

Challenges in the Digital Cities and Regions in Portugal

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Abstract: This paper presents the main results of a pioneer research project in the study of digital cities and regions in Portugal, regarding in-depth analyses. Unlike many other researches that subscribe a tecnocentric approach, in this research a sophisticated theoretical framework was adopted focusing on institutional and organizational, as well as technological factors that, in their inter-relation, influence the outcomes of the different cities and regions. Strengths and weaknesses of the digital cities and regions projects in Portugal are identified, comprising its conception and implementation. We also present the recommendations that can contribute to the debate and to social learning processes regarding policy formulation, project design and implementation as well as the practices of regional actors in Portugal and other countries of EU. Another primordial objective of the authors is accomplished by the research: to extend the theoretical and conceptual reflection about the issue; in this field, the proposal is that the digital cities and regions embrace a more adequate semantics, adopting the designation of knowledge cities and regions.

Keywords: digital cities and regions, knowledge-based development, governance, e-government, accessibilities, territorial competitiveness, regional information system, networks.

1. Introduction

The present paper presents the main results of the research “From the projects to the digital regions: which challenges?”[1] coordinated by the Centre of Social Studies of the University of Beira Interior (UBI_CES) and financed by the Portuguese Operational Program for the Knowledge Society (POS_C). In this research a transdisciplinary approach was adopted, supported by the expertise of researchers in sociology, regional economy and technology.

The general goal for this research was to deepen the knowledge on digital cities and regions in Portugal, and, taking in to account the identified characteristics and tendencies, contribute to the rethinking of the model, the methodologies and the projects that gave origin to the digital cities and regions and its implementation in order to improve results, not only in Portugal as in other EU countries, particularly those that joined recently.

The specific objectives were: (i) to analyse the institutional and social factors as well as the technological ones that, in an inter-related way, contributed to different outcomes in the digital cities and regions; (ii) identify the strengths and weaknesses found in the different dimensions considering the development of those cities and regions; (iii) outline recommendations that can reinforce a knowledge-based development.

The purpose of this paper is to present the main results of a research concerning cities and digital regions in Portugal, to intensify the scientific debate and to confront our results with international ones, deepening the knowledge about this subject.

Given the purpose of the paper, the scope of the research and its various aspects, in a major effort of systematization, we start by presenting the main theoretical assumptions that guided the research and the methodology used. The following section presents the context in which the projects of digital cities and regions emerged and the main strengths and weaknesses identified. The last section presents the main results of the project: (i) the recommendations are organized in six dimensions: governance, projects' conception, approval and implementation, e-government, accessibilities, territorial competitiveness and regional information system; (ii) final remarks and clues for further research.

2. Theoretical Framework and Methodology

We are faced not only with different analytical perspectives, theories and denominations about the accelerated changes of societies, but also with various identifications of their distinctive features. There seems to be an agreement on one issue only: the impact of information and communication technologies (ICT) in contemporary societies. Such differences are reflected in the design of policies and programmes, in research projects and in the design and implementation of intervention projects, which necessarily lead to different results.

It is therefore not indifferent to the investigation to choose either one or another theory, because the choice poses and implies different challenges to the empirical research on digital cities and regions. That's why we need to briefly present the adopted theoretical framework.

We reject the technological determinism and use, instead, a sophisticated model of analysis of the relationship between society and technology that Simões (2005a) [2] calls reciprocal conditioning. In this perspective we reject the technological determinism, but we don't underestimate the role of technology because each one, given its characteristics, establishes, not in an autonomous way, but in interrelation with social factors that conditioned it, different development paths. According to the adopted approach, the projects of digital cities and regions may succeed or not, depending on a wide range of social and technological factors.

The theory of the network society is based on above-mentioned perspective. Such theory proposed by Castells (1998) [3] and shared by Dijk (1999) [4], Himanen (2001) [5] and Barney (2004) [6], among others, seems to be the one that best captures the essence of the phenomena we are witnessing in contemporary societies. The dominant functions and processes are increasingly organizing around networks that shape and condition the morphology of our societies (Castells, 1998).

For Barney (2004: 26-7), the networks are made of nodes, ties and flows. A node is a distinct point (for example, a company or a R&D centre) connected at least to one other point, which in turn will be linked to other two or more points. The ties (for example, the connections via cable or satellite) connect the nodes. The flows (for example, information or knowledge) are what circulates among nodes and through the ties.

The nodes may be permanent or temporary, active, passive or reactive, or only net producers or receivers of different types of flows. The ties may be multiple or singular, strong or weak, dense or scarce, multidirectional or unidirectional, intersecting or parallel. The flows, in turn, can be constant or intermittent, abundant or scarce, reciprocal or one-way, unidirectional or multidirectional, significant or redundant.

But, if it is true that the networks are increasingly structuring the morphology of contemporary societies, and it is a necessary condition that economic, political and social

activities of countries and regions are organised or mediated by networks, this is, however, not a sufficient condition. The position that countries and regions occupy in the global society or the possibility to relocate will depend on the attributes that networks have. The more the characteristics of the nodes, ties and flows are similar to those first listed from the several pairs of characteristics mentioned above, the more the position of countries and regions will be strengthened. The nearer to those characteristics second listed from the same pairs of characteristics, the more the countries and regions will be demoted economically, socially and culturally on a global level. This can be explained by the fact stated by Himanen (2001: 167) that the networks operate in a binary logic: inclusion/exclusion.

Being presented the perspective on social and technological change and the network theory, it is important to define, at a more *meso* level, the concept used for cities and regions. Also at this level, there are several cities' and regions' theories, hence different ways of naming them: knowledge cities and regions, intelligent cities and regions, creative cities and regions, among others. This research focused on digital cities and regions in Portugal, a designation adopted by POS_C. However, in this study it was considered more relevant to adopt the concept of knowledge regions.

Based on Ergazakis' et al. (2006) [7] concept of knowledge city, we defend that the concept of knowledge region is a comprehensive one, embracing all economic, social and cultural aspects of a region, concerning to regions that bet on a knowledge-based development, through processes which allow a continuous creation, diffusion, sharing, up-dating and evaluation of knowledge. All of these imply a permanent interaction between not only the citizens of one region, but also with citizens of other regions and countries.

Various studies on the knowledge cities and territorial development and some theories in this field were a significant background for our research. Namely, the international experiences of cities studied by various authors in the book "Knowledge Cities - Approaches, Experiences, and Perspectives", coordinated by Carrillo (2006a) [8].

In that work, Ergazakis et al. (2006) present distinctive characteristics shared by six knowledge cities: Barcelona, Stockholm, Munich, Montreal, Dublin and Delft. They point out the following successful critical dimensions: the existence of political and societal will; the ownership of a strategic vision; the formulation of a strategic plan; the establishment of agencies that promote knowledge-based development; the international and multi-ethnic character of the city; the construction of an attractive and interactive site; the implementation of mechanisms to support innovation, value creation and financial support.

Carrillo (2006b) [9], Martínez (2006) [10] and Dvir (2006) [11] also highlight the identity issue, pointing out that another characteristic of knowledge cities is strongly associated to the capacity to build a future trajectory of development according to their past and present identity. As the last author points out, each city is unique: in its history, its economic, political and cultural specificities, in the composition of its population and in the socioeconomic challenges it faces.

The enounced characteristics are also crucial when the territorial approach is broadened, i.e., the knowledge regions.

The innovative milieu and the regional innovation systems theories were also frameworks that guided the search carried out, as well as several publications of the authors of this communication in the area of territorial development, namely Simões (2005b) [12] and Santos and Simões [13].

2.1 - Methodology

In this research we adopted a qualitative and comparative methodology. The qualitative approach allowed us to identify, on a deeper level, the main strengths and weaknesses of the digital cities and regions. In order to do so, we selected four different case studies: Beja Digital, Évora Distrito Digital, Gaia Global and Leiria Região Digital. That selection was based in the following criteria: projects with different levels of distinct characteristics such as economic development, leadership, participation and networking, internal and external coherence of projects.

The comparative approach was used to identify differences and similarities of digital cities' and regions' projects as well as to research the causes that explain them.

According to the two methodological strategies used, the following research techniques were adopted: interviews (10 exploratory and 29 semi-directives); 15 websites' analysis and documental analysis (policy documents regarding the Knowledge Society on a national and EU level), as well as reports of the four case studies and of other digital cities and regions.

3. Digital Cities and Regions: Context and Development

The Digital Cities Program was launched in Portugal in 1998 with the following main objectives: (i) to improve urban life, (ii) to fight peripherally, (iii) to reinforce economic competitiveness and employment and (iv) to support social integration and citizens with special needs (MCT, 1998) [14]. However, the concept of digital city was not defined in the context of that Program and the initiatives accomplished on its behalf were mainly directed towards e-government, essentially the issues of infrastructuring, and to the area of accessibilities. Meanwhile, in July 2000, that program became part of the Information Society Operational Program (POSI), following the orientations pursued in the eEurope Program. Later on, the POSI was redefined into the Knowledge Society Operational Program (POS_C) and it was then that the POS_C management team began to mobilise the project promoters to engage in larger territorial projects: the digital regions.

The digital city and region concept refers to a territory-based development approach; however, both on the European (see, for instance, the eEurope 2002 and the i2010 programs) and on the Portuguese policies, as on their instruments, there prevails a thematic approach of the knowledge society centred on eEducation, eResearch, eCommerce, eAccessibilities, among others.

Meanwhile, the POS_C management launched in 2003 the so-called Operationalization Guide to Digital Cities and Regions in order to create a framework to guide the design and implementation of projects and in which a concept of digital city/region is already presented: "A digital city/region is a network of digital infrastructures, institutions and skills that support the development of social capital and the creation, accumulation and dissemination of knowledge about a particular territory. Its objectives are: (a) to strengthen the social capital of a region, (b) to stimulate continuous learning, and (c) to embed the information technologies in the daily routine of local government and civil society in order to enhance competitiveness via regional innovation systems, to improve the quality of life in urban and rural areas, to promote citizens' participation and to develop the economy of a geographic area in a sustained way" (POS_C/UMIC, 2003:15) [15].

The promoters of the digital cities' and regions' projects must rely on that Guide to draw up their own projects, and their activities should be distributed by four dimensions of development: accessibilities, e-government, regional dynamization and infra-structures. In our study, a new analytical dimension was introduced and the previous four were reconfigured

into: e-government, accessibilities, territorial competitiveness and regional information system. The regional dynamization for the knowledge society no longer is a project dimension, it is its main objective.

As the projects should be conceived in partnership and the promoter should be a supramunicipal entity, the new analytical dimension introduced was governance.

Issues such as leadership, strategic vision, social capital, accountability and the participation of the main stakeholders and of people are analysed in the governance dimension [16]. The accessibility issue was examined through a multidimensional concept of access [17]. In the e-government field the questions related to the back-office and front-office, as well as the administrative reorganization were investigated [18]. In the territorial competitiveness dimension, the qualification of the human resources, innovation and competitiveness were approached. Finally, in the regional information system issues on hardware and software, as well as the way in which the information is managed and distributed, were also studied.

Considering the policies for the knowledge society and what was stipulated in the Guidelines for Operationalization of the Digital Cities and Regions, how did the main stakeholders implement the projects and which results have they achieved? The results in Portugal are very different. We can say that some regions, have begun processes of knowledge-based development, although they are clearly in an embryonic process that requires support and deepening.

The main strengths and weaknesses identified in the projects of digital cities and regions are presented below.

Table 1: Strengths and Weaknesses

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • The problematic of knowledge society was introduced in the local/regional political agenda; • The effort on the infrastructuring of the territories; • The significant cover of the regions with public access points that allow the physical access to ICT; • The map of existing institutional resources and some steps towards the local actors dialogue and the higher mutual knowledge; • The emergence of leaderships in some regions with strategy and mobilization capacity; • City' and digital regions' projects capable of transferability and of social apprenticeship processes in others regions; • The scale profits achieved with the new generation of projects that were implemented on a regional scope; • The achieved advances in some e-government segments; • The technological modernization of municipalities; • The induction of demand for specialized competences in the ICT area by municipalities, Association of Municipalities and other promoting entities. <p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • The difficulty of passing from (e) government paradigm to (e) governance; • The deficit of theoretical knowledge about the knowledge society; • The scarcity of strategic reflexion in most part of the regions; • The existence of very similar projects, despite the specificities of the regions; • The reductionism of the technocentric approaches and the excessive self-centredness of the projects; • The verticalization/sectorialization of the interventions; • The scarcity of relational culture and of the creation of collective dynamics of apprenticeship; • The deficit of organizational modernization in the municipalities and the absence of not only back-office indicators but also information and services demand ones; • The lack of projects that reduce the various forms of info-exclusion after access to ICT; • The projects' scarce orientation to the entrepreneurial, scientific and socio-cultural sphere; • The deficit of training of specialized human resources; • The reduced impact in terms of direct and indirect employment;

- The lack of an evaluation culture in the regions;
- The difficulty in assuring the sustainability of several projects;
- The excessive municipalisation of projects;
- The potential of instability associated to political/parties and localist disputes.

4. Recommendations and Conclusions

The present recommendations aim to stimulate the debate and the social reflexivity of the regional actors, of the (new) management entities of this kind of projects, as well as of the political decision-makers for territorial development policies in Portugal or in other EU countries. Recommendations for the five dimensions of digital cities and regions and also for the project's conception, approval and implementation are presented.

Table 2: Recommendations

Governance

1. It's crucial to substitute the (*e*) government paradigm by that of (*e*) governance and to create mechanisms that deepen the strategic reflexion capacities in the territories.
2. The constitution of partnerships in the new generation projects should demonstrate the participation of a wide representative range of actors (functionally and territorially) that form the territorial governance system.
3. The policies for knowledge cities and regions must contain instruments of social, cultural, institutional and entrepreneurial animation according to their own specificities, with particular emphasis on the identity ones.
4. Each territory must bet on improving the articulation between the policies oriented to the ICS and other policies, namely industrial, urban, innovation, scientific and technological.
5. It's crucial to stimulate a reflexive and co-operative attitude of actors that emphasises an inter-institutional dialogue as an essential condition to avoid fragmented interventions.
6. Leaderships must be chosen that are able to mobilize, bare accountable and implicate actors and to locate themselves above the political/parties and localist disputes.
7. To develop the creativity and innovation of the new generations, and also to attract and establish permanently knowledge workers in the territories, it's imperative to bet on the cultural dynamization, both intensively and extensively.

Conception, approval and implementation of projects

1. The projects should be inserted in the field of "knowledge society", as it would be reducing to put them in the "administrative modernization" sphere. It would make more sense to treat them as "integrated projects", making the approval dependent of pre-candidatures that provide high levels of information and are technically well sustained.
2. The pre-candidature should have the necessary time so that the diagnoses (i) is done obeying to thorough scientific and technical requirements, (ii) is adequate to the projects' goals, (iii) identifies which is the region' "level" on the path to knowledge society, through results already achieved in previous projects; (iv) indicates which are the mobilizable competences and the operative contributions to the project from the different social and entrepreneurial actors.
3. There should be a significant up-grading in the projects that reflects a passage:
 - from the information society paradigm to the knowledge paradigm;
 - from performances with a lack of strategic sense or short term strategies to interventions of structural nature;
 - from a sectorial intervention to a territorial one;
 - from a vertical intervention to a transversal and wide range approach;
 - from a technocentric intervention to a socio-organizational approach;
 - from technological management to knowledge-based management, which is centred on the promotion of citizenship and competitiveness;
 - from the underestimation of the mechanisms of reflexion and supervision to the need to raise on-going mechanisms of evaluation and of strategic and prospective analysis.
4. The candidatures of digital cities' and regions' projects should be organized in accordance with five dimensions: governance, e-government, accessibility, territorial competitiveness and regional information

system.

5. There should be a higher selectivity in the candidatures so that the approved projects with good performances can become examples of “good practice” for other territories;
6. It matters to include mechanisms of reinforcement of the processes of monitoring and evaluation that include not only input indicators, but also indicators of process, output and impact. These processes should be accomplished by qualified researchers, not only in evaluation techniques, but also in the field of the Knowledge Society;
7. The candidatures should be required to include a contribution to the reinforcement of the digital culture and of the competences of the citizens in the use of ICT;
8. A systematic and high-level research must be equated about knowledge-based development of regions, as well as the periodical promotion of forums of analysis and discussion between the academic/researcher area and the institutional/entrepreneurial universe.

Accessibilities

1. The projects should include activities that mobilize the more excluded people to frequent public access points, in order to reduce physical access inequality to ICT.
2. It is important to include in the projects activities that minimize inequalities that can be increased in the field of competences to the physical access to ICT and to the use of applications.
3. It is necessary to rethink the projects in order to include activities that promote qualified uses of ICT, which implies significant and effective articulations between the regional actors.

E-Government

1. The information of municipalities’ websites should adjust more to the needs of the users and it is also necessary to give differentiated answers according to the main specificities of the different users: citizens, enterprises, associations, and others.
2. It matters to develop mechanisms that stimulate and allow the participation of citizens in the public cause.
3. It would be important to bet on the maturity of the on-line services, namely in bidirectional and transactional services.
4. For a more adequate evaluation of the e-government back-office and demand indicators should be defined and used;
5. The technological modernization of the municipalities should be integrated in processes of organizational change, and also meet the specific needs of each municipality.
6. In the field of administrative modernization we must “turn the page” to projects whose results show basic, medium and mostly advanced training of the staff.
7. For an effective appropriation of competences, the municipalities should enlarge the permanent staff specialized in ICT.

Territorial Competitiveness

1. Enlarge the strategic partnerships to the entrepreneurial sphere in order to enrich the economic contents of the projects, so as to adjust them to the dynamics of demand, and mobilize reference actors to the new challenges of competitiveness.
2. Improve the production of innovation, mainly by creating networking mechanisms between entrepreneurial, technological and academic players, in a logic of activation and dynamization of clusters of regional basis and of the promoting the entrepreneurship of technological basis.
3. Raise mechanisms of extensification concerning the need to activate and stimulate latent demands in matters of technological and organizational *upgrading* – especially in more peripheral areas.

Information system

1. It is absolutely crucial to assure the appropriation of competences in matters of ICT in its more technological aspects which can be a threat in cases of excessive external sub-contraction.
2. The building of regional and local websites should be based on needs and specificities of the different target groups rather than on the supply possibilities, and making the information and the available services more attractive and interactive.
3. It is important to bet on regional websites that reflect regional vision, strategy and the specificities of the region, that mobilize partners and population, that encourage more interactivity and that are more than just a “sum” of the websites of municipalities and of other partners.
4. The information system should be settled in a multi-channel strategy displaying the diverse use of

communication channels compatibles with the daily practices of the populations.

5. The new cities' and regions' projects should enhance the reutilization and use of the existing infrastructures, namely the Digital Technologies Centre (DTC) built in the projects of this generation and that could be more profitable on a higher geographic scale, particularly in the less developed regions.
6. It would be important to raise the level of integration of the different entities so as to allow points of unique access to the user. To do this, it will be necessary to move towards an encompassing notion of interoperability that alongside standardization of technological solutions also includes the organizational dimension.

4.1 - Final reflections

The position that countries and regions occupy or will occupy in the global society, or the possibility they have to reposition themselves, will depend, as mentioned, on the attributes of their networks, depending these on characteristics of the nodes, ties and flows. In this increasingly globalised world, where cities and regions are becoming increasingly crucial players in economic development, the nodes of networks - social actors, particularly the collective ones - will be eventually decisive and may, in a process that is difficult and complex, make a difference in the regions, making them winners or losers, depending on their institutional capacity, and also on the kind and quality of ties and flows they are able to formulate and implement.

There are no standard solutions and those regions that want to be successful in the process of knowledge-based development act/react in different ways, depending on the specificities of their history, culture and institutions.

It is also important to reaffirm that ICT are not but a mere facilitator tool, they do not predetermine any kind of development; they do not prescribe a knowledge-based development. In that sense, it was suggested that the designation of digital cities and regions should be replaced by knowledge cities and regions. The term digital, in our opinion, refers implicitly to a technologically deterministic perspective that has several consequences, namely the appropriation of that sense of the word by the actors present in different regions, which has impacts, particularly in an intervention almost exclusively focused on infrastructure and technological responses. As repeatedly emphasized by Barney (2004), names have all the importance. When awarded, they not only describe, but also prescribe, or make things happen...

What differentiating marks highlight the cities and regions that begin to be "winners", from those that have failed to embark on these upgrading trajectories? This research project has confirmed the relevance of characteristics of knowledge cities and regions already identified in international experiences by other researchers. We can describe synthetically (i) the existence of political will and commitment, (ii) the development of strategic diagnoses adjusted to the specific geographic contexts, (iii) a defined framework to guide action with clear priorities, assuming the social, economic and cultural specificities as differentiating features regarding other regions (iv) the creation of mechanisms to stimulate innovation and support the creation, dissemination and sharing of knowledge, (v) the possession of qualified human resources and an attractive and conducive context aiming at the establishment of the knowledge workers, (vi) the existence of dynamic leaderships, (vii) the building of effective and diversified partnerships, (viii) the skills concerning the management, organizational and marketing challenges.

This research constituted a point of arrival due to the contributions given to a more systematic awareness of the knowledge regions, the various analysis' dimensions of the concept of those regions having been re-thought and reconsidered. It was also a point of departure

because it is crucial to pursue and deepen the theoretical reflection and the empirical research in order to increase and consolidate our understanding about these regions. This will enable stabilize and systematize the dimensions of the concept of knowledge city or region, a necessary step to move on to the development of indicators in a more sustainable way. Only with these monitoring and evaluating tools will we then be able to assess the "status" of a region, concerning all this dynamics of upgrading towards the knowledge society and all its challenges. The available indicators so far are predominantly fragmented in nature and based on the assumptions of technological determinism, not responding to several social aspects that are essential for the development of the regions, as we verified along the research.

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