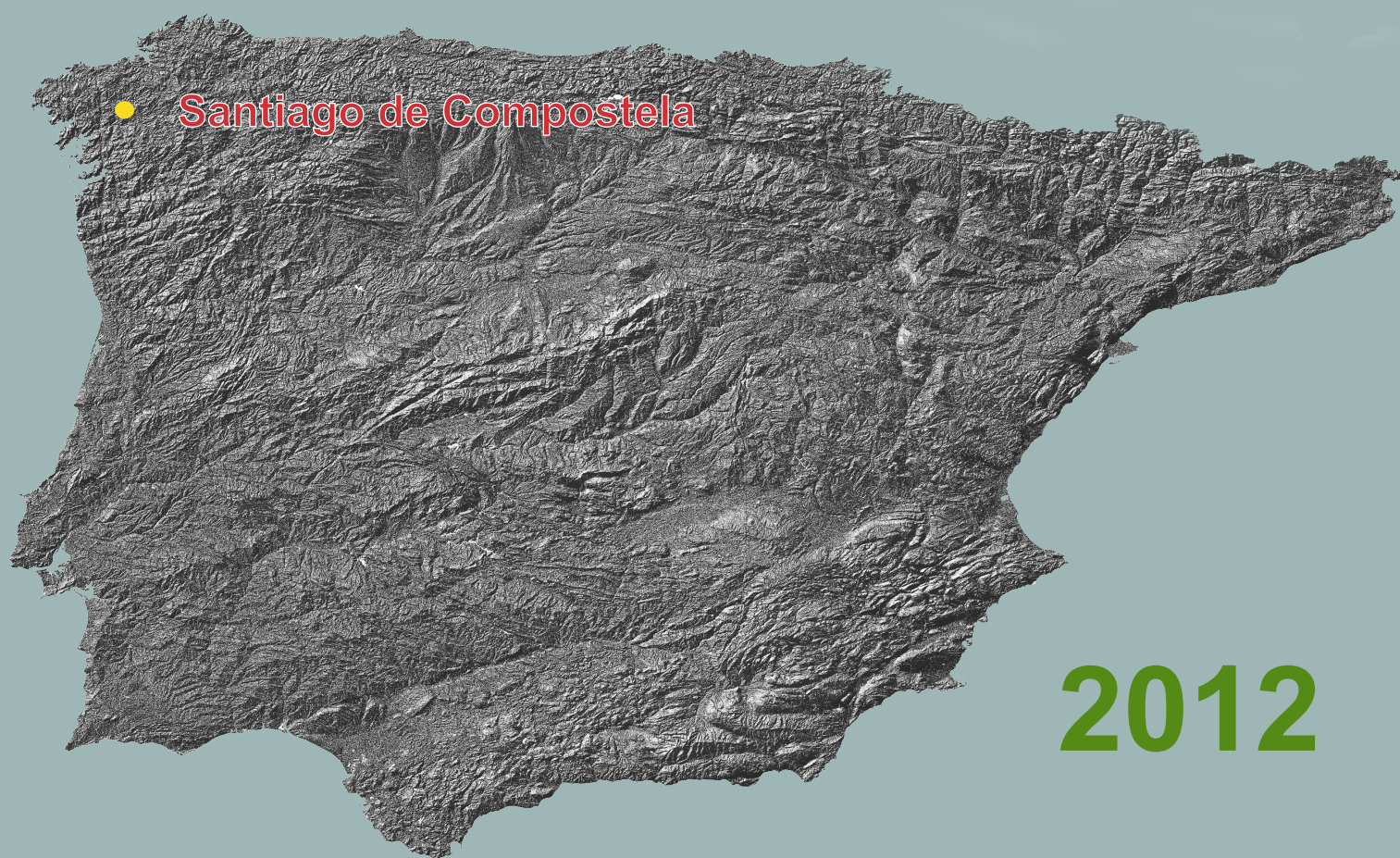




# XIII Coloquio Ibérico de Geografía

*Respuestas de la Geografía Ibérica a la crisis actual*



## **Coordinadores**

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Dominic Royé  
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# **XIII Coloquio Ibérico de Geografía**

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***SANTIAGO DE COMPOSTELA***

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**COORDINADORES**

Dominic Royé  
José Antonio Aldrey Vázquez  
Miguel Pazos Otón  
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Marcos Valcárcel Díaz

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# INFORMATION AND COMMUNICATION TECHNOLOGIES IN NORTHERN PORTUGAL RURAL SCHOOLS

**SARMENTO, JOÃO**

Universidade do Minho

j.sarmento@geografia.uminho.pt

**ARMAS QUINTÁ, FRANCISCO JOSÉ**

Post Doctoral fellowship, Universidade do Minho

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## **Abstract**

Information and communication technologies (ICT) offer the opportunity to develop rural areas, which were affected by demographic and economic recession. The Information Society offers new opportunities for development because it may allow us to overcome the isolation caused by distance. Electronic commerce or teleworking can be key opportunities to boost rural development processes. Yet, besides infrastructure, it is necessary that people have appropriate qualifications to use technologies in a fruitful manner. This article presents a study of the diffusion of the Information Society in rural areas of northern Portugal, through a survey conducted in rural parish schools. The analysis reveals the degree of ICT equipment in households and the use by families of the computer and Internet services. The research exposed two types of Digital Divide; one of them includes the population who do not have access to the technology, and the second the embraces the population who have the possibility of use, but who do not, either because of the lack of knowledge or because of not seeing any value in it

**Keywords:** *New Technologies, rural areas, North of Portugal, development.*

## **Resumen**

### LAS TECNOLOGÍAS DE LA INFORMACION Y DE LA COMUNICACIÓN EN LAS ESCUELAS RURALES DE NORTE DE PORTUGAL

Las tecnologías de la información y de la comunicación ofrecen posibilidades de desarrollo para el conjunto de las áreas rurales, que sufrieron los efectos de la distancia provocando en buena parte de ellas una profunda recesión demográfica y económica. La sociedad de la información ofrece nuevas posibilidades de desarrollo ya que permite vencer el aislamiento que provoca la distancia. El comercio electrónico o el trabajo a distancia pueden ser oportunidades clave para que las áreas rurales impulsen procesos de desarrollo, pero para ello son necesarias además de las infraestructuras, población con la cualificación oportuna para emplear de forma provechosa estas tecnologías. En la presente comunicación se aborda un estudio de la difusión de la sociedad de la información en las áreas rurales del Norte de Portugal, a través de encuestas realizadas en centros educativos de freguesías rurales. Del análisis de dichas encuestas se revelará el grado de equipamiento TIC en los hogares, así como los usos que hacen del ordenador e Internet las familias. Del análisis de los datos se expondrán dos tipos de brecha digital; una de ellas es la que engloba a aquella población que no tiene acceso a la tecnología, y la segunda la conforma aquel sector de población que, teniendo posibilidad de usarla no lo hace, bien por no tener formación para ello o por no verle utilidad.

**Palabras clave:** *Nuevas tecnologías, áreas rurales, Norte de Portugal, desarrollo.*

## 1. INTRODUCTION

Despite the widespread diffusion of the Information Society in most developed countries, the Digital Divide is a phenomenon that is still very present, especially in many of peripheral rural areas. The main problems presented by these spaces do not derive from the unequal distribution of the Information Society, but are more profound and go back to the early nineteenth century, when the Industrial Revolution and the development of capitalism began to materialize intense technological, economic, social and cultural transformations. In this context, rural areas have already started from a disadvantage position in relation to urban areas, and have scarcer business opportunities. This situation is strongly connected to rural population emigration to urban centres, where the more profitable economic sectors were located. Strong depopulation and aging processes led to a continued decline of rural economies.

Rural areas have been affected by varying degrees of peripherality, depending on distance to markets, accessibility to services and infrastructure quality. Overall this has meant that they have been characterized by a lack of competitive advantages when compared to urban areas. In many cases, this fact has been aggravated by an inability to engage with a demanding restructuring economic system. While we should be cautious with the utopian ideas of the 'death of distance', a 'flat world', and with the changing geographies associated with the rise of emergence of Information and Communication Technologies (ICTs) and the Information Society (GRAHAM AND MARVIN, 1996), there is no doubt that they have destabilized and reconfigured ways of seeing the world, economic and social relations, and the relative location of people, towns, villages and rural areas.

Although the diffusion of new technologies is a slow and complex process, especially in rural areas for their social and economic characteristics, there is no doubt that it can be an opportunity to stop and even reverse the declining situation of these areas. Not only are infrastructures needed but also knowledge to boost development processes. It is not enough for citizens to make a basic use of new technologies, particularly the Internet by exchanging information through email, consulting websites of different types, etc. For rural development to take place, intensive advanced services use such as teleworking and e-commerce among others are required.

This paper analyzes the dissemination of the Information Society in Northern Portugal by carrying out local surveys in rural schools. There is very little or no data at detailed geographical scales, and therefore this method of data collection is a valuable resource, both to learn the equipment linked to new technologies at rural homes as well as the use made by the families.

## 2. METHODOLOGY AND AREA OF STUDY

Just as in many European peripheral countries, rural space has registered a profound change in the past 50 years. Rural areas have changed from being mostly productive spaces into being consuming spaces. Thus, the multifunctionality degree of the rural acquires a great importance. Despite a sharp decline in rural population, a significant ageing of rural populations, and in people devoted to agriculture (OLIVEIRA BAPTISTA *et al.* 2004), 'a significant part of the Portuguese territory has rural or predominantly rural characteristics' (RODRIGUES 2010: 88).

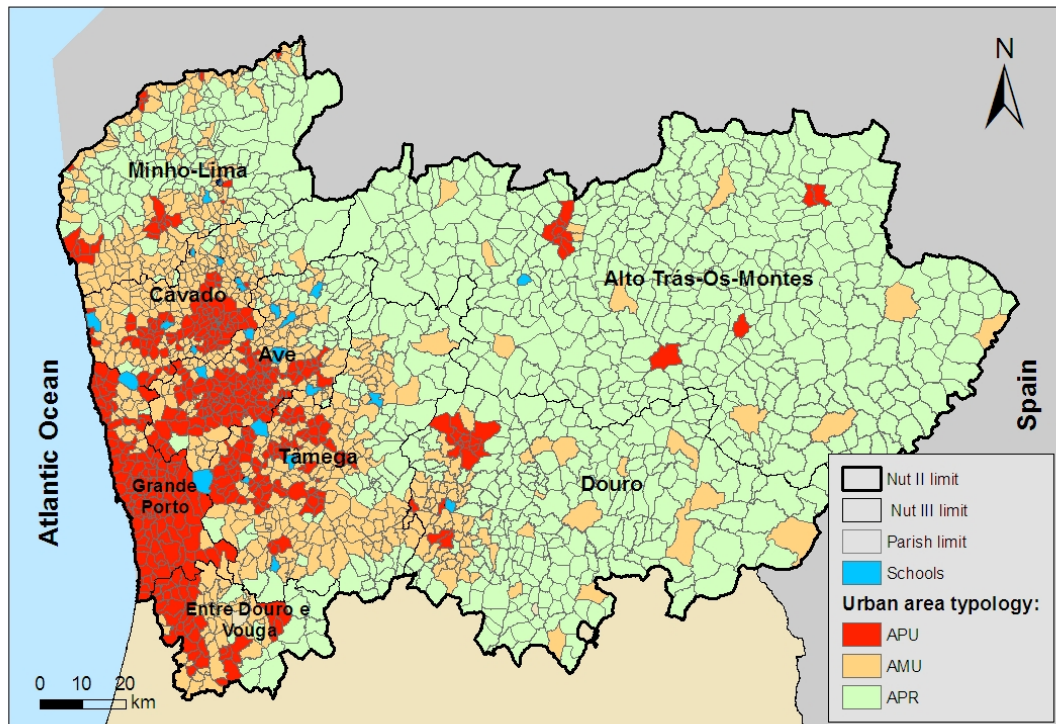
In Portugal, from an official viewpoint, the Statistics Superior Council designated three types of territories (in 1998 at the parish level and in 2009 at smaller statistics units). These are 'Predominantly Urban Areas', 'Moderately Urban Areas' (MUAs) and 'Predominantly Rural Areas' (PRAs). The latter category represents areas which are not classified as urban soil by Municipal Development Plans, which have a population density equal or smaller than 100 inhabitants by km<sup>2</sup>, and which do not have a settlement with over 2000 people. In this study, the analysis focused on different types of rural in the North of Portugal. Following Vitorino, Feio and Dimas (2004:104) classification, some of these rural areas are 'fragile inland or mountainous', 'transition areas' or 'intermediate development areas'. Therefore, they present a variety of characteristics.

The first attempt was to apply a questionnaire to pupils of various rural schools in the Northwest of Portugal. Since many parishes classified as PRAs do not have a school, many of the chosen schools are located in MUAs (see figure 1). Nevertheless, many of the pupils live rural areas. The sample was chosen according to the possibilities of a group of students from the University of Minho, who carried on with this task. In most cases authorizations had to be requested to the schools' administration, to the parents and to the Education Ministry. With some modifications an already validated questionnaire applied to rural Galicia (see ARMAS, 2009) was used. It was administered in the classroom, with the assistance of a teacher, and questions were explained one by one.

Rural schools are generally characterized by being small, with few teachers and resources and with few pupils. In Portugal, in the past years, as a result of severe cuts in public spending, there has been a profound restructuring of the schools' network. In some cases groups of schools were formed, sharing resources and management. In other situations, several small rural schools with few pupils were closed down, and replaced by larger schools in local or regional centers that accommodated pupils who have now to travel longer distances to school. The social and economic consequences of this process have not been established.

Questionnaires were applied in twenty schools, and pupils were asked to answer various questions which later allowed constructing a database, for SPSS statistical analysis. The more important reason to decide to carry out the surveys in schools was the opportunity to know not only the ICTs equipment at pupils' homes, but also ICT uses by family members. In this way, the four hundred twenty-seven questionnaires applied in twenty schools, have in fact covered more than 1772 people. This data allowed us to perform an initial analysis of the equipment and the use of new technologies in the North of Portugal, although it should be noted that, because of the geographical distribution of the sample of schools – biased towards a proximity of large urban centres – they do not represent the typology of 'predominately rural areas' as defined by the National Statistics Institute of Portugal.

Figure 1: Urban area typology and localization of the schools with surveys



Source: Modified from INE (2010) (Map by Ricardo Carvalho)

### 3. INFORMATION SOCIETY IN THE NORTH OF PORTUGAL

Despite the progress achieved in the last decade, both in new technology equipment, telecommunications infrastructure, and the number of Internet users in Portugal, there was not a process of convergence with the countries that are at the top of the Information Society dissemination. The gap is particularly wide in rural areas and in those groups where diffusion is more difficult, as is the case of the older population, the less skilled, lower income, etc. In the case of computer use and the level of education for the whole country, there is a difference of nearly fifty percentage points among individuals with higher education and those with a skill level below secondary education.

The computer has nowadays become an ubiquitous object and it is present in most daily activities. Its applications can be as varied as complex, going from a simple control of a cash register to powerful supercomputers that have been used in the different areas of science to run complex mathematical calculations. In spite of its few decades of life, it currently enjoys widespread use although there are still sectors of society that do not use it. Naturally, it is a key piece of the Information Society in which we live in.

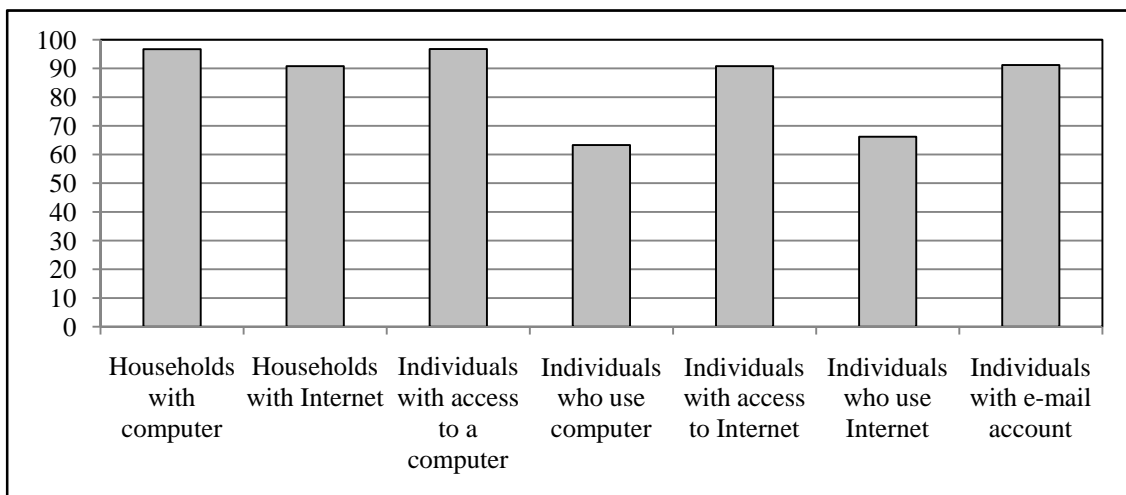
In the case of Portugal only six in ten households have a computer compared to 74% of European Union average (UE27) or 90% of the Netherlands, Sweden and Luxembourg (EUROSTAT, 2010). In the Northern Region this figure is slightly lower than the national average but the situation is considerably worse in rural areas. To these spatial disparities a social dimension should be considered, since computer uses differ significantly depending on the level of education, professional structure, income level, age, etc. In this context, computer users for the whole of Portugal varies from 94% of

individuals between sixteen and twenty-four years old, to just over 20% of those over fifty-five years old (INE, 2010). In the same way, these differences become even more palpable, as noted in previous lines, according to education levels. Everybody with higher education uses computers, while the population with lower skills than high school education, only use it in four out of ten cases.

In the case of the data gathered in rural schools in the Northern Region of Portugal, the data is significantly better due to the origin of the source, although interesting information could be obtained related to the use of new technologies by households residents. Data revealed that in the Northern Region, over 96% of households have some type of computer (desktop or laptop) and that 97% had access to the computer. Yet, only 63% of these people used it (see figure 2). This data reveals two other interesting aspects. The first one corroborates the deficient dissemination of new technologies compared to the rest of the countries of the European Union, despite being significantly more positive than the official statistics. The second one indicates that part of the population has the equipment (computers) but does not use it, so we could say that we are before two types of users (either the computer or the Network), the potential users and the real users. Potential users have the possibility of using new technologies but they can use them or not, while the latter are part of the digital society. This sector of the population could be part of the Information Society but it is not, they are part of a new dimension of the Digital Divide, that it could be called the "Gap in the Digital Home" (LOIS et. al, 2010:30).

One other basic indicator to measure the spread of new technologies is the use of the Network. One of the key aspects of the origin and spread of the Internet was directly related to the increase in the capacity of data transmission, and the creation of a common communication protocol to be used around the world. In spite of all the progress made in the nineties, the use of the Network was difficult for people with basic computer skills because it was very difficult to locate and retrieve information. This obstacle was overcome with the emergence of the World Wide Web, a European application that gave a solution to the problem of content search. Another key aspect of Internet development was the emergence of powerful search engines that have been capable of indexing all web sites that have come on to the Internet. According to one of the main Internet search engines, Google, in 2008 this search engine had indexed on their servers a trillion unique URLs to respond to more than two billion Internet users around the world (IWS, 2011).

*Figure 2: Equipment and use of new technologies in the Northern Region of Portugal*



Source: Own data



Despite the prompt spread of Internet use, there is still much to be done, even in developed countries. Portugal occupies the last positions in the number of Internet users within the European Union (EU27). Only half of its population uses the Internet compared to 90% in Sweden, the Netherlands or Luxembourg, or more than 80% in countries such as Denmark, Finland, the United Kingdom and Germany. In the process of dissemination of the Information Society, different socioeconomic factors are relevant, such as the education of the population, income levels, the activity sector which people work, etc. In the case of Portugal there is a direct relation between the number of Internet users, the level of education and income level. Whereas figures for Internet users in Sweden and the Netherlands nearly doubled that of Internet users in Portugal, the same was the case in terms of the number of inhabitants between 25 and 64 years old with higher education. More pronounced is the difference in terms of GDP per capita, which is four times higher.

The official statistic data at the regional level highlights that the situation of the Northern Region of Portugal is worse than in the country as a whole, especially in relation to Internet users and the educational level of the population (higher education). The study has been carried out in this region through the collection data in schools, and shows some differences with regard to official statistics, in part due to the nature of the data sampling. In this study, there is a significant difference in homes that have a connection to the Internet, and less pronounced in relation to the Internet users. According to Eurostat (2010), only half of the households in the Northern Region had Internet connection and around 48% of its population were Internet users. The analysis of data from schools revealed that nine in ten households surveyed had connection to the Internet, but only six in ten people were using it. In this respect, as well as in the use of computers, there is a part of the population that has the possibility of using new technologies but do not do it, either because they do not have appropriate knowledge or do not see the utility of using it. In this study, 90% of the total of population to which the survey was addressed, had the means to access the Internet but just over 60% were using them (see figure 2). Similarly to the use of computers, we face a new type of the Digital Divide. These indicators can be useful at the time of developing policies and programs to promote and spread the use of new technologies, with an emphasis on the advantages and opportunities that these tools offer for the development of spaces in decline, especially in rural areas. In this respect it is necessary to highlight the importance of advanced services on the Internet. This is succinctly addressed in the next section.

#### **4. THE SPREAD OF ADVANCED SERVICES ON THE INTERNET**

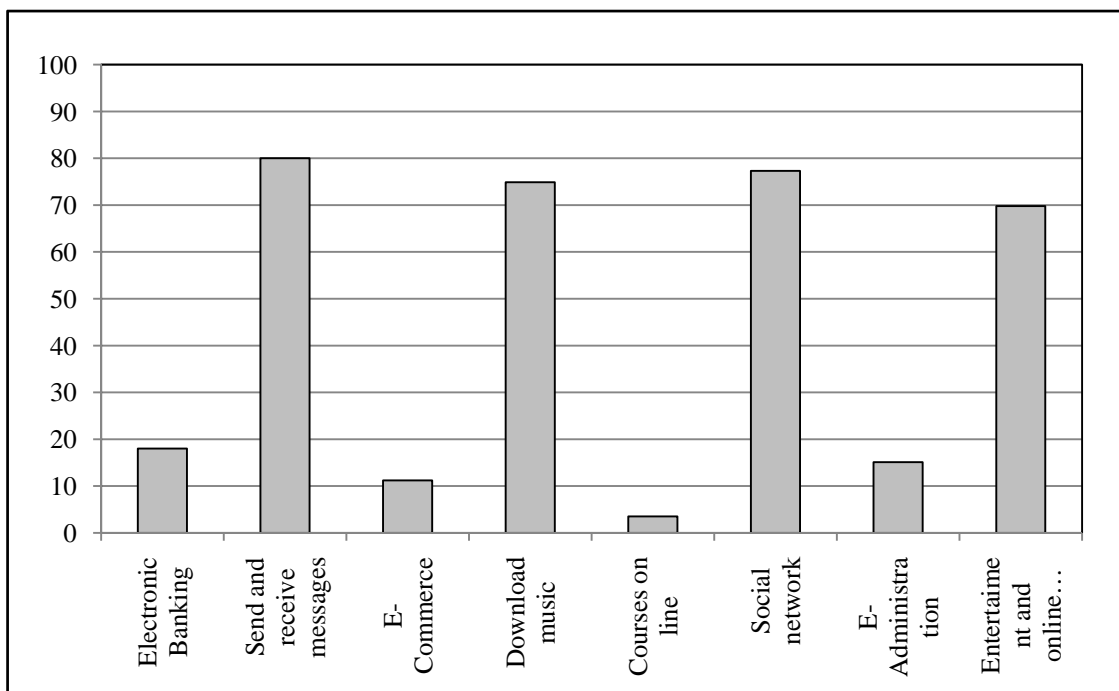
Studies of the uses that people make of the Internet should differentiate those people who use the Internet for the most basic tasks, such as searching for information or communication, compared to the people that use it for consumption of advanced services, such as e-commerce, banking and e-government, or e-learning. Nowadays many services offered through the Internet, either by the public or private domain, range from simple hotel booking or weekly shopping in a supermarket, to multiple and varied administrative and financial procedures.

In terms of consumption of advanced Internet services, Portugal occupies the last positions with regard to other European Union countries. In the case of e-commerce, only 15% of users practice it versus 60% in the UK and 54% in Denmark and Norway (EUROSTAT, 2010). Another evidence of this is related to e-Government.

In this case, despite having very low values which are not so pronounced as in the use of electronic commerce, just over 20% of Internet users in Portugal make use of telematic means to interact with the public administration, compared to 77% in Iceland, 72% of Denmark and 68% in Norway (EUROSTAT, 2010). The availability of these services, which grows on a daily basis, does not mean in the case of Portugal, a progress in the process of diffusion of new technologies and the statistics in this respect reflect this.

Results from rural schools corroborate the situation described in previous lines. To the low number of Internet users in relation to the European Union countries and to the high proportion of potential users who have the means to join the Information Society but do not, we can add the limited use of advanced services. Of all Internet users, only 11% use e-commerce. Yet, 80% make use of the Internet to send and receive messages (see figure 3). Similar values were obtained in relation to e-administration, where only 15% of Internet users used this service. Nevertheless, 75% of Internet users download music. Another indicator that has been selected to measure the use of Internet advanced services is electronic banking. In the case of Northern Portugal, the data obtained from the survey showed only two in ten Internet users use this service. Despite its low incidence, this is one of advanced services with more impact among Internet users. However, as has been expressed in previous lines, the most basic tasks have greater popularity, such as the case with the participation in social networks, which are accessed by almost eight in ten users of the Net. A final indicator that was considered appropriate to study was the spread of online courses. In this respect the results were very negative, because only 3.5% of Internet users do training courses through the Net (see figure 3). This fact is related to the low rate of qualified people, especially those that have higher education. Naturally that these results reflect the methodology here employed. The respondents were young, and more in tune with the social use of the web and not so much its economic use. Nevertheless, the survey also included the families of the respondents, and therefore, the results are particularly important.

*Figure 3: Use of advanced and basic services in the Northern Region of Portugal*



Source: Own data

On the one hand all of these indicators suggest that there is a low coverage of the Information Society in Portugal, especially in the northern region. On the other hand, they point to a different type of the Digital Divide, one that separates basic Internet users and advanced Internet users. The advanced services on the Internet can generate development processes, such as the case of the implementation of telework and e-commerce. Rural areas, such as the case with most of the Northern region of Portugal, can benefit from such services because distances tend to disappear in the Information Society, and the peripheral regions can offer their products and services to anyone regardless of residence. As pointed out by Drucker (2001), e-commerce will be the true revolution of the Information Society, and this revolution will have a greater impact for outlying rural areas because they will be able to expand their markets around the world.

## 5. CONCLUSIONS

The results of the data analyzed, those taken from official sources and those collected through surveys conducted in rural schools in Northern Portugal, showed how this region in particular and the country in general is lagging behind in the Information Society diffusion process. Despite significant progress in the main indicators in the last five years, convergence with other European Union countries has been deficient, and the "traditional" Digital Divide continues to have a strong presence in this territory, especially in rural areas. Along with this, it was found that there is a significant sector of the population that has access to equipment and infrastructure to connect to the digital society, but who does not take advantage of this access. This sector of the population that has the means to be part of the Information Society but does not, is part of a new dimension of the Digital Divide, and we could call it the "Gap in the Digital Home" (LOIS et al., 2010:30).

On the other hand, an analysis of the use of advanced services offered by the Net was carried out, given its importance to promote and generate a development process, especially in depressed rural and peripheral areas. The result obtained after the analysis of the surveys conducted in rural schools in Northern Portugal, highlighted the weak diffusion of new technologies in this region. Electronic commerce, which may be a factor leading to the decline of rural areas, is not very present because only one in ten Internet services users make use of it. To conclude, we consider that it is necessary to stress the fact that to approach the full possibilities of the Information Society, it will not only take the equipment and infrastructure, but also it will be very important to have adequate levels of education and training. Without the infrastructure the Digital Divide cannot be dealt with and without a skilled population that is able to exploit this potential, information and communication technology would be a simple channel for basic services without the opportunity to boost development processes.

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## REFERENCES

ARMAS QUINTÁ, Francisco José (2009). *Sociedade da informação e desenvolvimento rural. Análise de novos processos sociais e territoriais em regiões*

- periféricas. O caso de Galicia* [CD]. Santiago de Compostela: Servizo de Publicacións Universidade de Santiago.
- BAPTISTA, F. OLIVEIRA *et al.* (2004), “Rural e Agricultura (1960-2000)”, in *II Congresso de Estudos Rurais – Espaços Rurais Periféricos*, Angra do Heroísmo. Universidade dos Açores.
- CAIRNCROSS, Frances (2001): *The death of distance 2.0. How the communications revolution will change our lives*. London: Texere, 317 p.
- CASTELLS, Manuel (2000): *La era de la información*. Vol. 1. Madrid 2ª ed.: Alianza Editorial, 645 p.
- CRANG, Mike; CRANG, Phil; MAY, Jon (1999): *Virtual geographies: Bodies, space & relations*. London: Routledge, 322 p.
- DRUKER, Peter (2001): “Detrás de la revolución de la información”. *La Factoría* [en línea]. Outubro-Enero de 2001, nº 13 [ref. de 04-07-2006]. Disponível na Internet: [www.lafactoriaweb.com/articulos/drucke13.htm](http://www.lafactoriaweb.com/articulos/drucke13.htm)
- EUROSTAT. Statistics Database on Internet. See: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
- GOVERNO DE PORTUGAL. Instituto Nacional de Estatística. Ver: [www.ine.pt](http://www.ine.pt)
- GRAHAM, S., MARVIN, S., (1996): *Telecommunications and the City*. Routledge, London.
- GRIMES, Seamus (2000): “Rural areas in the information society: diminishing distance or increasing learning capacity?”. *Journal of Rural Studies*. Vol 16, p. 13-21.
- HOGGART, K. (1997): “Let’s do away with rural”, *Journal of Rural Studies*, 6(3), 245-257.
- INTERNET WORLD STATS. See: [www.internetworldstats.com](http://www.internetworldstats.com)
- KELLERMAN, Aharon (2002): *The Internet on Earth*. Chichester: John Wiley & Sons Ltd., 282 p.
- LOIS GONZÁLEZ, R. C.; MACÍA ARCE, J. C.; ARMAS QUINTÁ, F. J. (2010): “ICT inequalities in the Spanish urban system” en *Journal of Urban and Regional Analysis*, vol. 2, nº2, pp. 19-32.
- MALECKI, Eduard J. (2003): “Digital development in rural areas: potentials and pitfalls”. *Journal of Rural Studies*, vol. 19, núm. 2. p. 201-214.
- RODRIGUES, M.R.S (2010): As Tecnologias de Informação e Comunicação e a escola em meio rural. *Medi@ções*, 1(2): 88-102.
- SASSEN, S. (2003). *Los espectros de la globalización*. Buenos Aires: Fondo de Cultura Económica, 276 p.
- SHORT, R.; KIM, J.; YEONG, H. (1999): *Globalization and the City*. Harlow, Essex: Longman.
- VITORINO, Nuno; FEIO, Paulo Areosa e DIMAS, Bruno (coord.) (2004): *Desenvolvimento Rural e Ruralidade em Portugal: Uma Análise Empírica*. Lisboa: Gabinete de Planeamento e Política Agro-Alimentar.