

PROGRESS AND CHALLENGES OF MEASURING THE INFORMATION SOCIETY IN LATIN AMERICA AND THE CARIBBEAN

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ABSTRACT

The access to Information and Communication Technologies (ICT) became fundamental for socio-economic growth, particularly in developing countries. Indicators elaborated by OSILAC have shown that although the usage of some ICT is growing widely, the level of internet usage in Latin America is still very far from its use in developed countries. The present unequal access within and between developing countries can be worsened if there are no policies to guarantee the digital access to all or most sectors of society. Existing social and economical differences can be both deepened by the lack of or deepening the access to ICT. Measuring ICT access, usage and capabilities is therefore indispensable for elaborating, monitoring and evaluating adequate and inclusive policy-design.

The objective of this paper is to present the “Progress and challenges of measuring the Information Society in Latin America and the Caribbean ICT”. Special attention will be given to the initiatives that have been undertaken to harmonize indicators, and the results of the analyses carried out with the available statistical information on ICT access and usage produced by OSILAC in order to monitor ICT related policies in the region.

Key words

ICT Measurement, Information Society, Digital Divide, Latin America and the Caribbean

RESUMEN

El acceso a las Tecnologías de la Información y la Comunicación (TIC) se ha convertido en un aspecto fundamental para el crecimiento socio-económico, particularmente en los países en desarrollo. Los indicadores elaborados por OSILAC han demostrado que aunque existe un incremento en el uso de algunas TIC en América Latina, el nivel de uso de Internet se encuentra aún lejos del nivel observado en los países desarrollados. La actual desigualdad en el acceso dentro y entre países en desarrollo puede empeorar si no existen políticas para garantizar el acceso digital a todos o la mayoría de los sectores de la sociedad. Las brechas sociales y económicas existentes pueden ser profundizadas por la falta de acceso a las TIC. La medición del acceso a, el uso de y las capacidades en TIC es indispensable para la elaboración, seguimiento y evaluación de políticas diseñadas de manera adecuada e inclusiva.

El objetivo de este trabajo es presentar los "Avances y desafíos de la medición de la Sociedad de la Información en América Latina y el Caribe". Se presta especial atención a las iniciativas que se han adoptado para armonizar los indicadores y los resultados de los análisis realizados con la información estadística disponible sobre el acceso y uso de TIC producida por OSILAC para el monitoreo de las políticas relacionadas con TIC en la región.

Palabras clave

Medición de las TIC, Sociedad de la Información, Brecha Digital, América Latina y el Caribe

1. Introduction

Measuring Information and Communications Technologies (ICT) access, usage and capabilities is a key process to allow sound assessments and monitoring on the advances of countries. It has become clear that this does not only apply to advanced countries as ICT poses significant opportunities and challenges to the developing world. The measurement of the phenomena and its dynamics becomes indispensable in order to understand the development of today's information

societies and to support adequate policy-design and assessment. Particularly, developing countries need to comprehend the dynamics of the ICT evolution and revolution and its possibilities to support socio-economic development (Katz and Hilbert, 2003; Schulz and Olaya, 2005).

Literature argues that equity can be increased by a broadened access and usage of ICT, showing them as an opportunity for development. However, some indicators elaborated by the UNECLAC Observatory for the Information Society in Latin America and the Caribbean (OSILAC) [1] allow concluding that although the usage of some ICT like mobile phone is growing widely, the level of internet use is still very far from use in developed countries, and broadband access indicators shows that Latin America is not growing as fast as advanced countries (Peres and Hilbert, 2008). Therefore, in order to elaborate accurate policies for information society, exercises to assess current dynamics and to establish the real digital divide and stage of ICT evolution in countries of the region are a crucial step of the process.

To present the current stage of the development of indicators for the information society in Latin America and the Caribbean, and its importance for the strengthening of public policies, this paper is structured as follows: Section 2 summarizes the background and progress in the measurement of ICT in the region, including the development of the OSILAC Statistical Information System on ICT. Special attention will be given to the initiatives that have been undertaken to harmonize indicators, such as the “Partnership on Measuring ICT for Development”, an inter-agency initiative in which OSILAC has been playing an important role. In Section 3, the results of a few analyses carried out with the available statistical information on ICT access and usage produced by OSILAC will be presented, including a comparison of the Latin American context with European countries. Section 4 discusses the importance of ICT indicators for the developing and monitoring of digital policies in the region. Finally, Section 5 presents final conclusions and the challenges met in the process of measuring ICT for development in Latin America and the Caribbean.

2. Measuring the Information Society

2.1. Background

Following the World Summit on the Information Society (WSIS), which took place in two phases (Geneva 2003 and Tunis 2005), countries and regions were called upon to develop tools for measuring and monitoring progress towards the information society, including basic ICT indicators (Partnership, 2005a and

2005b). The Partnership on Measuring ICT for Development was then launched in June 2004, as a multi-stakeholder initiative aimed at improving the availability and quality of ICT data and indicators, particularly in developing countries. Currently the members of the initiative are ITU, OECD, UNCTAD, the UNESCO Institute for Statistics, the UN Regional Commissions (UNECLAC, UNESCWA, UNESCAP, UNECA, the World Bank, EUROSTAT and UNDESA, who joined the Partnership in May 2009. ECLAC is part of the Partnership Steering committee, along with ITU and UNCTAD.

Among the main objectives of the Partnership is to identify a set of key indicators (Annex 1) in the measurement of ICT (Partnership 2005b, 2008 and 2010). This set of indicators [2] represents the result of discussions and agreements taken regionally among National Statistical Offices, and globally among member institutions of the Partnership. In the region of Latin America and the Caribbean, the creation of OSILAC in late 2003 represented an important step towards creating an environment that fosters the development of ICT indicators.

These core indicators were first presented at the Thematic Meeting of the World Summit on the Information Society held in Geneva from 7 to 9 February 2005 and endorsed by the Statistical Commission of United Nations (UNSC) its 38th session in February 2007. Subsequently, the list has been reviewed by the same Partnership in 2008 and 2010. The updated publication of the Core ICT Indicators was presented at the 41th meeting of the UNSC, held in February 2010.

2.2. Current status and key challenges in ICT measurement

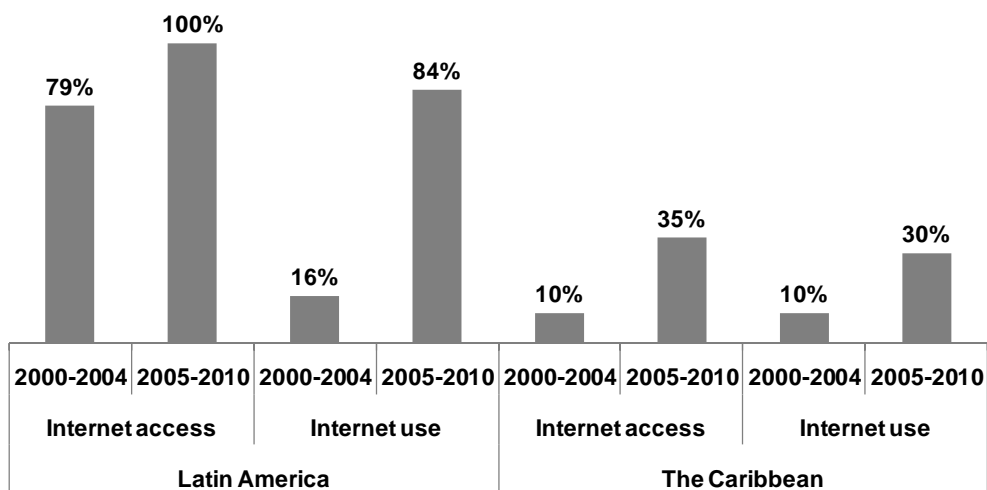
Over the last five years, the region has experienced significant development in the production and compilation of harmonized statistics and indicators on ICT access and use collected by means of National Household Surveys (NHS) and National Business Surveys (NBS). It has also strengthened its regional capacities for the formulation and design of questionnaires, data collection, harmonization of indicators, and dissemination of methodologies. This process has been significantly supported by OSILAC, which has maintained and expanded its collaboration with the National Statistical Offices (NSO) of the region, having organized six annual Workshops on Information Society Measurement in Latin America and the Caribbean since 2004, as well as conducted other activities of direct technical assistance and online support to the countries [3].

The adoption of the “Compendium of Practices on the implementation of ICT questions in household and business survey” by the Statistical Conference of the Americas (SCA) of ECLAC in 2007 has been a crucial point for the statistical

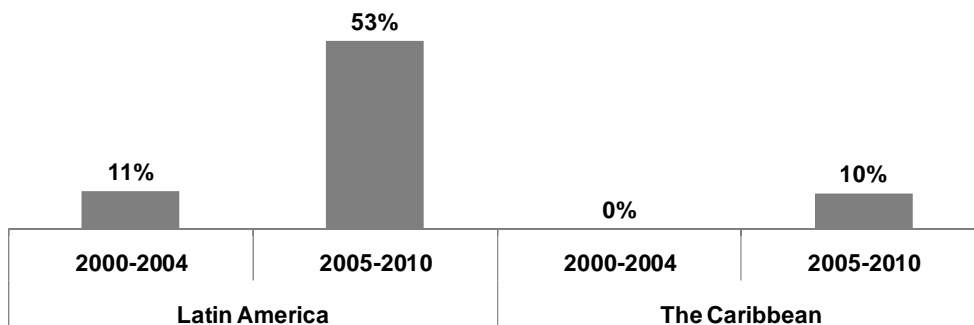
development in this area. Elaborated by OSILAC, the updated document collects and organizes information on the progress made by countries in the region from 2000 until 2010 [4]. Until 2004, it shows that only 15 countries in Latin America had indicators on Internet access and only three on Internet use [5]; while currently, 19 countries have data on Internet access and 16 on Internet use. In the Caribbean countries, the available information is scarcer; until 2004, only two Caribbean countries had indicators on Internet access and other two on Internet use, while in 2010, 7 countries have data on Internet access and 6 on ICT use in NHS [6]. Moreover, on NBS, currently 12 countries have incorporated questions on ICT in Latin America and the Caribbean in the period. Graph 1 displays a summary.

Graph 1. Percentage of countries monitoring ICT core indicators (revised list) in household and business surveys in Latin America and the Caribbean.

Households surveys



Businesses surveys



Source: OSILAC based on information reported by National Statistical Offices, December 2010. For household results it was considered only countries that had at least one indicator of access and one of use. Number of countries in Latin America: 19. Number of countries and territories in the Caribbean: 20.

Additionally, efforts have been made in order to coordinate activities with the Working Group on ICT Statistics, created in the 3rd Reunion of the SCA in 2005, and with the United Nations Statistical Commission (UNSC), through the work carried out with the Partnership on Measuring ICT for Development. This network has been expanded and now includes other institutions that measure additional and more specific indicators on ICT, such as ICT sector, ICT infrastructure, e-education, e-government, etc. Among them are ministries of planning, of economy, of education and of science and technology, as well as universities, think tanks and firms in the ICT sector.

In the case of ICT-access variables, their collection and analysis started before the creation of OSILAC, which has taken advantage of the results of the MECOVI work (Program of the Improvement of Surveys and the Measurement of Living Conditions in Latin America and the Caribbean) developed by ECLAC, the World Bank and the Inter-American Development Bank. As a result of this project, most countries have included ICT-access questions in their module of housing and household information, specifically in the inventory of households' durable goods and services, which traditionally is answered by the head of the household. The key variable in this module is the ownership of Internet.

On the other hand, the collection of ICT-use variables does not have the same coverage and frequency in all Latin American and Caribbean countries, being almost non-existent in the latter. Some, like Paraguay, El Salvador and Honduras, have incorporated ICT questions in their annual household surveys; others, like Uruguay, Chile and Dominican Republic, inquire about ICT use only every two or three years. In all cases, the most important outcome of this work is that the region began to establish a set of internationally comparable indicators based on official statistics.

Despite efforts on the elaboration of indicators, there is still a great challenge in terms of measuring ICT impacts. Although indicators provide background information on the advances in ICT access and use in the last years, it is well known that it is not possible to establish isolated causal relationships among variables of interest. This is a complex field that requires more analysis in the region, especially in a thematic like this, where effects are usually transversal and mutually crossed (Peres and Hilbert, 2008). An impact evaluation of a program and/or activity involving ICT requires advanced techniques, including teams of multiple disciplines that seek to quantify results explained by a real action, rather than by any other random factor that has happened while the initiative was developed.

The countries of the region must build capacity in this regard, which will impact the strengthening of existing institutions, even knowing that any further budget spent on ICT initiatives competes with other priorities that have not been covered in the countries of the region, given the context of a scenario of scarce resources with high opportunity cost.

2.2. Statistical Information System on ICT

The implementation of the Statistical Information System on ICT [7], which is the result of OSILAC efforts for the collection of ICT household information with the collaboration of statistical offices, has been a major milestone in the development of ICT statistics in the region. Through a single application, the system integrates data on ICT access and use collected in NHS in Latin America and the Caribbean.

At present, the system provides statistical information on ICT for 17 Latin American countries, with the exception of Argentina and Cuba, summing up 96 NHS databases collected and harmonized by OSILAC. Based on the information provided by the system, it is possible to measure ICT-access-and-use gaps, identifying their social, economic and demographic factors, seizing potential targets for public policies in those populations that illustrate the greatest

disadvantages in the adoption and productive use of ICTs. As such, the system is a powerful tool for the formulation and evaluation of public policies and ICT-related strategies in the region.

There are 47 ICT variables available, including the core indicators (Annex 1), and 20 socio-economic variables, like household income, educational level, occupation, sex and geographic area (urban, rural). Notice, however, that not all the variables are available for every country. The database mainly covers surveys made from 2000 to 2009, and the micro-data available includes Bolivia, Brazil, Chile, Costa Rica, Colombia, Panama, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela.

This system stands out because it allows one to process the results of multiple databases which are displayed in a single table, thus providing access to aggregated results according to ICT- and socio-economic variables. Additionally, it is possible to make comparisons over time, within countries, between countries and at regional level. The system can be accessed by any person, by Internet. It is available in English or Spanish and the results can be obtained in HTML or in Excel format. Its target audience includes researchers, decision-makers, opinion leaders and students and anyone interested in the ICT topic.

The harmonization of the variables has been carried out using a combination of SAS base, SQL and macro codes and involves the creation of a master code of categories of analysis of each variable of interest, and the normalization of lengths and names of each variable of each survey. Currently, the data system integrates the answers given by 10,099,693 interviewed people from 2,674,827 homes in the last 9 years, in other words, an average of 1,009,969 persons per year. This sample size can hardly be achieved by other surveys, pointing out that the system is an information source of enormous potentialities for analysis and research on the progress of the information society in the countries of the region. Some studies like Grazzi and Vergara (2009) and Grazzi (2009) have used the data from this statistical system to determine access and use of ICTs in the countries of the region.

Finally, it is important to mention that OSILAC has focused the analysis in NHS, but the region has other important sources of information like Population Censuses and Administrative Records. In 2010, a new round of censuses has began, and a considerable number of NSOs in the regional are including questions on ICT access and individual use. These information should be shortly available, but they are beyond the scope of this paper.

3. Digital divide in Latin American and the Caribbean

Available data in the OSILAC Statistical Information System on ICT [7] illustrates the current status and evolution of the digital divide both among and within Latin American countries, which are the result of pre-existing economic and social inequalities in certain dimensions such as income, education, gender, ethnicity, geographic location, among others.

In order to illustrate the development of public policies focused on reducing the digital divide, it is important to distinguish the existent gap in access to ICT goods and services, and the gap in the individual use of digital tools. That is necessary because what characterizes the social and productive organization of information societies is the quantity and quality of digitalized information and communication, and not the number of installed computers or other equipment (Peres and Hilbert, 2008). Therefore, public policies fostering digital inclusion should not only ensure ICT access, but also empower people from different backgrounds to use ICT and to make it relevant to their lives (Balboni, 2007).

The data collected from the NHS in Latin America have allowed the elaboration of detailed analyses at national and sub national levels, indicating the existence of relationships between levels of income, education and geographic location, in regards to ICT access and use. In Latin America, the study by Grazzi (2009) is one of few papers that have examined the determinants of Internet adoption and have elaborated a cross-country analysis seeking to examine the correlation between the socio-economic characteristics of Internet users and the different Internet activities undertaken by individuals. The main findings of his study are: that Internet access cannot be translated automatically into usage and that the digital divide is still a reality inside the household – for example, women and older people are less likely to use the Internet, even when access is provided.

Other studies, such as Grazzi and Vergara (2009); Razeto and Celedon (2009); OSILAC (2007a), Regulatel (2007) and IDRC (2007), report that the access gap increases as technology becomes more complex and expensive for the user. Thus, the key determinants to the digital divide in Latin America and the Caribbean are indeed socio-economic variables of income, education level and access to ICT by households.

3.1. The access gap

In order to examine the digital divide in ICT access in Latin America, both among and within countries, we have considered the adoption of the technologies that

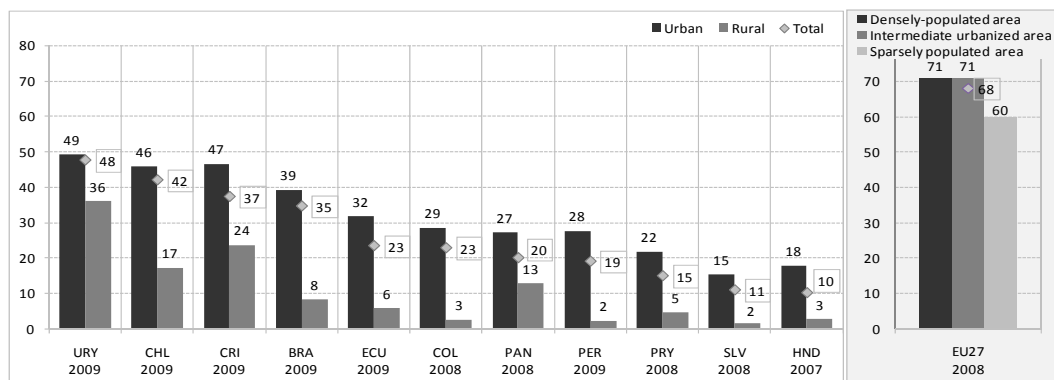
have acquired a greater role both at a household and at an individual level: the computer and the Internet [8]. Although in general these technologies are present in an increasing number of households, their level of penetration varies by geographic area (urban or rural) and income level, among other characteristics.

Below are some results obtained through the OSILAC Statistical Information System on ICT, which illustrate the relationship among the Internet access determinants, and furthermore allow the identification of the major public-policy issues in the region. These results were also compared with indicators from more developed countries by means of Eurostat - Data Explorer [9].

Computer ownership: to analyze the external gap among countries, we compared 11 states from Latin America and identified the existence of two main patterns of household computer access dividing the countries into two groups (Graph 2): the first comprising Uruguay, Chile, Costa Rica, and Brazil, with percentages of computer access varying from 35% to 48%, and a second group formed by Ecuador, Colombia, Panama, Peru, Paraguay, El Salvador and Honduras with lower penetration, ranging from 10% to 23%. Compared with the European Union (EU) the gap is considerably greater, given that household access to a computer in this region is of 68%.

If we consider the internal gap within countries, which reflect differences according to geographical area (rural and urban in Latin American countries) and income, i.e., the divide is highly marked. In all countries of the region, household computer access in urban areas is at least 10 percentage points higher than in rural areas, and this difference can be up to 30 percentage points in countries with known social inequalities like Brazil. Thus, the urban-rural gap is clear for all Latin American countries examined, even those who have shown significant progress towards the information society. In the case of the EU, the differences in access between densely populated areas (71%), intermediate urbanized areas (71%) and sparsely populated areas (60%) is not as marked.

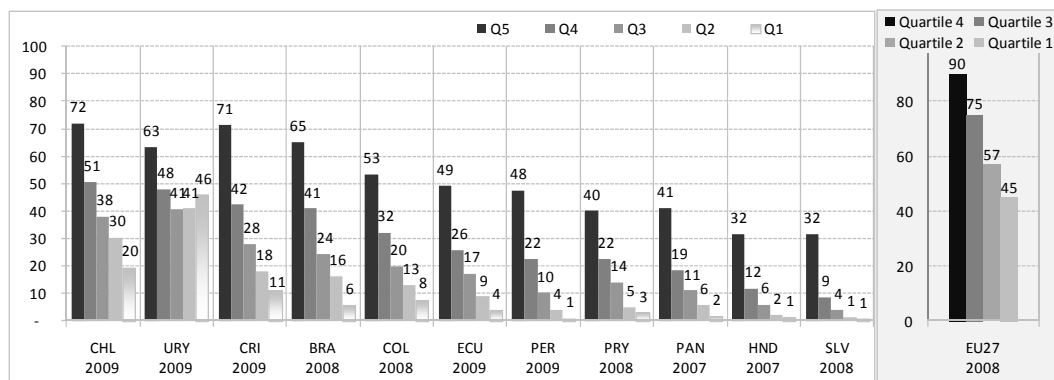
Graph 2. Presence of a computer at home by zone in Latin America (11 countries) and in the European Union (27 countries). (Percentages).



Source: author's elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat - Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability.

The level of household income is also another determining factor for the presence of computers in households in Latin America. As shown in Graph 3, the difference in the presence of the equipment among the highest and lowest quintiles of income is expressive in every country in the region, with exception of Uruguay, which presents the better access distribution in relation to the household revenue: access is higher than 40% in every quintile, probably due to public programs like the one laptop per child (project Seibal). In Chile, Costa Rica, and Brazil, the percentage of access in the highest quintiles of income (fifth quintile) varies from 63% to around 72%, while in the first two quintiles percentages varies from 6 to 30%. On the other hand, in Paraguay, Panama, Honduras and El Salvador, computer access in households from the fifth quintile does not exceed 41%, while in the first two quintiles it is lower than 6%. In short, the revenue distribution is still the principal determinant for the presence of a household computer in the region. The majority of European countries reveal less inequality than Latin-American countries. Unsurprisingly, the level of computer access in EU countries is much higher than in Latin American countries in every quintile.

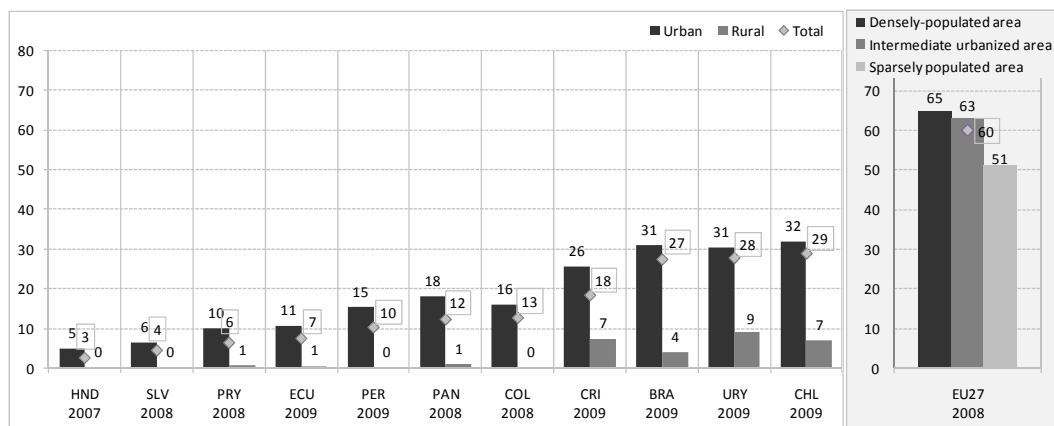
Graph 3. Presence of a computer at home by income group in Latin America (11 countries) and the European Union (27 countries). (Percentages) [10]



Source: author's elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat – Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability.

Internet ownership: the gap in Internet access in Latin American households is even more influenced by income levels and geographical area than the computer access divide. In relation to the external gap by geographical area it can be seen that the tendency is repeated, with the characterization of a group of countries with greater access, where only Chile, Uruguay, Brazil, and Costa Rica have levels of Internet access higher than 15%. Moreover, the second group could be further divided into two blocks of countries, the first one formed by Colombia, Panama, and Peru, whose access levels vary between 10% and 13%, and another including Ecuador, Paraguay, El Salvador, and Honduras, where Internet access does not exceed 7% (Graph 4). On the other hand, Internet access in EU homes is at least twice the level in Latin American countries. Even in the EU's sparsely populated areas, access is greater than all of Latin America's urban areas.

Graph 4. Households with Internet access by zone in Latin America (11 countries) and in the European Union (27 countries). (Percentages)



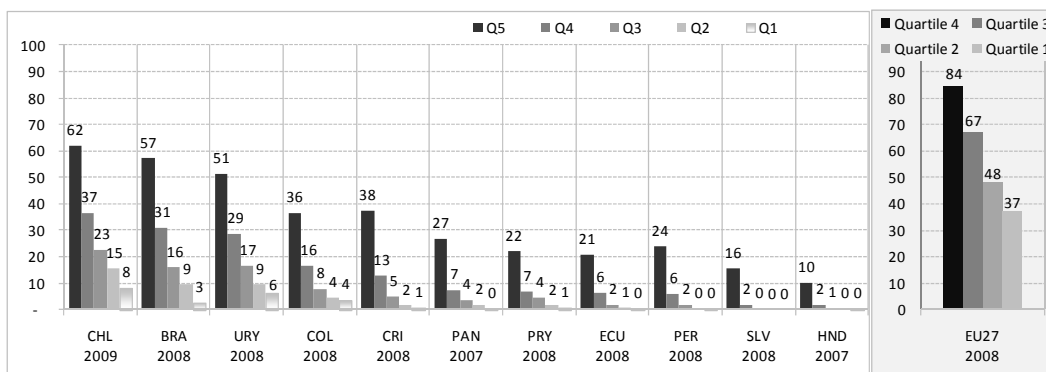
Source: author's elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat. Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability.

Considering the internal gap by geographical area, we can see that Internet access in Latin American households is even lower in rural areas, mainly due to the lack of network infrastructure, but also to lower income and educational levels. In the last group of countries mentioned above, network access in rural areas is almost non-existent, while in urban areas it reaches up to 11%. And in countries with higher urban access, the rural gap is extreme. For example, Brazil and Chile stand out as having the highest inequality in this respect. In rural areas, the access does not exceed 4% and 7%, respectively, while in urban areas it goes up to 31% and 32%.

The internal gap in Internet access according to income follows a pattern similar to that of computer access, the difference being that the penetration levels are significantly lower. Graph 5 shows that even in countries with higher rates of Internet access, like Chile, Brazil and Uruguay, access in the first two quintiles does not exceed 15%. In the case of Brazil, for example, the differences are extreme: while 57% of households in the fifth quintile have Internet access, when it comes to the first quintile (the most excluded) this percentage is a mere 3%. In countries with lower internet penetration, like Paraguay, Ecuador, Peru, El Salvador and Honduras, Internet access in the highest quintile reaches up to 24%, while in the two first quintiles it practically inexistent.

At the same time, the gap in the Internet access between countries from the EU and Latin America is huge, even higher than in computer access. Internet penetration in households from the last quartile of EU countries (37%), which have the lower incomes in that region, exceeds the penetration of the fifth quintile (the richest) of most Latin American countries, with the exception of Chile, Brazil, Uruguay and Costa Rica.

Graph 5. Households with Internet access by income in Latin America (11 countries) and in the European Union (27 countries). (Percentages) [11]



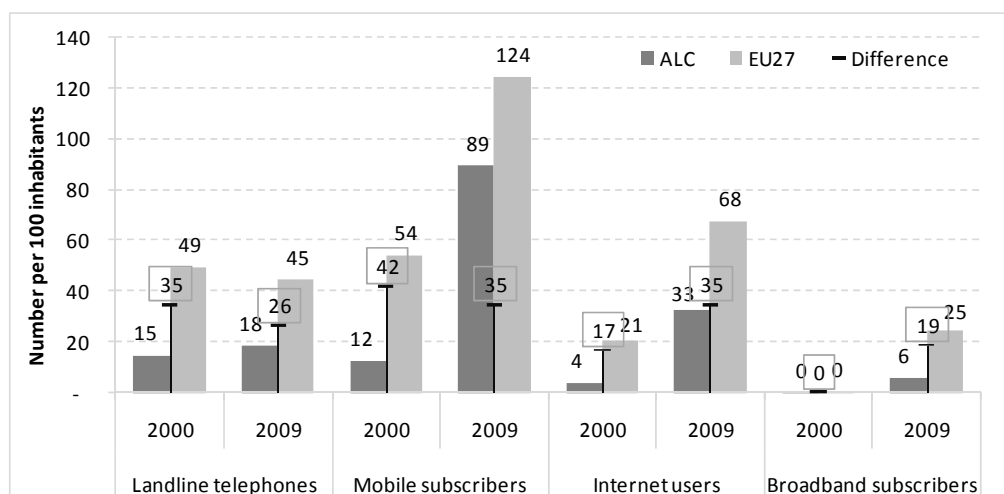
Source: author’s elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat. Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability.

With the information available at OSILAC it is possible to make additional analysis on the access gap in households, but that was beyond the scope of this paper, which aims to show that differences in income and geographical zone affect both access to computers and the Internet, with a deeper impact in the latter. In this way, the results confirm the premise that social and economical factors are still determining internet access, particularly the level of income and geographical location. Also, it demonstrates that the internal gap increases as technology becomes more complex and costly for the user, such as the Internet.

In this sense, we can also see (Graph 6) that the gap in the adoption of new technologies, such as Internet and broadband, is increasing between developed and developing countries. While the number of Internet users in Latin American countries went from 4% in 2000 to 33% in 2009, in EU countries the growth was from 21% to 68% in the same period, showing that penetration differences between both regions also grew from 17 to 35 percentage points. In the case of broadband

access, the numbers from ITU demonstrate that while none regions had access to the technology in 2000, in 2009 the penetration of broadband subscribers went up to 25% in the EU region while in Latin American countries it did not exceed 6%. We see then that even with the crescent access to ICT in Latin America, there is still a long way to go towards closing the gap.

Graph 6. ICT penetration in Latin America and the Caribbean and in the European countries (27 countries) [12], in 2000 and 2009. (Percentages)



Source: author's elaboration based on the ITU data "World Telecommunications Indicators Database" (2010), latest available revision.

3.2. The usage gap

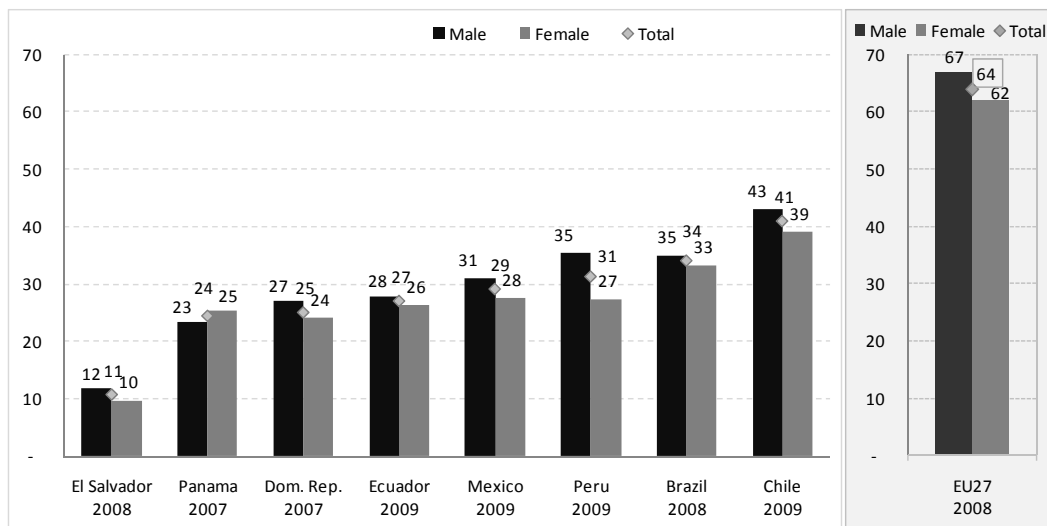
It is known that measuring access to ICTs is not sufficient to identify differences in the potential socio-economic development of countries and their people. Access to infrastructure is an initial step in closing the digital divide, but only the first and most basic one. Therefore, explicit efforts should be made to understand the usage gap, especially considering the ICT benefits for economic development, social welfare, and the full participation of citizens in the information society.

In this way, to identify the limitations on the uptake of these technologies in different groups in society it would be important to analyze ICT usage according to age, gender and educational level, as well as to understand which are the main activities carried out by these groups in different places of access, like the household, school, work, commercial Internet-access facilities, etc.

In order to illustrate the digital divide on Internet usage in Latin America, a comparative analysis was made using OSILAC data on Uruguay, Peru, Paraguay, Panama, Mexico, Honduras, El Salvador, Ecuador, Costa Rica, and Brazil. The variables analyzed were Internet usage by gender, activities undertaken and access location. This information was also compared to numbers from the European Union.

Internet usage by gender: The individual use of Internet varies considerably among the Latin American countries analyzed, ranging from 41% in Chile (2009) to 11% in El Salvador (2008). But within each country, the percentage of men and women using the Internet seems to be fairly even, varying between one and three points in most countries, with the exception of Peru, and Chile, where male access can surpass female's by up to 8 percentage points (Graph 7).

Graph 7. Internet usage by gender. Latin America (8 selected countries) and the European countries (27 countries).



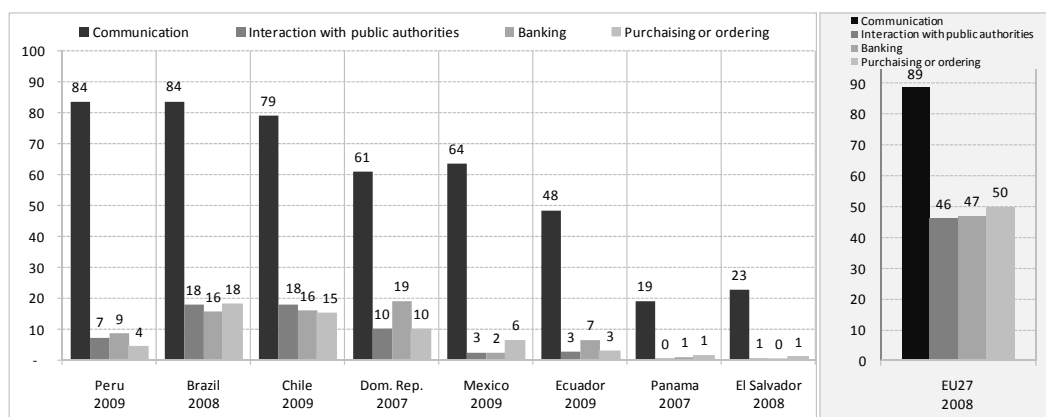
Source: author's elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat. Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union counties the data used is from 2008, to keep comparability.

Panama is the only country where the female access exceeds male's by two percentage points. And, as expected, the percentage of individuals using the Internet in the EU is more than twice higher than in Latin American countries, with

the exception of Brazil and Chile, where in any case the difference is superior to 20 percentage points. Neither does the EU region seem to display a pronounced difference in Internet access by gender, given that 62% of its women and 67% of its men use the Internet (in 2008).

Internet activities: Information-seeking and communication are the most frequent Internet activities undertaken by individuals in all countries of Latin America and other countries (Graph 8). However, the list of core indicators on Internet access and use (Partnership, 2008b) no longer includes the option “to search for information,” given that it is a nearly universal practice. In the case of the countries analyzed, communication is the main activity undertaken by people in Latin America, with percentages that vary from 19% (Panama) to 84% (Peru), but in most of the countries they are higher than 50%. In the EU region, the use of Internet for communication is universal (around 90%).

Graph 8. Internet activities undertaken by individuals in Latin America (8 countries) and in the European Union (27 countries). (Percentages over the total number of Internet users) [13]



Source: author’s elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat. Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability [14].

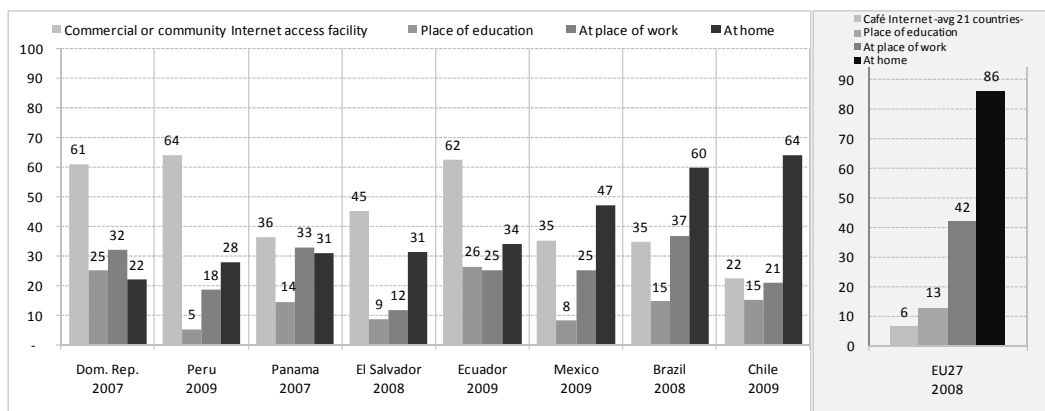
Noteworthy in the region are the low levels of Internet use for more complex activities such as e-government, e-commerce and online banking. While in EU countries, 46% of the Internet users interact with public authorities through the Net, 47% perform banking activities and 50% are adept in purchasing online, these activities are almost non-existent in most of the Latin American region, with the

exception of Brazil (2008), Chile (2009) and the Dominican Republic (2007). For example, e-government usage rates are 18% in Brazil, 18% in Chile and 10% in the Dominican Republic. In the other Latin American countries, it does not exceed 7%.

There are many explanations for this phenomenon, including lack of e-government services available to citizens, problems with cyber-security and the low income level of the region in general. Thus, one can infer that the average Latin-American Internet-user is not prepared yet to use the network for more complex activities, which require more sophisticated interactions.

Location of Internet use: In most Latin American countries analyzed, commercial Internet access facilities are known as the most popular locale for Internet use, with the exception of Mexico, Brazil and Chile where home access is predominant, with percentages of 64%, 60% and 47%, respectively (Graph 9).

Graph 9. Location of individual use of the Internet in Latin America (8 countries) and in the European Union (27 countries). (Percentages over the total number of Internet users).



Source: author's elaboration based on the OSILAC - ICT Statistical Information System (www.eclac.org/tic/flash) and Eurostat. Data Explorer (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). For Latin America countries the information is the latest available, and for the European Union countries the data used is from 2008, to keep comparability.

These commercial establishments are present in all urban centers, mainly in low-income communities, and have proved to be an important access option for a significant part of the population. In Peru, Ecuador and Dominican Republic, for example, access to the Web through these centers is greater than 60%, while at home, work or school, this percentage does not exceed 40%. On the other hand, it is worth

noting that the household is an important place for individual access to the Internet in countries that have a larger middle class and more resources, such as Mexico, Brazil and Chile. That is also the case of EU countries, where the home is used by 86% of the Internet users while the commercial internet access by only 6%.

4. Conclusions

The challenge of developing ICT indicators in Latin America and the Caribbean is as important as the development of information societies themselves. With more or less intensity, countries in the region have been incorporating ICT into all aspects of daily life, as a means for political and socio-economic development. Understanding this dynamic has been a learning process in many ways. Since the beginning of the decade, driven mainly by world events related to the IS (such as the World Summits that took place in 2003 and 2005), policy-makers and researchers noticed the need for elaborating indicators to support the development of this society and to assess the adoption of its technologies.

In Latin America and the Caribbean, the process of developing ICT indicators was conducted by OSILAC and supported by the International Development Research Centre (IDRC), UN-ECLAC and the National Statistical Offices (NSO). In 2004, they started to discuss a list of core indicators and the implementation of ICT questions on NHS and NBS. Consequently, between 2004 and 2009, the regional NSOs have presented significant progress in measuring access to and use of these technologies, producing the data that constitutes the main source for the OSILAC's Statistical Information System on ICT. The system integrates, through a single application, the data collected in NHS in LAC countries, containing variables on ICT access and use, in addition to socio-economic variables of interest, which are sources of valuable information for researchers and decision-makers in the field of public policies.

The analysis conducted in this paper confirms the premise that social and economic factors are still determining Internet access in the LAC region, particularly the level of education, income and geographical location (mainly rural or urban). This gap increases as technology becomes more complex and costly for the user, such as broadband. Therefore, closing the access gap is a major challenge in public policies related to emerging new technologies.

Considering the internal access gap, the region faces a considerable difference in access between the richest segment of the population and the poorest, which could be reduced through various types of policies, giving Governments the possibility to take responsibility in promoting and facilitating not only ICT access, but its use in

particular. Such policies would provide the lower income sectors of society with an inclusive tool that could help supplement and correct socio-economic disadvantages. As for the geographical gap, especially with regards to the extremely low levels of access in rural areas, the first – and logical -- step to be taken is to expand networks, both private and public, in all countries of the region. This is important, given the striking external gap in the region, in which countries present levels of access still quite inferior when compared to developed countries.

On the other hand, the gap on Internet use is more difficult to close. It is directly linked to education, income and culture, among other aspects. The study shows that in most LAC countries, commercial Internet access facilities are the most important locale for Internet use, with the exception of those few countries that have a larger middle class and more resources, where the household proves to be an important place for individual access, as we see in developed countries. That means that for individuals from the poorest quintiles, shared access seems to be the only viable solution to Internet access, especially considering that the value of equipment and connection are still too high in relation to the per-capita-income in the region. Finally, regarding the activities undertaken by individuals in the LAC region, we see that education needs to be prioritized, in order to take the use of the network beyond communication and leisure in favour of more sophisticated activities that could effectively mean better education, job opportunities and quality of life.

Further efforts to produce ICT-access-and-use indicators are therefore essential in order to assess current dynamics and determine the real digital divide and stage of ICT evolution in the countries of the region. Analysis of the impact of ICT on different sectors of society is crucial to elaborating accurate policies for the information society. This is especially important for identifying how ICT can accelerate the dissemination of knowledge. In this way, tools such as the OSILAC Statistical Information System on ICT are crucial to the development of public policies in the region.

Endnotes

[1] OSILAC, the Observatory for the Information Society in Latin America and the Caribbean, is supported by the Institute for Connectivity in the Americas (ICA) and the International Development Research Centre (IDRC) of Canada.

[2] Several reference documents with revisions and analysis of the ICT core indicators can be found, both for households and for business, which have been subject of constant study, i.e. OSILAC (2007c and 2010), ITU (2009), Partnership (2005a, 2005b, 2008 and 2010), UNCTAD (2007 and 2009).

[3] More information in <http://www.cepal.org/socinfo/osilac/> .

[4] See in <http://www.cepal.org/cgi-bin/getProd.asp?xml=/publicaciones/xml/3/32163/P32163.xml&xsl=/ddpe/tpl/p9f.xsl&base=/socinfo/tpl/top-bottom.xsl>.

[5] In the case of NHS, according to Partnership (2010), the indicators developed by OSILAC are separated into access indicators, collected at the household level, and use indicators, which apply to individuals.

[6] Statistics obtained based on the official information reported by countries. Note that in most of the Population Censuses of the Latin American and Caribbean countries there are questions on computer and Internet access in the module corresponding to household's goods and services (OSILAC, 2007b and 2010).

[7] Available in <http://www.cepal.cl/tic/flash>

[8] For this study, the latest data available on the Statistical Information System on ICT was used for the Latin American region, and for comparisons with the European Union the data was based on the ITU and Eurostat.

[9] Although the categories of analysis for each variable are not strictly the same, we've conducted the exercise of putting together and in the same scale the graphs of calculated indicators of the Statistical Information System on ICT and the Eurostat – Data Explorer in order to compare them with sufficient cautions. In the case of income in Latin American countries we usually managed the quintiles of income as measure and we found Eurostat data on quartiles of income.

[10] There are also available data from 2009 but the difference on the year base could bias the comparison and show gaps even wider between Latin American and Caribbean countries and European Union countries.

[11] As mentioned before, we have compared quartiles of income in EU with quintiles of income in Latin America. We focused the analysis on the highest subgroup of income taking into account that the gaps could be even wider because we usually compared the 25% of the richest households in EU with the 20% of the richest households in Latin American countries.

[12] It does not include mobile broadband subscriptions.

[13] Percentages obtained over the total of Internet users. In the case of Latin American and Caribbean countries we restricted the population scope to individuals aged 15-74.

[14] Most countries of the region do not use the reference period of 12 months in the questions on individual use of ICT

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Received October 2009

Revised March 2011

Annex 1. Revised list of ICT core indicators

Revised list of core indicators on access to, and use of, ICT by households and individuals

HH1 Proportion of households with a radio
HH2 Proportion of households with a TV
HH3 Proportion of households with telephone
Fixed telephone only
Mobile cellular telephone only
Fixed and mobile cellular telephone
HH4 Proportion of households with a computer
HH5 Proportion of individuals who used a computer (from any location) in the last 12 months
HH6 Proportion of households with Internet access at home
HH7 Proportion of individuals who used the Internet (from any location) in the last 12 months
HH8 Location of individual use of the Internet in the last 12 months:
Home
Work
Place of education
Another person's home
Community Internet access facility
Commercial Internet access facility
Any place via a mobile cellular telephone
Any place via other mobile access devices
HH9 Internet activities undertaken by individuals in the last 12 months (from any location)
Getting information about goods or services
Getting information related to health or health services
Getting information from general government organizations
Sending or receiving e-mail
Telephoning over the Internet/VoIP
Posting information or instant messaging
Purchasing or ordering goods or services
Internet banking
Education or learning activities
Playing or downloading video games or computer games
Downloading movies, images, music, watching TV or video, or listening to radio or music

Downloading software
Reading or downloading on-line newspapers or magazines, electronic books
HH10 Proportion of individuals with use of a mobile cellular telephone
HH11 Proportion of households with access to the Internet by type of access
Narrowband
Fixed broadband
Mobile broadband
HH12 Frequency of individual use of the Internet in the last 12 months (from any location)
At least once a day
At least once a week but not every day
Less than once a week
HHR1 Proportion of households with electricity

Source: Partnership on Measuring ICT for Development, Revisions and Additions to the Core List of ICT Indicators [online]

<http://unstats.un.org/unsd/statcom/doc09/BG-ICTIndicators.pdf>, 2009.

Summarized list of core indicators proposed for measuring ICT through business surveys

B1 Proportion of businesses using computers
B2 Proportion of persons employed routinely using computers
B3 Proportion of businesses using the Internet
B4 Proportion of persons employed routinely using the Internet
B5 Proportion of businesses with a web presence
B6 Proportion of businesses with an intranet
B7 Proportion of businesses receiving orders over the Internet
B8 Proportion of businesses placing orders over the Internet
B9 Proportion of businesses using the Internet by type of access (narrowband, broadband (fixed, mobile))
B10 Proportion of businesses with a local area network (LAN)
B11 Proportion of businesses with an extranet
B12 Proportion of businesses using the Internet by type of activity:
Sending or receiving e-mail
Telephoning over the Internet/VoIP
Posting information or instant messaging
Getting information about goods or services
Getting information from general government organizations
Interacting with general government organizations
Internet banking
Accessing other financial services
Providing customer services
Delivering products on line
Internal or external recruitment
Staff training

Source: Partnership on Measuring ICT for Development, Revisions and Additions to the Core List of ICT Indicators [online]

<http://unstats.un.org/unsd/statcom/doc09/BG-ICTIndicators.pdf>, 2009.

