The Digital Divide, or the Danger of Exclusion from the Information Society

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The euphoric promises of a new world to be brought about by the digital revolution now behind us, a trend has emerged that involves underestimating the scope of the transformations under way. It is as if an attack of realism, compensating for the unbridled euphoria of early prognostics, has drawn a veil over reality, making it hard to see the magnitude of the changes in progress. Euphoria and disappointment: two companions in obstructing the analysis necessary for intervening in reality and transforming it if necessary.

Technological convergence

The transformations announced in the area of ITCs during the last two decades of the 20th century and from then until now have imbued the collective unconscious with the underlying idea that we are facing a revolution instigated by the technological convergence of three industrial sectors (telecommunications, information technologies and the audiovisual industry) that have historically been autonomous.

Electronics is the basis on which the three sectors involved in convergence have been developed. Without the progress in electronics, none of the three would have experienced the breakneck transformation recorded in the second half of the 20th century. In fact, technological convergence appeared because of evolution in the basic components of ITCs, i.e.,

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microelectronics, software and communication infrastructures.

Progress in microelectronics is achieving increasingly larger shares of integration and exponential advances in the speed of information treatment. Communication infrastructures use new transmission supports, improve the efficiency with which existing ones are used, take web externality into account as a key factor (interconnection) and incorporate intelligence and management capacity, thanks to the provisions of microelectronics and information technologies. In terms of hardware, information techno-logies are achieving increased portability, speed and calculation capacity, while software is looking for greater levels of user-friendliness and better provisions and is tending to be supported on communication networks.

However, convergence would be unviable without the digitalisation that makes it possible to manipulate all sorts of sources of information in a unique fashion, i.e., it doesn't matter whether the information was originally audio, video, graphic or data based because digitalisation turns everything into bits. Digitalisation also allows greater flexibility and freedom in the incorporation of new services. For example, it is very simple to enter a few more bits in a digital section, which can signify, for example, a destination address, access key or a new user licence. Finally, it is more effective to store, process and generally manage information in a digital format, basically because of the characteristics of today's electronics.

Although the level of technological convergence is high, there are a good many technical questions not completely resolved. These include common communication protocols for different types of services, be they voice, data or audiovisual, the medium on which services and convergent applications are sustained (cable, fibre optics, radio spectrum) and the possible integration of telephony,

television and Internet on a single user platform.

The implications of the road towards this technological convergence are considerable. The best known example probably relates to the transformation currently under way from circuit switching networks, which reserve a physical channel throughout the time a communication lasts, to package switching ones, where information is exchanged by sharing the channel among the different users and by using it in accordance with the capacity demanded at any one time.

The road has never been easy, despite the hype from technology and political marketing departments, and until the end of the 1990s we found (Prado and Franquet, 1998) that traditional barriers between the industries most closely involved (telecommunications, information technologies and audiovisual) were so strong that, even though technological progress supplied the conditions necessary for convergence, it ran up against enormous adverse inertia.

The setting for the information superhighway was still just a potential revolution when Al Gore was promoting it back in 1992 and it continues to be so today. To make it reality, we need telecommunication infrastructures to change much faster, as the change so far has been much slower than expected or desirable. We also need convergence between industries, something we already said is running into many problems in practice.

Despite this slowness in the development of infrastructures, the challenges surrounding the deployment of the information society are looming large, thanks particularly to the exemplifying role of the popularisation of the use of the Internet and also favoured by the progress in compression and digitalisation techniques that has enabled the use of already-existing networks to implement services initially only envisaged for when the information superhighway was available. However, limits on broadband availability on the old networks impose a transmission speed that relegates the most sophisticated applications, which should be the fruit of productive convergence, to a purely experimental nature.

However, nobody is any longer in doubt that the information society is the point of reference, as the implementation of information and communication technologies moves inexorably forward and all the activities of humankind are being mediated by technologies. It therefore involves a process of social and cultural change brought about by technology that manifests itself in all spheres, including the economic, political, educational, labour, health, social welfare, culture and leisure areas, etc. The consequence of being sidelined from this process will be irreparable damage.

The information society as a stage

The concept of the *information society* is not closed and despite how clear it is, it does not designate a universe of finite variables. It is instead a convention we use to refer to the new reality that is beginning to take shape in the post-industrial period.

The ambiguity of the label is shown in the very proliferation of appellatives used to refer to the same set of phenomena and which include the *New Economy*, the *Network Society*, the *Digital World* and the *e-Society* (Castells, 1998; Dertouzos, 1997; Echevarría, 1999; Cebrián, 1998; Negroponte, 1995). However, none of the above labels has had the success of the *information society.* Although the *knowledge society* has its own admirers, it nowhere near threatens the leadership of the 'information society'. The difference between the two concepts is a question of emphasis.

The people who use the label *information society'* emphasise the possibility of accessing information, while the people who prefer *knowledge society* emphasise processing information, i.e., the mechanism through which information is transformed into knowledge. The label the *information and knowledge society* could be used (and indeed is beginning to be used quite frequently) to acknowledge the phenomenon with greater attention to the emphasised qualities, but given that access to information does not exclude the process of transforming it into knowledge and that access to the first is the *sine qua non* for reaching the second, we will use the simplified appellative *information society*, which is the most commonly accepted and which includes the two realities.

Interregnum

Despite the clearness of the expression, the first thing we should specify is that we are not in the information society but rather in the process of moving towards it. We are therefore living through an eclectic historical period situated at the interregnum of the industrial society we are leaving and the information society on the horizon, which will be the culmination of the digital revolution.

In fact, the information society refers to a state reached when all the players in a society, both people and public and private organisations, have the possibility of accessing and broadcasting any information, from any place, immediately and in the format they wish. This situation is only possible if they have the tools that allow it, i.e., the so-called Information and Communication Technologies (ITCs) and, in particular, the convergence of the technologies facilitated by digitalisation.

Risks of exclusion from the information society: the digital divide

Having accepted the importance of establishing the media so as not to be sidelined from the construction of the information society, we should bear in mind that its implementation cannot be taken for granted. The implementation of the networks on which they are sustained is occurring in a global but unequal fashion, built upon pre-existing social and economic realities and, therefore, the unequal situations that characterise the relative position of each country and each region in the international economic order and the social inequalities that affect people within each particular society. The implementation of ITCs will have multiplying effects on the starting reality. Following market logic, the areas that enjoy more wealth and development will be the "natural" receivers of innovation, thus generating improvements in their relative positions, while areas of less wealth and development will see theirs worsen. This is what has begun to be known as the *digital divide* and has a double representation: on the one hand, the geopolitical order, where the distance between the world's rich and poor countries will increase further and the gap between more and less developed regions within

nations will grow and, on the other hand, the social order, where the distance between social groups will increase, both at the worldwide level and within each state or region.

Worldwide digital divide

If we look at a set of primary indicators, the evidence is clear. The digital divide is a globally inevitable reality if we observe the inequality in transmission capacity available in the backbone of the Internet network among the different regions of the planet. Furthermore, this divide is growing, as we can see in the evolution of the data corresponding to the years 1999 and 2001.

The above illustration shows the privileges of the more developed countries and also the US's central position, i.e., its role as the compulsory road for reasonable quality transmissions. Let me give you an example. A Catalan company develops a web-based service with a target public that is mostly Spanish-speaking Internet users. It will have a transmission capacity of 68 Mbits/second if it uses a direct link with Latin America and 776 Mbits/second if the link is through the United States.
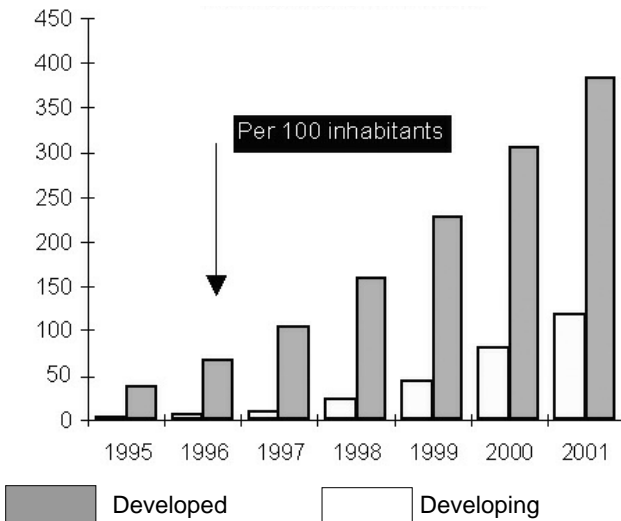
The distribution of Internet users across the world is another good indicator of the digital divide between

Internet Interregional Backbone
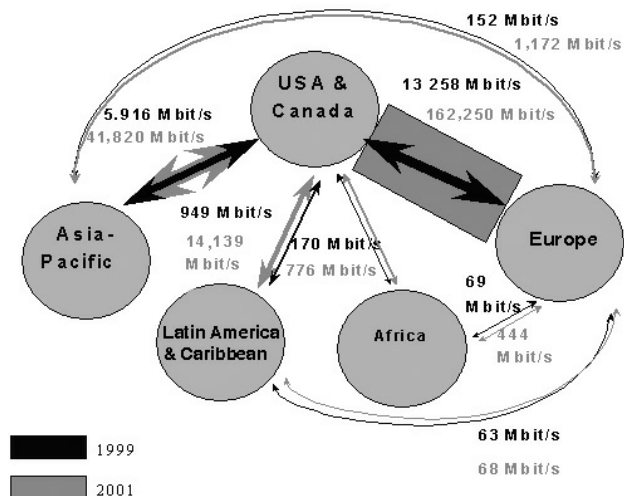
Source: Author's own preparation with data from TeleGeography Inc.

Internet users in millions

Source: Author's own preparation with data from ITU

developed and developing countries.

The figures on the different people's access to the basic information and communication technology resources on which the information society is built according to their wealth clearly shows the scale of the digital divide, to the extent it could easily be called an abyss.

We can see the evidence of the digital divide using these gross figures, and it would be greater still if we used data on more refined indicators. However, there is enough here to sound an alarm about the inauspicious consequences of practising an inhibitionist policy with respect to the information society.

The digital divide in developed countries

If the observation point is a developed country like our own, we might think we are safe from the danger of falling into the digital divide, but nothing could be further from the truth. Continuing with the same analytical logic we applied at the global level, we can see that the divide manifests itself among countries from the developed world, too, and so we looked at the figures corresponding to the five big countries of the EU and other smaller ones that make it possible to establish more significant contrasts.

If we take infrastructures into account, one datum used because of its high indicative value is the number of fixed telephone lines available. In Spain, we lag behind the other four big states of the EU, at levels very similar to Portugal. Our deficit with respect to the smaller countries of the north of Europe is even greater.
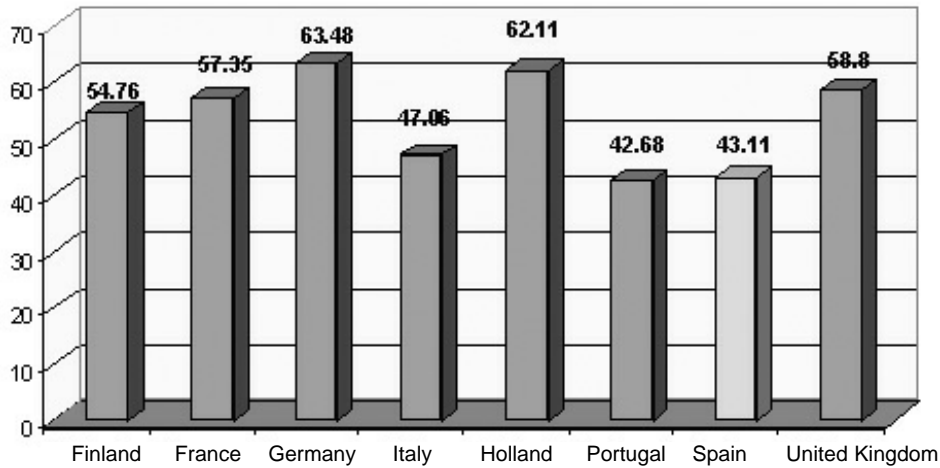
Another infrastructure element considered highly significant with regard to the ability to join the information society is the availability of personal computers.

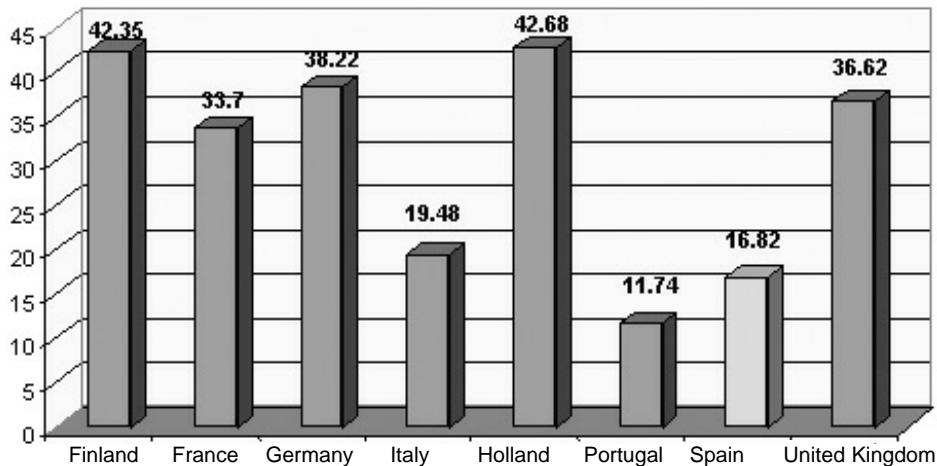### Characterisation of the digital divide in the world, 2001
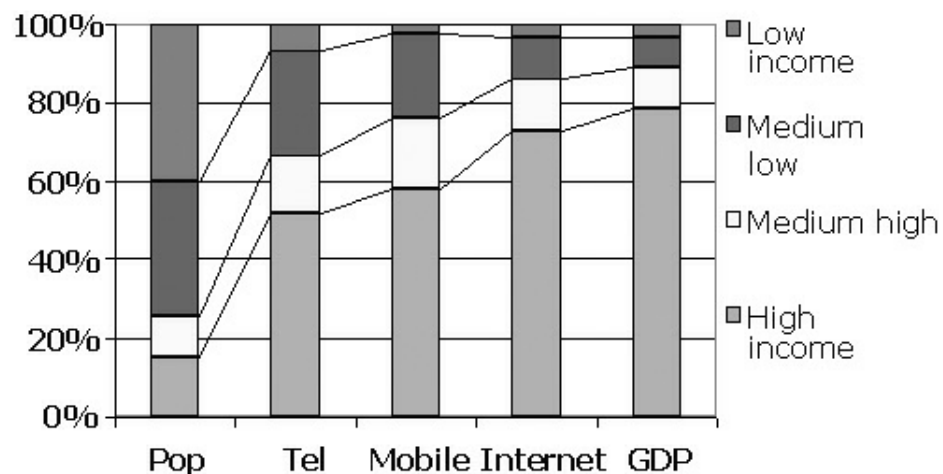
Source: Author's own preparation with data from ITU

Fixed telephones per 100 inhabitants, 2001

Source: Author's own preparation with data from ITU

Personal computers per 100 inhabitants, 2001

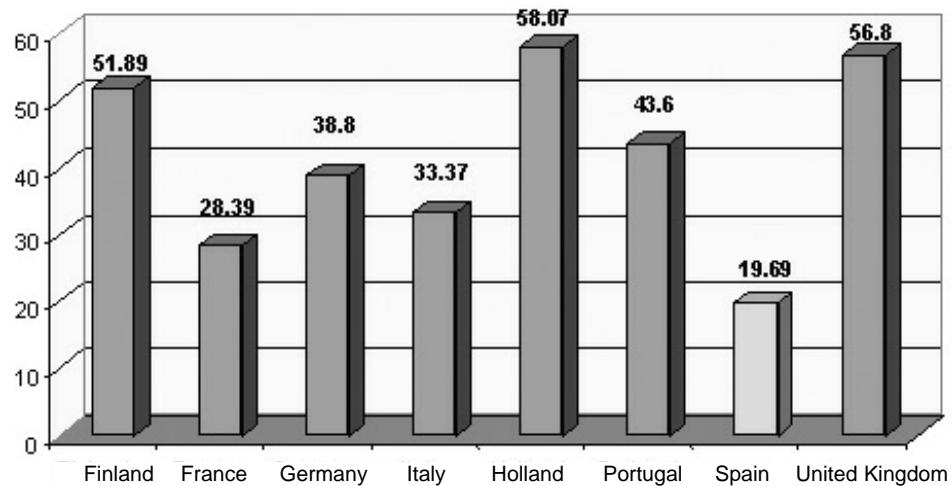Source: Author's own preparation with data from ITU

Spain is badly out of step with the other big four countries in the EU, with indices very similar to the smaller, less developed countries in the Union.

Finally, if we consider another of the most representative indicators of progress in the information society, i.e., the number of Internet users, the alarm bells that announce the danger of falling into the digital divide ring louder.

The divide appears to be a real threat and these figures suggest that Spain's incorporation into the information society is facing obstacles that threaten its long-term ability to keep up with the other four big countries of the EU, not to mention the market advantage in terms of leadership in the use of the Internet that the Scandinavian countries are registering. The alarm bells ring even louder if we take into account that even one of the smaller, less developed countries in the Union easily outpaces Spain.

Internet users, 2002

Source: Author's own preparation with data gathered by NUA on the situation of the first five months of 2002.

The digital divide in the autonomous communities

Furthermore, Spain is not a homogenous reality and the new threats of the digital divide affect the autonomous communities on which it is based.

Proof of this is the unequal provision of fixed telephone lines in homes in the different autonomous communities. This is emphasised even further if we take line quality into account, a factor which should be considered because it affects Internet access conditions.

Another limiting factor occurs in areas where most of the fixed telephones in rural nuclei with orographical difficulties are covered by Rural Cellular Access Telephone (RCAT) lines, which was a good solution for overcoming isolation in voice communication for many areas but is a barrier to them joining the information society as the lines do not allow Internet access. The lack of a solution to this problem goes a long way towards indicating how areas within developed countries can fall into the digital divide.

Another indicator we considered for observing positioning with respect to the information society is the availability of personal computers. Their distribution is unequal across the communities, with homes in Catalonia and Madrid being the

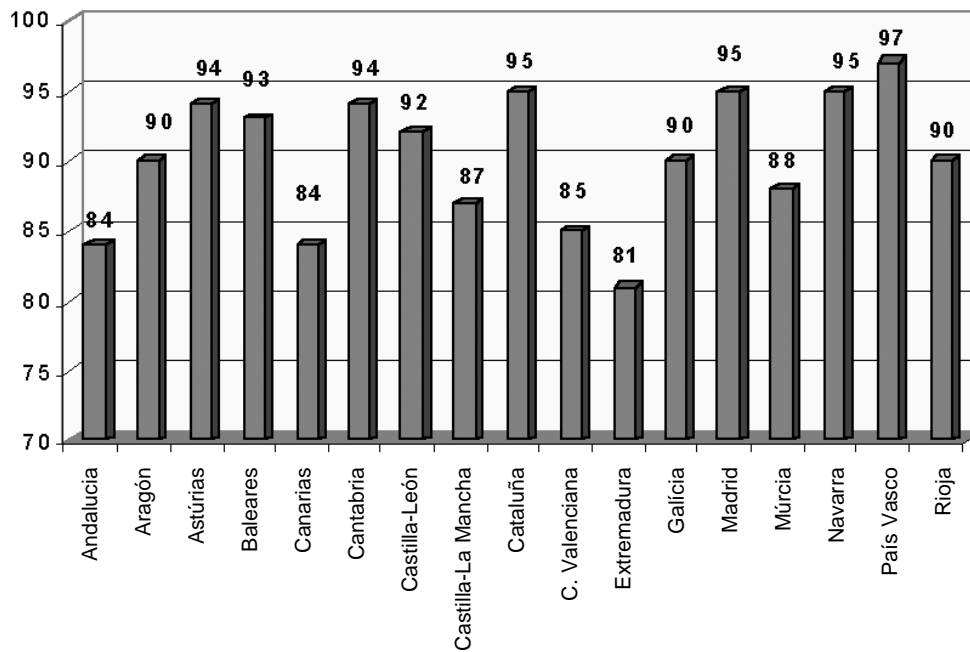best equipped, some 15 points above the lowest ones.

As well as the infrastructure indicators analysed, which attest to the greater danger of falling into the digital divide, we can also look at the relative position of Internet use, which in terms of being a dynamic indicator is highly significant in the evolution towards the information society, particularly when we consider that it reflects the level of practical assumption of its importance by the public.

Once again, the unequal distribution of Internet users in the different autonomous communities indicates the double nature of the digital divide: firstly, among communities, and secondly, between the communities and the same indicators in the other developed countries. Altogether, this bears witness to a danger of exclusion from which nobody should feel safe, but which will obviously more greatly penalise the people starting from the less fortunate positions.

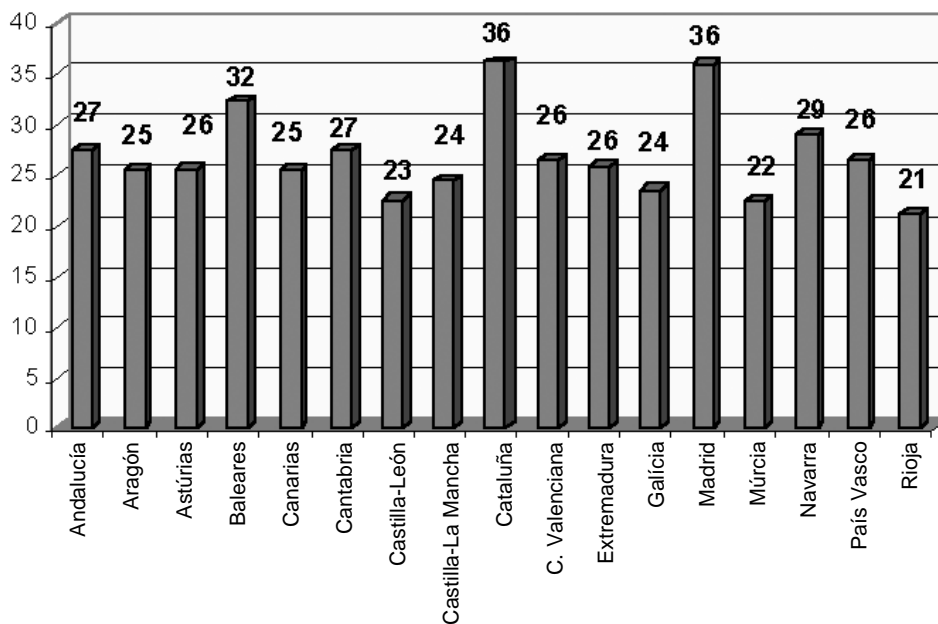## Strategies to confront the digital divide

The threat of the digital divide is an international reality and one within blocks of developed countries and within their

**Homes with fixed telephone lines, by autonomous community, 2001**

Bar chart showing percentage of homes with fixed telephone lines by autonomous community (2001):
- Andalucía: 84
- Aragón: 90
- Astúrias: 94
- Baleares: 93
- Canarias: 84
- Cantabria: 94
- Castilla-León: 92
- Castilla-La Mancha: 87
- Cataluña: 95
- C. Valenciana: 85
- Extremadura: 81
- Galicia: 90
- Madrid: 95
- Múrcia: 88
- Navarra: 95
- País Vasco: 97
- Rioja: 90

Source: Author's own preparation with data from the MCYT

Homes with PCs, by autonomous community, 2001

Bar chart showing percentage of homes with PCs by autonomous community (2001):
- Andalucía: 27
- Aragón: 25
- Astúrias: 26
- Baleares: 32
- Canarias: 25
- Cantabria: 27
- Castilla-León: 23
- Castilla-La Mancha: 24
- Cataluña: 36
- C. Valenciana: 26
- Extremadura: 26
- Galicia: 24
- Madrid: 36
- Múrcia: 22
- Navarra: 29
- País Vasco: 26
- Rioja: 21

Source: Author's own preparation with data from Sedisi

Internet users, by autonomous community, 2002
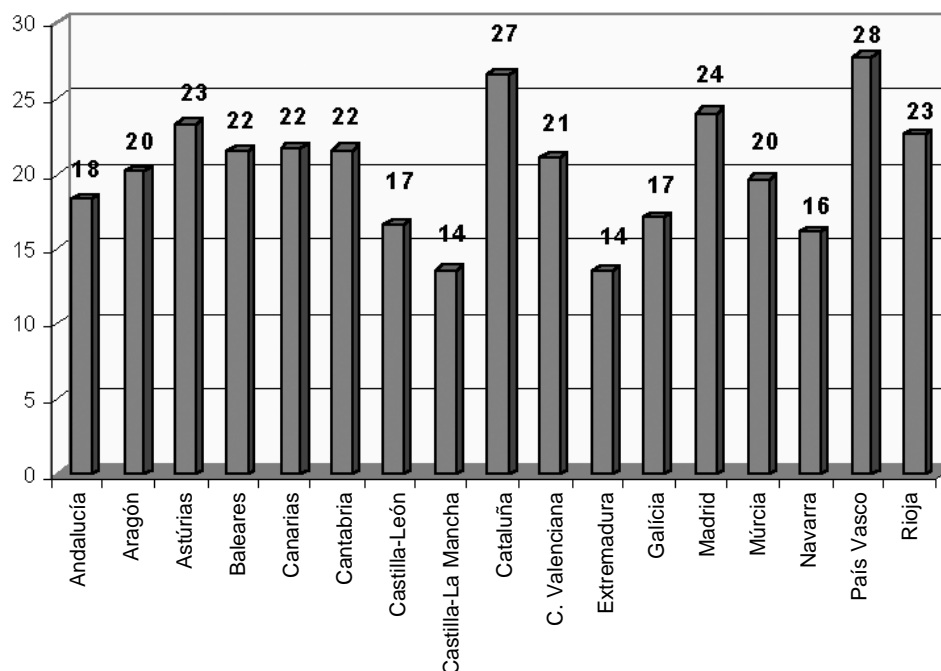
Source: Author's own preparation with data from AIMC

regions: falling into the abyss left by the divide or being able to leap to the other side will depend on a number of factors that can all be conditioned by political action.

In fact, it is within the technological framework that will give rise to the information society that we can establish active modelling policies for the introduction of ITCs that can generate new dynamics, aimed at changing the "natural" market tendency to multiply the size of the digital divide to the detriment of the less fortunate countries, regions and social groups. ITCs offer new tools that could allow a particular society, i.e., a state or nation, to change its relative position by applying active policies, through action by its government, that has repercussions on all the elements that make up the information society (i.e., infrastructures, users, content and environment).

The determining factors the strategy must impact in order to prevent the digital divide have to take many factors into account that can be divided into three categories: infrastructures, accessibility and training.

Infrastructures

Infrastructures include access terminals and all their components and accessories, from computers to digital televisions, STBs to game consoles, PVRs to PDAs and mobile telephone terminals. They also include all network resources, such as fixed and mobile telephony systems, coaxial and fibre optic cable, digital satellites, digital terrestrial television, digital terrestrial radio and other wireless web resources. The important thing in this aspect is the extension and quality of network coverage and number of terminals.

Accessibility

Accessibility refers to the access price for quality services and the infrastructures needed to actively participate in the information society, without quality discrimination due to place of residence or economic resources. With a view to

preventing a breach between territories and people, the availability of quality services at fair, reasonable and accessible prices to all regions at rates that are reasonably comparable must be guaranteed. Similarly, in rural zones and high-cost areas, the provision of these services has to enable rates to be reasonably comparable to those charged for similar services in urban areas.

Training

Training materialises in two areas: the training of competent professionals in information and communication technologies, both with regard to hardware and software, and within the latter, both in terms of programs and design and the implementation of services (i.e., content production). Training will provide the development conditions for a competitive industrial network capable of generating quality services that not only satisfy internal demand but are also able to operate on the global market that characterises the information society. The second area refers to the public's digital literacy with a view to facilitating competent incorporation as active participants in the information society. Literacy will not only help close the digital divide that is unfailingly opening up between information-rich and information-poor citizens, but competition will also lead to a revitalising of activities with regard to the use of the services on which the information society will be germinated.

The strategies for deploying the information society must impact these three levels and only by taking them into consideration is there any hope of being able to build strong bridges towards the promised digital society because, as I have indicated elsewhere (Prado, 2003), the promise of the digital paradise has been followed by the verification that there is a high price reserved for Providence. The convergence of the telecommunications, information technology and media sectors that was made possible and promoted by digitalisation opened up a process of change which materialised more in expectations than realities and where we have already had sonorous disasters that will have consequences.

Convergence blunders

Companies in these sectors were unusually anxious to free up vertical integration processes (increasing the divide through mergers or the purchase of companies within the same activity sector) and horizontal integration operations (increasing the divide through mergers or the purchase of companies in different industrial sectors involved with convergence), which led to a spectacular rise in the divide among the principal operators and big conglomerates.

The process of concentration reached a size that had no historical precedents and set off alarm bells about possible consequences with regard to pluralism and free competition. The appearance of signs that this level of concentration endangered the economic viability of even the big players took longer to appear, but have now become obvious. Investing in expectations required the mobilisation of financial resources on such a scale that even the most solid groups saw their liquidity threatened as they could not turn them into realities in the short term. This led to restructuring at Telefónica, Vivendi and even AOL-Time Warner, not to mention the winding-up of digital terrestrial platforms such as Quiero TV and ITV Digital or the Kirch Media Group.

The process has resulted in a number of situations. Economic circles in the communication hypersector have accelerated as much as communication speed to reach a top speed that has never been seen before in history. Technological convergence requires a slower tempo than the one imposed by economic expectations. Content convergence requires an even slower tempo. And as a final point with regard to the new situations comes the confirmation that convergence is not viable unless it is achieved on the basis of a solid supply of content and services, in such a way that the final tempo will be the result of an equation in which all the previous tempos are involved but where the variable with the most weight will be that of content.

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