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From Territorial Asymmetry to Digital Asymmetry: The case of Continental Portugal

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Abstract:

This paper aims to understand how the new information and communication technologies (ICT) help to promote territorial cohesion. We make a characterization of the functional marginality and digital marginality of the Portuguese territory, from which it can be concluded that they are spatially coincident. The solutions to minimize these asymmetries, and thus, contribute to more competitive and innovative inland regions, that promote the life quality of its residents and attract new talents, go through induce the demand for new technologies in areas of low population density.

Keywords: ICT, Regional Planning, Functional Marginality, Digital Marginality.

1. introduction

In the current context of the spatial planning of the Portuguese territory, we are witnessing an asymmetry in the population distribution, where the majority of the population is concentrated in a dense and dynamic urban coastline, in contrast with a desertified and declining rural hinterland. In the opinion of Ferrão (Ferrão, 2002), the opposition between social groups, economic sectors, modern and traditional spaces, introduced the coastal/inland contrast as a substantial fact of the territorial organization of the country. The urbanized, industrialized, intra-structured and demographically dynamic Portugal – the coast – stands out from the rural Portugal, agricultural, undeveloped, and demographically repulsive – the inland.

OECD also recognizes this territorial asymmetry, according with a recent study, the percentage of Portuguese population living in predominantly urban areas increased by two percentage points between 1991 and 2004 – while the OECD average remained virtually unchanged – and exceeds the OECD average (50 % versus 47% in 2004) (OCDE, 2008).

The population asymmetry, which is increasingly accentuated in Portugal, leads to a territorial imbalance. On one hand, as stated above, the inner cities lose critical mass necessary for them to be a strong economic, technological and social stake in the regions where they are integrated, maintaining, however, some

positive aspects as the environment conservation and cultural heritage, rural amenities and the life quality (Ferrão, 2002). On the other hand, the coastal cities will begin to feel the externalities of the population increase for which they are not planned, like the excessive concentration of population and activities, traffic congestion, lack of territorial planning, destruction of natural ecosystems, pollution and noise.

In an attempt to counteract this dichotomy, it is of extreme urgency, to understand the factors that determine the regional development of the inland, as well as the tools that can make the implementation of innovative public policies possible.

This work aims to understand how the new information and communication technologies (ICT) can help to promote territorial cohesion.

In point 2, we explore the spatial asymmetry, particularly the urban/rural dichotomy, using the concept of centrality pre and post digital revolution. Also at this point it is analysed the territorial asymmetry of the Portuguese territory, through the functional marginality of their parishes.

In the third point of this paper, it is examined, the theoretical discussion around the role that the ICT play in regional development and, to what extent, are they crucial to mitigate the territorial asymmetry. We also present at this point, a small characterization of the ICT dissemination in the Portuguese territory, through the distribution of the optical fibre infrastructure.

In point 4 we discuss some approaches that may contribute to a greater digital and territorial cohesion.

2. Territorial disparities

The territorial dynamics, in particular, regional disparities, are undeniably linked to the discussion of functions and centrality systems. The role that urban centres play regarding their rural surroundings, as well as the interaction of these two identities (urban/rural), is seen as crucial for a sustainable development of the territory.

This issue started to receive some attention in the early 90's. According to Marques (Marques, 2003), the European Commission in a 1994 report, Europe 2000+, recognized the importance of the relationship between the urban and the rural and debated the role of small and medium size cities and their importance as providers of services to the surrounding inner areas. In 1999, as a way to promote more balanced spatial development, the ministers of the member states have defined three guidelines that encompass the dimensions of the concept of territorial cohesion defined by the European Union (Development, 1999):

Development of a balanced and poly-centric urban system and a new urban/rural relationship;
Ensure equal access to infrastructure and knowledge;
Sustainable development, prudent management and protection of the natural and cultural heritage.

In addition to these three objectives, the spatial development committee says that: "cooperation is the key to an integrated spatial development policy and represents an added value to sectoral policies that act alone."

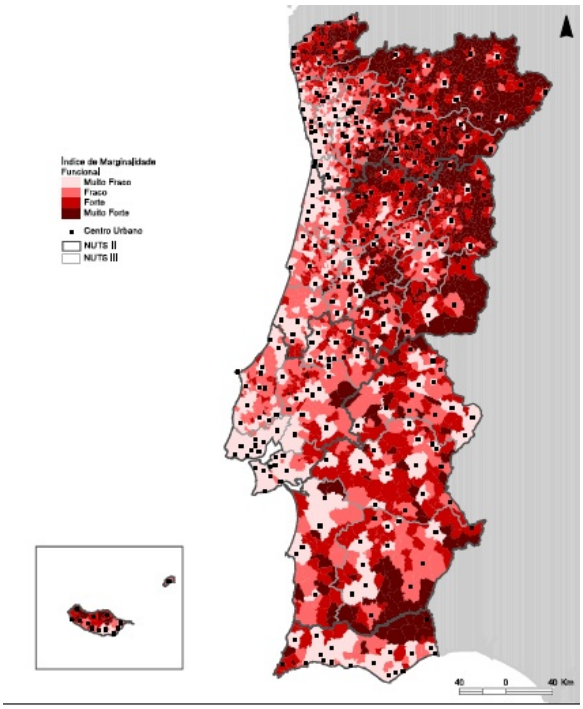
After a decade and a huge evolution of the technological tools, the discussion about centralization, decentralization and dispersion remains. What will be the role of urban and rural areas in regional development? Will it be attended a growing centrality around major urban centres, or will it be a dispersion and decentralization of people, services and goods?

Hall (Hall, 2005) believes that the role of large cities will continue to be central. The expectation of the author is that cities will maintain their uniqueness of attraction, for a wide range of activities that require face interaction between producers and consumers. Castells in his book *The Internet Galaxy* (Castells, 2004) also shares this view, demystifying the end of cities. According to the author, internet is an agglomeration enabler and not a dispersion medium. Despite the increasing ability to produce at distance, due to the increasing use of new technologies, cities continue to grow in size and complexity through the spatial concentration of jobs, economic activities and human capital. Kotkin and DeVol in their study *Knowledge-Value Cities in the Digital Age* (Kotkin, DeVol et al., 2001) analyse the reaction of various American cities in virtue of the first and second digital revolutions. The authors argue, that opportunities vary according to cities, because different types of activities have specific requirements for their location. However, there are some factors, which are a common denominator in all the cases that were studied. The most important is the life-style – people choose to live where they have life quality and access to activities they consider to be an asset in their daily life. The second is that, although, theoretically the industries of soft technology can operate at distance, they prefer to locate near skilled-workers. Workers, that are, where there is good life quality, for instances, in urban centres.

In 2004, the National Statistical Institute (INE) presented a study, that aimed to characterize the urban systems of the national territory, through the analysis of the urban centres hierarchy and the interactions between them, that are established in order to acquire a set of goods and services from different areas (services and trade, education, health and social security, among others). In the same study, it characterizes the levels of functional marginality of these territories

due to the same goods and services (INE, 2004). The analysis results are shown in Figure 1.

Figure 1 – Functional Marginality in Portugal



Source: (INE, 2004).

Analysing the map, we find a weak territorial cohesion in relation to their morphological dimension: the inland is functionally organized around a small number of urban centres, and the coast, is more complex and functionally organized around various urban centres. In addition, from a non-integrated form of functioning of these subsystems is a set of parishes, which are mainly within the inner North and Centre and in the inland territory between Alentejo and Algarve, which experience high levels of functional marginality.

While important, this analysis suffers from the way the distances were calculated for each parish to the set of goods and services analysed. The INE considered for this purpose the linear distance between the centroids of the parishes, without taking into account the orography of the land, physical barriers, or the infrastructure of transports, road networks and public transport. Probably the results would not be very different, however, with the existing technology it is possible to make a thinner and more realistic study. Another interesting analysis would be to embed the digital distance between parishes, for example, consider the broadband connections and e-services available between parishes and realize to what extent this variable changes the calculated distances. At the next point, it will be analysed the map of the broadband distribution in Portugal.

3. Digital asymmetries

At the time we live in, the information and communication technologies have the ability to change simultaneously various dimensions of human life. The boost of globalization we are witnessing affects the way we work, the access to education, the way we communicate and share our interests, modifying and creating new connections and boundaries between actors in the society. Furthermore, redraws territorial spatial structures, as well as economic, social and political concepts. It is in this context, that new technologies cannot be

ignored, when it comes to territory and regional planning.

In recent years, the importance of regions in the economic performance began to attract the attention of academics and politicians, as well as of global institutions like the World Bank and the OECD. Renowned economists such as Paul Krugman (Krugman, 1999) and Michael Porter (Porter, 1990), have been arguing that the success of the national economy in the global market is highly dependent of the economic competitiveness, performance and innovation capacity in the various regions of a nation and its cities. Also for Tödtling (Tödtling and Kaufmann, 1999) distant relationships can support the input of knowledge into an agent of the innovation system, but in order to generate collective benefits is necessary to anchor it in the region.

What, then, will be the role of ICT in this new context? Does ICT *per se* promote regional development? The discussion on this matter is not consensual.

For some authors (Brunn and Leinbach, 1991; Berben and Clements, 1995), technologies bring unconditional advantages to the economic growth of the peripheral areas. These studies are mainly based on the fact, that new technologies create a substantial improvement of the access and use of information, regardless of the location.

Other authors (Capello and Nijkamp, 1996; Grimes, 2000), also recognize the advantages in the use of ICT to promote economic growth in peripheral and disadvantaged regions, but warn that the technological tools cannot be studied separately without taking into account the socio-economic factors of the regions.

However, Castro and Butler (Castro-Jensen and Butler, 2003) in their study about the demand for services based on ICT and regional economic development reveal that regions with more population and richer have static and dynamic advantages at the outset. In other words, the capture process will begin earlier in these regions, the network will grow faster and the cumulative process of ICT for social and economic development will be more intense. On the other hand, the authors have doubts about the strategies purely oriented to the market on the supply side in order to promote the adoption of ICT, to encourage regional development and, subsequently, move towards greater regional economic equality.

Fernández-Maldonado recommends that the use of ICT as a mean of relieving the externalities of urban centres should not be ridden in a simple, linear way (Fernández- Maldonado, 2005). The author argues, that the application of technology in a vertical manner (top-down) has had poor results and has been unsustainable from a financial standpoint. As a solution to this problem, Fernández-Maldonado

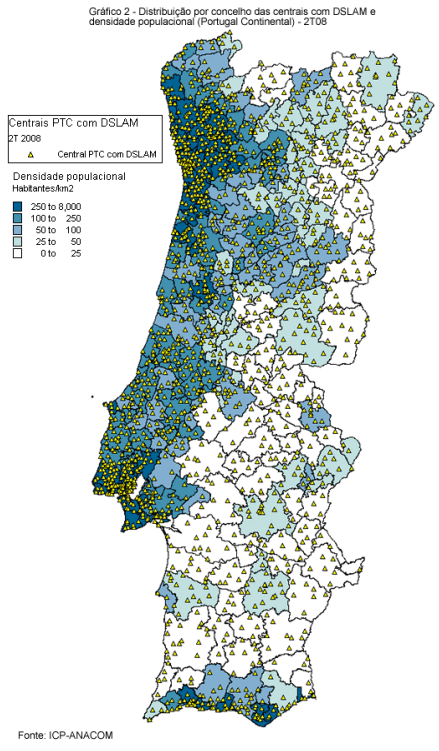
proposes a watchful eye on the tools and lessons that can be drawn from the existing urban contexts successful initiatives.

The starting point is, generally, the assumption that when they are technologies that enable communication there are contacts, which is not necessarily true. ICT's do not create the social and economic relations that make the agents interact and create effective information needs, which, in turn, lead to the creation of new types of activities. Graham (Graham, 2002), argues that, currently, the explosion of ICT use is an extension of the social, economic, cultural and geographical powers of groups and organizations who are best connected, more qualified and who better organize themselves to capitalize the advantages of ICT. In the author point of view, so far, these are the major beneficiaries of the "information revolution".

In a project developed in partnership between the University of Porto (GEDESFLUP), the INESC-Porto and the University of Aveiro on ICT for a competent country (Marques Oliveira et al., 2005), the author reflects on the demand and supply of networks and telecommunications infrastructures: "the networks and physical infrastructures of telecommunications are key elements of an expansion policy of services and universal provision of the capabilities of those networks. Given the industry's history, the inherent nature of these strategic infrastructures and the significant investments involved, most of these physical infrastructures belong to incumbents and are developed according to their interests. When these historic operators belonged to the state it was expected that the investments in these networks were a factor that preceded the demand; currently, with privatization and the consequent prevalence of the shareholders interests, it is unlikely that investments are made without the existence of a significant demand. Thus, from a superficial perspective would be unlikely to expect a significant boost in the use of ICT through a supply pressure."

This can be seen in Figure 2, which presents the distribution of the broadband in Continental Portugal.

Figure 2 - Distribution of the Broadband in Portugal



Source: (ANACOM, 2008).

What can be seen in the map is a spatial correlation between the population density and the density of the access points to the broadband. This corroborates the hypothesis that telecommunication operators follow market trends, where the marginal cost of a further diffuser antenna becomes low.

4. Bridging the Gap

As seen in the preceding paragraphs, we are witnessing a territorial and digital asymmetry between the coast and the inland. The digital infrastructures since privatization follow market trends and tend to increase their area of influence where the marginal cost is low.

It is still difficult to predict what role ICT's play in rural development. The lack of literature on the subject assumes that it does not exist yet a sufficient distancing size to evaluate the impacts of this phenomenon. However, there are areas where ICT has limitless possibilities and grow at an unstoppable pace, as in the case of public services (e-government), libraries (e-culture), distance education (e-learning), and telemedicine (e-health). Once the location of services is not determinant by their access and transport costs are reduced, small communities and rural areas can significantly improve their centrality and functionality if they can capitalize the potential of e-services.

In this context, the role of the e-planner, in what concerns to towns and the territory area, will be to find solutions that pass through the use of ICT in strengthening the social and territorial cohesion, in order to improve the delivery of services and, consequently, enhance the quality of life of people in two ways:
Improve the levels of social inclusion;
Reduce the regional imbalance.

On the other hand, the strategy of planning the territory, in addition to the aim of improving the life quality of local residents, must have in regard innovative ways of boosting the rural country in order to avoid an exodus from the inland to the coastal strip.

The information and knowledge society values creativity, as a key factor of success and competitiveness; creativity, one that requires an environment that can stimulate it and enhances a wide range of social, cultural and economic stimulus, being, therefore, associated with the rise of new work environments, new lifestyles, organizations and spaces that are conducive to a creative work. It is, therefore, essential to create conditions that foster the innovative planning of the territory in order to captivate the settlement of new inhabitants, and not only strategies that promote the inner regions as tourist resorts.

One possible way to do this is to induce the demand for new technologies in areas of low population density. The central state and the local authorities can

stimulate the induction of the demand.

4.1 The role of the Central Power

The optical fibre begins to be a good as important as water or electricity, so it is up to the state to regulate, creating natural incentives or promoting crossed subsidies, so that private companies, providers of these services, have a social vision and not only a purely mercantilist one. It is up to the state's regulatory role to promote the equity of the infrastructure.

Moreover, it is also up to the state to raise citizen's awareness for the importance of technology in the development of their regions. This awareness can be done in schools in several ways. There are government programs in place, such as e-schools and e-academies, which allow the distribution of computers (hardware and software) at low cost, which are important in accessing information. It has also been done an effort to bring optical fibre to schools, according to the program "Connecting Portugal", in January 2006, all public schools from 1st to 12th grade were connected to broadband internet, with the exception of a small number. A year earlier only 18% had a broadband connection. Besides these programs, which are important in raising awareness and in the dissemination of ICT, it is necessary to promote technological literacy across the curriculum, to help young people understand the mechanisms at there disposal, that allow them greater civic participation.

4.2 The Role of Local Government

The main actors of the city closely link the e-readiness of a city to ICT infrastructure and its use: businesses, citizens and communities and local government. The latter can be seen as the main sponsor and supplier of e-city. The level of e-readiness of the administration of a city is linked to the capacity of this city to use ICT in the delivery of public services aimed at competitiveness and sustainability objectives, but it also reflects the ability that the government has to equip the communities with tools that will allow the public participation in the planning of their community. In this context, ICT should be the main weapon in the modernization of local government. Apart from the direct benefits to local authorities in terms of effectiveness and efficiency of its operation, the local e-government will have a direct impact on local economy, reducing the context costs caused by the local administration, boosting it in the direction of the objectives of the Information Society.

Realizing the importance of the municipal chambers in the awareness and dissemination of ICT UMIC –Agency for the Knowledge Society (Santos and Amaral, 2006) commissioned a study on the Internet presence of the Portuguese municipalities for the year 2005. The findings are depicted in a master thesis (Aleixo, 2007) presenting the results in the form of a map as shown in Figure 3.

The presence of each of the municipalities in internet is classified in one of the four levels of the model, leaving those who do not have available website or web address to level 5 ("No Web Site"). The 268 municipalities with available website were distributed as follows:

Level 1 - the highest level of maturity, which corresponds to the level of transaction, which accounts, for the first time, with the presence of a municipal chamber (compared to 2003);

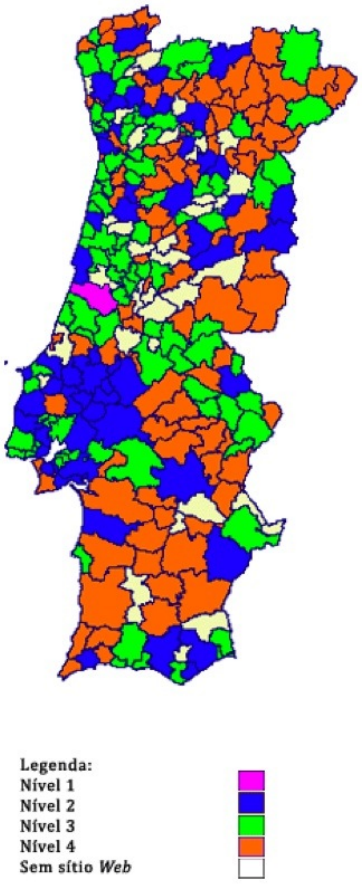
Level 2 - gathers the municipalities that offer, at least, one form for online fill or, allow the online consultation of processes. In this situation were recorded 60 municipalities, corresponding to 19.48 % of the autarchies that have available internet presence;

Level 3 - forms available for download, brings together 92 municipalities, which correspond to 29.87% of the available Web sites;

Level 4 - ranks the municipal chambers that only provide information about the autarchies and the county, registers 115 municipalities, corresponding to 53.9 % of the available Web sites;

Level 5 - are the municipalities that at the time of the study had no online presence, a total of 40, accounting for 12.99% of the total of Portuguese autarchies.

Figure 3 - Classification of Digital Municipalities



Source: (Aleixo, 2007).

In 2005, only the municipal council of Pombal is presenting a high maturity level of e-government, allowing its citizens to make payments for municipal services and follow their cases through the site. Most municipalities, 54%, have a basic Web service, which demonstrates the poor penetration of new generation technologies in local governments.

Only by visual analysis is difficult to establish a spatial correlation between the functional marginality, the digital marginality and the usability level of

Internet in the municipalities. But the pattern shown on the map suggests that most municipalities of level 4 are located on the inland and in Alentejo. Curious is the fact, those municipalities with large centrality as Cascais, Oeiras, and Almada have low levels of e-government.

5. Conclusions

The sustainable development of the territory goes through the interaction between the urban centres and their rural surroundings.

What we are witnessing in the Portuguese territory is to a territorial asymmetry, caused largely by a weak territorial cohesion. As can be seen in the literature, despite the advantages that the introduction and use of the ICT can bring in promoting economic growth in remote and disadvantaged areas, it is important to take into account the socio-economic factors of the regions, because cities are always privileged spaces, and will continue to be the core processes of regional development. Besides, if the state does not have a regulatory role, infrastructure and technological networks will not reach the most disadvantaged areas.

We will assist to a digital asymmetry, where the use of ICT will represent an extension of the social, economic, cultural and geographical powers of groups and organizations that are better connected, more skilled and that better organize themselves to capitalize the advantages of ICT.

In short, Portugal is witnessing a territorial and digital asymmetry between the coast and the inland. The digital infrastructure, since privatization, follows the market trend and tends to increase its area of influence where the marginal cost is low. One of the possible ways to reverse this trend is to induce the demand for new technologies in areas of low population density.

The central state and the local authorities can stimulate the induction of this demand. It is up to state's the regulatory role of promoting equity infrastructure. On the other hand, the state's role is also to raise awareness between citizens for the importance of technologies in the development of their regions.

This awareness will be more effective if done in schools. Although it has already been taken some steps in this direction, such as programs to purchase laptops at low cost, there is still much to be done, including the introduction of literacy materials for new technologies in the curriculum.

Local government has also a very important role in raising citizen's awareness to the level of public participation. A municipality that has the ability to use ICT in the delivery of public services aimed at competitiveness and sustainability objectives reflects the ability that government has to equip the communities with tools that will allow

public participation in the planning of their community. As shown, there is still a long way to go in using ICT as a tool for communication and public participation in municipalities.

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