and flows;
- measuring knowledge outputs;
- measuring knowledge and learning (human capital).

To **measure knowledge inputs** is similar to measure the investment in the production of scientific and technical knowledge, including research and development (R&D)

**Development of knowledge flow** indicators would yield better measures of the R&D and knowledge intensity of industries and economies.

Statistical techniques could be developed to **estimate knowledge stocks** based on current R&D input and flow measures.

To **measure knowledge outputs** and evaluate the performance of knowledge-based economies, priority should be placed on developing improved indicators of the private and social rates of return to R&D and other knowledge inputs. This includes measuring returns to individuals, firms and societies in terms of employment, output, productivity and competitiveness, and could be based on both macro-level econometric analyses and firm-level surveys. One of the great challenges is to develop indicators and methodologies for analyze the impact of technology on productivity and economic growth.



**Human capital indicators**, particularly those relating to education and employment, are central measures for the knowledge-based economy.

To study the evolutions of knowledge economy we can use Harrold-Domar [31] model. The model implies that economic growth depends on policies to increase investment, by increasing saving, and using that investment more efficiently through use intelligent solution and technological advances.

Let  $Y$  represent output, which equals income, and let  $K$  equal the capital stock.  $S$  is total saving,  $s$  is the savings rate, and  $I$  is investment.  $\delta$  stands for the rate of depreciation of the capital stock. The Harrod-Domar [31] model makes the following *a priori* assumptions:

$$Y = f(K)$$

1: Output is a function of capital stock

$$\frac{dY}{dK} = c$$

2: The marginal product of capital is constant, the production function exhibits constant returns to scale

$$\frac{d^2Y}{dK^2} = 0 \Rightarrow \frac{dY}{dK} = \frac{Y}{K}$$

3: Since the marginal product of capital is constant, it equals the constant ratio  $Y/K$

$$sY = S = I$$

4: The product of the savings rate and output equals saving, which equals investment

$$\Delta K = I - \delta K$$

5: The change in the capital stock equals investment less the depreciation of the capital stock

Derivation of output growth rate:

$$g = \frac{dY}{dK} = \frac{Y(t+1) - Y(t)}{sY(t) - \delta K(t)}$$

If the marginal product is constant:

$$g = \frac{Y(t+1) - Y(t)}{sY(t) - \delta \frac{dK}{dY} Y(t)}$$

$$c \left( sY(t) - \delta \frac{dK}{dY} Y(t) \right) = Y(t+1) - Y(t)$$

$$cY(t) \left( s - \delta \frac{dK}{dY} \right) = Y(t+1) - Y(t)$$

$$cs - c\delta \frac{dK}{dY} = \frac{Y(t+1) - Y(t)}{Y(t)}$$

The marginal product of capital is constant:

$$s \frac{dY}{dK} - s\delta \frac{dK}{dY} \frac{dY}{dK} = \frac{Y(t+1) - Y(t)}{Y(t)}$$

$$s \frac{dY}{dK} - \delta = \frac{\Delta Y}{Y}$$



In summation, the savings rate times the marginal product of capital minus the depreciation rate equals the output growth rate. So, increasing the savings rate, increasing the marginal product of capital, or decreasing the depreciation rate will increase the growth rate of output, these are the means to achieve growth in the Harrod-Domar model. We can say that the economic growth depends on policies to increase investment, by increasing saving, and using that investment more efficiently through use intelligent solution and technological advances.

The economy growth depends on investment and using that investment more efficiently through use intelligent systems.

## **5. Intelligent locality solution in our country**

Although Romania is not in a very advanced on the use of modern information and communication technologies, there are some tests and some achievements which are increasingly approaching knowledge society. Projects directory computerized of prefectures and town halls, designed by professional bodies at national level, are a first point of departure in the use of modern technologies. Current national developments were due in large measure both technological advances and new economic policies of privatization and promoting competition in the market of new information technologies and communications, new technical and legal regulations in the field, new national and regional strategies of development of society. In Romania, the general issue of information society, virtual town, the digital economy has been studied since the early 2000s and then continued and continues to study the knowledge society, knowledge economy, as well as intelligent villages is a research topic point.

Now in our country through a new concept, leading information technology firm IBM aims to provide a new arena for the world that is becoming more intelligent. The intelligent city concept offers new ways for both governments and the private sector through the convergence of the digital and physical worlds [30].

Advantages and benefits of intelligent locality: Alignment with the latest technologies in the field of information; Example openness to modern technology, reducing costs, degree of sports in case of disasters, better communication with citizens and gain a picture, the transparency achieved; awareness of citizen participation in community life economic, social, cultural, democratization of information by providing data coherent, consistent, updated, improved access to national and universal culture by accessing databases of information and documentation, reducing the amount of work attributed to public servants and default time for solving citizens, reduce errors, than the information's security and transactions entered effectuate, training human resources on a large scale, the phenomenon of mass.

## **6. Conclusion**

City today is the result of remarkable progress made as a result of using information and communication technologies. Society changes caused by the transmission, storage, processing and access to information and knowledge put their imprint on locality

development. Locality aims to become intelligence through intelligent systems, modern information and communication technologies. These solutions make daily activities more easily and efficiently.

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### **References**

1. Anthony Arundel, **From the 19th to the 21st century: Indicators for the Knowledge Economy**, "Knowledge Economy – Challenges for Measurement", December 8-9, Luxembourg, 2005
2. Alpopi, C., **Orasul prezent – Orasul viitorului, Theoretical and Empirical Researches in Urban Management**, Year 1, Number 1, 2006 **Cercetari practice si teoretice în Managementul Urban**, Anul 1, Nr. 1, 2006, ISSN: 1842-5712
3. Blakely, EJ, NG Leigh, **Planning local economic development: Theory and practice**, Library Congress Cataloging-In-Publication Data ,2009, ISSN: 978-1-4129-6093-9
4. Lise Bourdeau-Lepage, Desislava Kolarova, **Knowledge Society and Transition Economies**, Laboratoire d'Economie et de Gestion Espace Europe Institut, 2005
5. Doukidis, G., Mylonopoulos, N., Athanasia (Nancy), P., **„Social and Economic Transformation in the Digital Era“** Publisher Idea Group, 2004, [Online]
6. Giffinger, R, Fertner, C., Kramar, H., Kalasek, R. Pichler-Milanović, N., and Meijers, E. **“Smart cities - Ranking of European medium-sized cities“**, Final report (October 2007). On the web: [http://www.smartcities.eu/download/smart\\_cities\\_final\\_report.pdf](http://www.smartcities.eu/download/smart_cities_final_report.pdf)
7. James, M. B., **Innovation and the city: a macromarketing approach to industry development**, Marketing Intelligence&Planning, 2009, vol 27, issue 2, pp. 233-245, ISSN 0263-4503
8. Kachroo, P. , Wadoo, S. A. , Sadeq J. Al-nasur , Apoorva R. Shende , M.P. Singh , Kaan Ozbay, **Information technology requirements for intelligent evacuation systems**, World Review of Intermodal Transportation Research, Issue: Volume 2, Number 2-3 / 2009, pp. 127 - 144
9. Komninos, N., **Intelligent cities: towards interactive and global innovation environments**, Aristotle University, Thessaloniki, GR-54124, Greece, International Journal of Innovation and Regional Development, Issue: Volume 1, Number 4 / 2009, pp. 337 - 355
10. Matei, A., Anghelescu, S., **Models with Simultaneous Equations for Local Development**, Theoretical and Applied Economics, Vol. XVII, No. 1, 2010, pp 27-48

11. Mendes, M. J., Suomi, R., Passos C., **Digital Communities in a Networked Society E-Commerce**, E-Business and E-Government Publisher Kluwer Academic, 2003 [Online]
12. Pacesila, M., Colesca S. E., **Orasele inteligente: perspectiva de ansamblu si implicatii politice**, Theoretical and Empirical Researches in Urban Management, Year 2, Number 5, **2007 Cercetari practice si teoretice in Managementul Urban**, Anul 2, Nr. 5, 2007 ISSN: 1842-5712
13. Rosca, I. Gh., Ghilic-Micu, B., Stoica M., Batagan L., Marasescu A. s.a., **Informatica Societatea informatională. E-serviciile**, 2006
14. Teodorescu, De Horio-Nicolai, Junzo Watada, Lakhmi C., **Jain Intelligent Systems and Technologies: Methods and Applications**, p. 296, Springer, 2009, ISBN 978-3-642-01885-5
15. Yi-chen, L., **Global information society: operating information systems in a dynamic global business environment**, Publisher Idea Group, 2005 [Online]
16. Digital Planet, **The Global Information Economy**, Published by World Information Technology and Services Alliance (WITSA), 2006
17. European Comission, **Information Society**, 2010  
[http://ec.europa.eu/information\\_society/eeurope/i2010/index\\_en.htm](http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm)  
[Accesat 10 Ianuarie 2010].
18. European Comission, **Economica land Finacial Affairs** [http://ec.europa.eu/economy\\_finance/eu/countries/romania\\_en.htm](http://ec.europa.eu/economy_finance/eu/countries/romania_en.htm) [Accesat 10 Ianuarie 2010].
19. **Europe's Digital Competitiveness Report**, Volume 2: i2010 — ICT Country Profiles, Bruxelles, 04.08.2009 -  
[http://ec.europa.eu/information\\_society/eeurope/i2010/docs/annual\\_report/2009/sec\\_2009\\_1104.pdf](http://ec.europa.eu/information_society/eeurope/i2010/docs/annual_report/2009/sec_2009_1104.pdf) [Accesat 10 Ianuarie 2010].
20. Government of Romania <http://unpan1.un.org/intradoc/groups/public/documents/Other/UNPAN036099.pdf> [Accesat 10 Ianuarie 2010].
21. <http://www.oecd.org/dataoecd/20/41/40789235.pdf> „**The Future of the Internet Economy**” Organization for Economic Co-operation and Development COED [Accesat 10 Ianuarie 2010].
22. National Institute of Standards and Technologies <http://www.nist.gov> [Accesat 10 Ianuarie 2010].
23. Sistemul Electronic National [www.e-guvernare.ro](http://www.e-guvernare.ro) [Accesat 10 Ianuarie 2010].
24. Sistemului Electronic de Achiziții Publice – SEAP, [www.e-licitatie.ro](http://www.e-licitatie.ro) [Accesat 10 Ianuarie 2010].
25. E-România ([www.romania.gov.ro](http://www.romania.gov.ro)) [Accesat 10 Ianuarie 2010].

26. Amsterdam- Intelligent City, <http://mytechbox.wordpress.com/2009/06/08/amsterdam-will-be-eu%E2%80%99s-first-%E2%80%98intelligent%E2%80%99-city/>  
[Accesat 10 Ianuarie 2010].
27. **Birmingham is fast becoming the UK's first Intelligent City**  
<http://www.digitalbirmingham.co.uk/case-stories/birmingham-is-fast-becoming-the-uks-first-intelligent-city>
28. **IBM se pregătește pentru un deceniu al inteligenței** din data de: 25.01.2010  
[http://www.agora.ro/index.php?qs\\_sect\\_id=126&qs\\_stire\\_id=28595&qs\\_f\\_id=5](http://www.agora.ro/index.php?qs_sect_id=126&qs_stire_id=28595&qs_f_id=5)
29. **IBM susține construirea unei planete mai inteligente**  
<http://www.comunic.ro/news.php/IBM-sus%C5%A3ine-construirea-unei-planete-mai-inteligente--Agora-News/1/65288/>
30. **IBM aims to build "smarter planet"**  
<http://www.hurriyetdailynews.com/n.php?n=ibm-building-8220smarter-planet8221-2010-03-17>
31. **Models for economic growth – IB Economics**  
<http://welkerswikinomics.com/blog/2008/02/26/models-for-economic-growth-ib-economics/>

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