Merging digital capital and digital governance: A framework for local government websites

Sandra Isabel Rodrigues Bailoa

Polytechnic Institute of Beja

School of Technology and Management

Abstract: Most studies about websites of local public administration can be found in the area of e-government, where models developed for the management and evaluation of these websites are composed of dimensions based on criteria of technical and technological nature such as accessibility, navigability, usability, aspects decisive for its functionality and quality.

However, they have left in second place the analysis of dimensions related to the management of public organizations, such as transparency, network of relationships, human capital, social and environmental responsibility, aspects that are emphasized in the theories of intellectual capital. In this area websites are considered as strategic tools of knowledge management, however, there are very few models for management and evaluation of websites based on the theories of knowledge management and intellectual capital, and those that exist are mainly for the business area.

Thus, this paper intends to propose an intellectual capital model for contents management of local government websites, as the literature leaves open that possibility. The dimensions of digital capital considered relevant in the development of local government websites were: services, democratic, relational and organizational e-capital.

Key words: digital capital, local e-government, digital governance, websites management, municipal council

1. Introduction

In the literature one can find many references that investigated the processes of management of municipal websites. The majority of studies can be found in the e-government area. However, one can also find some references that investigated the resulting impact of internet based projects, e-government projects and development of websites on the intellectual capital area. The references that studied the application of the theory of intellectual capital to the digital networks say that the digital capital corresponds to the intellectual capital within/in digital networks such as the Internet. Among the references that analyzed the digital capital on websites, only some propose models for the management of digital capital of

Correspondence to:
Sandra Isabel Rodrigues Bailoa
Edifício da Escola Superior
de Tecnologia e Gestão
Campus do Instituto Politécnico
de Beja
Rua Pedro Soares
7800-295 Beja, Portugal
Tel.: +351 284 314 400
E-mail: sandra.bailoa@ipbeja.pt

websites, such as the works of Terra and Gordon (2002), Ruta (2009), Liu and Chen (2009), Liu (2009) and Chen (2011). Models that represent the digital capital of websites structure contents and functionalities by a set of categories of digital capital, but they were mainly built for the management of companies' websites.

Then again, studies about municipal websites fit on e-government area where the websites management models are based mainly in measuring technological aspects undervaluing important aspects of organizational management. These aspects are emphasized in intellectual capital area, however, they still have a pioneering and exploratory nature, and it was not possible to identify models for municipal websites management based on intellectual capital theories. Thus this paper tries to connect the knowledge areas of intellectual capital and e-government to analyze the processes of management of municipal websites and intends to introduce an analysis model of intellectual capital for municipal websites management through defining the categories of digital capital important in the development of municipal websites.

This paper is organized as follows. The next section introduces the literature review and describes the theoretical background of digital capital and local e-government. The third section proposes the categories of digital capital of local governments' websites. The fourth section presents the main conclusions.

2. Literature review

2.1. Digital capital: State of the art

One cannot talk about digital capital without mentioning its roots, the intellectual capital theory. Research on intellectual capital has taken different approaches in different areas such as accounting, strategic management, human resources, and finance thus, the concept has many definitions and interpretations. However, these have been converging and it is usual to define intellectual capital as the set of intangible assets (knowledge, information, creativity, competences and skills of workers, trademarks, customer satisfaction, marketing, and quality, among others) that create value and competitive advantages to organizations. And it is usually classified as human capital, structural capital and relational capital. Thus, knowledge and intellectual capital are important production factors in today's economies.

As stated by Serrano and Fialho (2003, p. 112), the concept of intellectual capital was created in 1969 by the economist John Kenneth Galbraith, although Queiroz et al. (2005, p. 213) state that the modern development of intellectual capital was made mainly by Brooking (1996), Sveiby (1997), Edvinsson and Malone (1997) and Stewart (1998) producing scientific texts and studies with practical application, especially in business area.

It is possible to find a multiplicity of intellectual capital management methodologies, especially coming from the business area where the first models were produced. However, it is also possible to observe some other research paths with the application of the concept to the public sector management, to the territories management and to digital networks. Therefore, digital capital perception results from the application of intellectual capital theory to digital business networks made possible by the Internet and the term was initially suggested by Tapscott et al. (2000).

For Tapscott et al. (2000, p. 26), 'when intellectual capital moves to digital networks, it transforms entire industries and creates wealth in entirely new ways.' The new value that is created is the digital capital, including Tapscott et al. (2000, p. IX), considered the digital networks of business b-webs (business-webs) as 'the mechanisms for the accumulation of digital capital, the knowledge- and relationship-based currency of the new economy' and the increasingly universal business platforms.

Tapscott et al. (2000, p. 5) state that the digital age brought new ways of working and negotiating in an economy that they termed as 'digital economy'. While industrial economy depended on physical goods, where mass production implied shortages and high mobilization costs of raw materials, manufacturing and assembly of products and their distribution, in the digital economy many products such as software and electronic entertainment are not physical, they are knowledge-based products and even the value of physical goods such as medicines and cars depends on the knowledge embodied in its design and production (Tapscott et al, 2000, p. 5.). Callen et al. (2001, p. 4) state that the third computer revolution was characterized by the emergence of a new way of doing business, the 'dot com' company. E-business or e-commerce activities are examples of these business activities online. Callen et al. (2001, p. 4) explain that in this type of business, traditional inputs such as work labour, machines, materials and money are not enough to describe the production process of these companies 'dot com' where inputs in the form of intangible assets play a key and leading role in their performance. The importance of these intangible assets such as information, knowledge, intellectual capital linked or presented in digital networks explains the emergence of digital capital concept. Chen (2011, p. 3592) considers that the concept of digital capital developed by Tapscott et al. (2000) is the specific intellectual capital of digital business networks and is the main strategic resource for competitive advantage in the digital economy. To Tapscott et al. (2000, p. 26) one explanation for the high valuations of stocks of companies operating on the Internet is the market's growing recognition of digital capital. 'When business-webs grow, digital capital also Increases' (Liu, 2009, p. 508). Therefore, following these considerations, digital capital corresponds to the intellectual capital within/in digital networks such as the Internet.

Tapscott et al. (2000, p. 26) consider that digital capital adds new dimensions to the three kinds of intellectual capital (human, structural, and customer) described by knowledge-management thinkers as Leif Edvinsson and Hubert Saint-Onge.

> Simply put, digital capital results from the internetworking of three types of knowledge assets: human capital (what people know), customer capital (who you know, and who knows and values you), and structural capital (how what you know is built into your business systems). With internetworking, you can gain human capital without owning it; customer capital from complex mutual relationships; and structural capital that builds wealth through new business models (Tapscott et al., 2000, p. 5).

According to Tapscott et al. (2000, pp. 26–27), the digital extension of Human capital includes capacity, skills, knowledge, creativity and know-how of individuals that interconnected share knowledge and commitment to create value and it extends to people across the

b-webs in which an enterprise participates; Relationship capital consists of customer capital that when internetworked in a b-web, it becomes relationship capital, which can be obtained from multidirectional and dynamic relationships/ reciprocal linkages involving all b-web participants as customers and providers of context, content, commerce services, and infrastructure; and the digital extension of Structural capital consists of, first, networked knowledge, processes, and tools available at the point of need and, second, new b-web business models that change the rules of market leadership. Thus, according to these authors, digital capital is the result from the internetworking in a b-web of three types of knowledge assets: human, structural and relationship capital.

2.1.1. Studies on digital capital management

In the literature one can realize that over the last decades research has been made and some methodologies to analyze and manage intellectual capital at organizational level have been produced. Despite that, research at digital networks level did not follow the same constancy and persistence. Anyway, since it is a different manner of establishing the work and activities of private and public organizations that goes beyond the context of their physical existence with specific characteristics that one should know better, then this area should be worthy of attention from researchers.

Owing to the particular characteristics of the digital economy, it is not adequate to use models developed for organizations to analyze the digital capital of websites, for the reason that they do not contemplate all aspects of these digital platforms. Liu and Chen (2009, p. 9416) affirm that the existing studies at the corporate level are inadequate to measure the scale of cyber-entrepreneurship activities or analysis of its determinants. In order to try to overcome this problem, some research that analyzes the digital capital inherent to websites can be identified, such as the studies of Tapscott et al. (2000), Callén et al. (2001), Cinca et al. (2001), Terra and Gordon (2002), Queiroz (2003), Mello et al. (2003), Srivihok and Intrapairote (2004), Carvalho and Ferreira (2007), Bailoa (2007), Ruta (2009), Liu (2009), Liu and Chen (2009), Joia (2009), Gholamian et al. (2010), and Chen (2011).

In the area of intellectual capital, studies about websites try to show that these infrastructures have a role to play in knowledge management, as they allow its creation, use and dissemination. Terra and Gordon (2002) and Ruta (2009) consider websites as essential tools of intellectual capital management, proposing the management of websites based on sources of intellectual capital of the organization as a way to promote the creation, use and dissemination of intangible assets such as information and knowledge and the improvement of processes such as innovation, creativity and learning. The use of websites is seen as a strategic tool to support decision making. For example, in the case of the local public administration websites, it may serve or influence the decision making of a set of agents such as: the municipality, the citizens, local businesses, potential investors, tourists, and others. Thus, the website eventually can serve multiple interests and therefore it requires a suitable governance model.

In general, studies about digital capital try to identify dimensions of intellectual capital (human, structural, customer, relational, organizational, among other categories) important

for a better management of websites of enterprises and other organizations and, in the case of public organizations websites, to achieve better results in e-government projects. It is possible to identify some models that represent digital capital of websites by structuring the applications and features of websites by a set of dimensions or categories of intangible assets considered important for its management. In Table 1 some studies about websites in the area of intellectual capital can be observed and the dimensions/ categories that were considered to represent digital capital in each study and the type of websites analyzed.

Table 1. Studies on digital capital

Studies	Digital capital categories	Websites analyzed
Tapscott et al. (2000)	Human capital, Structural capital and Relationship capital	b-webs
Callén et al. (2001)	Internal structure: management efficiency and External structure: image and customer loyalty	Firms websites
Cinca et al. (2001)	Internal organization, External structural capital, Human capital, and Social and environmental commitment	City councils websites
Terra and Gordon (2002)	Leadership capital, Social capital, Structural capital, Human capital and Network capital	Firms websites
Queiroz (2003)	Human Capital, Internal organization, External relations, Quality and Transparency	City councils websites
Mello et al. (2003)	Human Capital, Structural capital, Relational capital and Transparency	Legislative Assemblies home pages
Srivihok and Intrapairote (2004)	Human capital, Structural capital and Relational capital	SMEs websites
Carvalho and Ferreira (2007)	Organizational capital	Organizations websites
Bailoa (2007)	Human capital, Structural capital, Relational capital and Transparency	City councils websites
Liu and Wang (2007)	Internet relational capital, Internet customer capital, Internet innovative capital and Internet service capital	Job search websites
Liu (2008)	Internet relational capital, Internet customer capital, Internet innovative capital and Internet service capital	Mobile phone service websites
Ruta (2009)	Human capital, Social capital and Organizational capital	A multinational consulting firm website
Joia (2009)	Human, Organizational, Relational and Innovative capitals	G2G (government-to--government) projects connecting a Central Bank to the courts of justice
Liu (2009)	Internet relational capital, Internet customer capital and Internet service capital	Real estate websites

Studies	Digital capital categories	Websites analyzed
Liu and Chen (2009)	Internet relational capital, Internet customer capital, and Internet service capital	Recruiting websites for the armed forces
Gholamian et al. (2010)	Human capital and structural capital (this one divided in customer capital, process capital and innovational capital)	e-business
Liu (2010)	Internet relation capital, Internet patient capital and Internet service capital	Hospital service websites
Chen (2011)	Internet relational capital, Internet customer capital, Internet innovative capital, and Internet service capital	Cargo clearance business websites
Liu (2013)	Internet relational capital, Internet customer capital, and Internet service capital	Job search websites

S o u r c e: Author's own elaboration.

Analyzing Table 1, it can be seen that the most studied dimensions and considered as critical components of the digital capital are first the relational capital, then service capital, customer, human, structural and even innovation would appear. Other dimensions related to aspects considered crucial in the management of public organizations also arise, such as transparency and social and environmental commitment, although with less focus than the other dimensions in the various analyses. The relational capital was present in all studies, a key dimension, corresponding to the first function of the portal, to create value allowing and maintaining the interaction and communication of organization with users.

Research exposed in the Table above presents some diversity both in the sectors where organizations studied operate (private or public sector), either in the methodologies used in the studies. Even in the case where the methodologies get close, such as in Liu and Wang (2007), Liu (2008), Liu (2009), Liu and Chen (2009), Liu (2010), Chen (2011), and Liu (2013), the dimensions in which the digital capital is subdivided not always converge, and in each case it is being adjusted for object cases of the study. This diversity presents difficulties in generalizing or confirms the results in adopting general implications due to the pioneering and exploratory nature of studies, limitations which are also recognized by the authors concerned, such as in Chen (2011, p. 3597) and Liu (2013, p. 128). Chen (2011, p. 3593) concludes that even after conducting a series of studies, the digital capital got different dimensions when applied to different industries.

Despite the relevance of digital networks and its intangible benefits for the public organizations, there is a small amount of research that identifies the digital capital present in the websites of public entities. Joia (2009, p. 1397) considers that the evaluation of e-government initiatives is still a challenge for academics and public sector managers since much of the benefits of these projects are intangible. The few examples are the works of Cinca et al. (2001), Queiroz (2003), Mello et al. (2003), Bailoa (2007), Joia (2009), Liu and Chen (2009), and Chen (2011).

Among those studies, it was possible to verify that models for management of websites of local public administration are not proposed. Cinca et al. (2001) and Queiroz (2003), while studying websites of municipalities, propose models of intellectual capital management for organizations in the public sector and not directly for the management of websites. Therefore, in these studies websites were used as a means to analyze intellectual capital of organizations. Studies of Mello et al. (2003), Bailoa (2007) and Joia (2009) analyze websites of public sector organizations but also do not propose management models for websites or e-government projects. The works of Liu and Chen (2009) and Chen (2011) refer to the management of specific websites of certain organizations and represent digital capital adjusted to each situation and as mentioned above, may not be generalized in other cases, as the one that is discussed here, the particularity of local administration.

Anyway, despite the studies of Cinca et al. (2001), Queiroz (2003), Mello et al. (2003), Bailoa (2007), and Joia (2009) do not produce digital capital management models, we find important contributions with respect to intangible assets in them that are critical in the management of organizations and websites in public sector. Similarly, studies of Tapscott et al. (2000), Callén et al. (2001), Srivihok and Intrapairote (2004), Carvalho and Ferreira (2007), Gholamian et al. (2010), Liu and Wang (2007), Liu (2008), Liu (2009), Liu (2013) and models of Terra and Gordon (2002), and Ruta (2009) focus on the analysis of enterprises websites that leave important clues to understand many issues related with the management of the digital capital.

Thus, the literature leaves open the possibility of project models for management of websites of public administration based on the theories of intellectual capital, since it was not possible to find any proposals in the rare existing studies.

2.2. Local e-government: State of the art

Over the last decades, ICTs have brought major impacts on the lives of the public administrations. The construction of the Information Society has brought many challenges, including the modernization of their work processes, so often connoted of regulatory and bureaucratic. Since the last decade of the 20th century, these entities have looked for new ways of providing public services with the use of ICTs and especially with the use of Internet, of which the e-government projects are the most visible face. E-government has brought great changes in the way government works, provides services and interacts with other agents in society. It is a radical transformation process that can be carried out thanks to information and communication technologies enabling a wide range of possibilities to rethink the ways of working of public organizations (Batlle-Montserrat et al., 2009, p. 4). Thus, central and local governments have developed e-government projects aiming to provide information and services to citizens and companies through the Internet.

In the literature e-government definitions converge and, in a simple way, consist in providing information and services to citizens and businesses through the Internet. 'When we talk about e-government we refer to the use that public administration, whether central, regional or local, make of information and communication technologies' (Santos and Amaral, 2002, p. 25). 'E-government refers to the delivery of government information and services online

through the Internet or other digital means. Unlike traditional structures, which are hierarchical, linear, and one-way, Internet delivery systems are nonhierarchical, nonlinear, two--way, and available 24 hours a day, seven days a week' (West, 2004, p. 16). 'E-government is characterized by inter-organizational relationships including policy coordination and policy implementation and by the delivery of services online or through other electronic means to citizens' (UN, 2002, p. 54).

When this supply of information and services by ICTs occurs at the level of local administration, it is called local e-government. 'It is the use of Information and Communication Technologies that offer to individual and businesses in a given territory the services and conditions for the promotion of democracy and quality of life, relating the political power and local Public Administration with the citizen and the companies, resorting the exchange of information of electronic base' (Gouveia, 2004, p. 25).

Based on the same principles of e-government, the author presents a differentiating factor, which is the greater territorial proximity with the citizen (Gouveia, 2003, p. 189). The responsibility for the conduction and administration of local e-government is from local authorities, which can be organized in varying degrees depending on the country concerned but which in Portugal underlies the activities of the City Councils and Parish Councils (Gouveia, 2004, p. 26). Gouveia (2004, p. 36) presents a set of local e-government functions: to publish information; interact with the public; perform transactions with citizens and remaining local public administration; integrate information with other local public administration; and transform information.

Since these situations affect the local public administration, municipal managers need to conduct these processes in order to have satisfactory results, requiring information that could reflect the progress. According to Batlle-Montserrat et al. (2009, p. 4), two important aspects are needed to drive this process to a successful transformation: the existence of an e-government model for cities and measuring the development of e-government in the cities. They state that in order the transformation was a success, municipal managers have to reflect on issues such as: 'How is the city doing the journey? Where is the city going? At which stage of this journey is the city?' (Batlle-Montserrat et al., 2009, p. 4).

2.2.1. Studies on local e-government

The area where we can find the greatest amount of studies on websites of public administration is e-government. In this area, the Internet is now seen as a governance tool and, accordingly, there are many public entities that have designed their websites, making available content and providing services on the network, such as city councils. 'Digital government has the potential to connect every citizen with elected officials and decision-makers like no previous innovation or activity. It offers individuals new and greater access to information and knowledge, subsequently redefining personal freedom' (UN, 2002, p. 54).

In the cities, municipal websites have allowed the modernization of services, and local administration has been able to realize the potential that the good use of digital networks can have on the development and innovation at regional and local level, as well as in the welfare of citizens and businesses. In the digital economy, where networked relationships proliferate,

'Intelligent Cities' are considered, the cities where the local innovation system is supported and updated by means of digital networks and applications (Komninos, 2007).

According to Batlle-Montserrat et al. (2009, p. 4), in Europe the principle of subsidiarity ensures that decisions are taken as closely as possible to the citizen, allowing the cities to benefit from autonomy in a large number of skills and play an important role in the organization of European society, enabling that electronic government has a very strong impact at local level.

Due to this potential, the process of e-government has been widely studied. Research has focused on the benefits, evolutionary stages, barriers to its development, aspects of electronic governance, website evaluation, among others. In literature that studies and evaluates *local e-government* processes, it was possible to identify two different sets of approaches. On the one hand, studies that analyze the electronic governance pratices and, on the other hand, studies that evaluate the level of maturity of e-government.

2.2.1.1. Studies on digital governance

The intensive use of ICT, especially the Internet, in various areas of society and within the public administration in particular has allowed new forms of state's relationship with citizens and has influenced public management. It is under the scope of the management of e-government processes that new management paradigms for the public sector arising from the use of ICT in governance emerge, enabling new forms of governance, where you can stand out, among others, the concept of electronic governance. 'With the advent of ICTs, electronic governance appears as an emerging trend to reinvent the functioning of the government, especially in the provision of public services and citizen participation in the management, of online way' (Mello and Slomski, 2010, p. 378).

According to the UN (2002, pp. 53–54), governance is not the government as a physical entity, or the act of governing individuals, but it should be understood as a process by which institutions, organizations and citizens are guided.

> E-governance is the public sector's use of the most innovative information and communication technologies, like the Internet, to deliver to all citizens improved services, reliable information and greater knowledge in order to facilitate access to the governing process and encourage deeper citizen participation. It is an unequivocal commitment by decision-makers to strengthening the partnership between the private citizen and the public sector (UN, 2002, p. 54).

The electronic governance has been the theme of multiple studies appearing, represented in models consisting of several dimensions where the devices which comprise the websites according to some criteria are grouped. Thus, this line of research tries to identify the characteristics, features and tools of websites, grouping and sorting the functionalities in a certain number of categories. The electronic governance practices are represented in models that include a set of dimensions based on criteria mainly of technical and technological nature. Examples of dimensions/ categories that are analyzed are security and privacy, accessibil-

ity, navigability, services, usability, content, among others, expressing concern to show the functionality and quality of websites. Some studies that identify the electronic governance practices at the municipal level are the following examples: Holzer and Kim (2004, 2006, 2008), Holzer et al. (2010), Holzer and Manoharan (2012), Goldberg (2009), Mello and Slomski (2010), Moura et al. (2012), Stoica and Ilas (2009), Carrizales et al. (2011), Souza et al. (2012), Vrabie (2010), West (2003), Santos and Amaral (2000, 2003, 2006, 2008, 2012), Santos et al. (2003), Santos et al. (2005), Batlle-Montserrat et al. (2009).

The models of this line of research explain the electronic governance practices adopted by local governments grouping and sorting features and tools of websites on dimensions/ categories that represent these practices. The differences between models are mainly in the way how the characteristics of websites are grouped and classified. The model developed in the study of Holzer and Kim (2004) is among the most referenced, having appeared in several examples of evaluation of digital governance practices at the municipal level as a result of these studies, such as the work of Goldberg (2009), Mello (2009), Mello and Slomski (2010), Moura et al. (2011), Moura et al. (2012), Stoica and Ilas (2009), Carrizales et al. (2011), Souza et al. (2012), Vrabie and Öktem (2012), Vrabie (2010, 2012), Carrizales et al. (2011), Fan (2011). Holzer and Kim (2004) consider that the digital governance includes both digital government (delivery of public service) and digital democracy (citizen participation in governance), and that these two groups are represented by five subgroups practices: Security and Privacy, Usability, Content, Services, and Citizen Participation.

2.2.1.2. Studies on the level of sophistication of e-government

The analysis and review of the literature in the e-government area also points to the existence of a line of investigation where it is possible to verify a set of models that explain the implementation of e-government and classify maturity level of websites as a set of development stages. The various phases show how it develops the government offer of information and services through the Internet platforms, resulting in an ongoing process of integration and incorporation of different levels of technology and levels of sophistication of utilities, services and functions in the websites of organizations.

From the approaches that studied e-government sophistication level, most models that address the evolution of e-government have some differences either in number or in the classification of the considered stages. Nevertheless, when the description of the stages is considered, most of them end up coinciding for presenting similar characteristics or commonalities, varying the number of stages according to the aggregation or disaggregation of the factors that are being analyzed. Each stage ends up representing a greater degree of sophistication of the websites by increasing the capacity to provide information, services and better communication, which is performed by the continued integration of devices from different levels of technology and sophistication of utilities that they claim to offer.

In general, the maturity levels begin with the provision of information at lower levels and may even include the possibility of payments at the highest levels. Models have in general 4 to 5 stages, which may be summarized in: information (online presence with the creation of the website and information availability), interaction (one-way and two-way communica-

tion), transaction (payments, process status consultation, requests), vertical and horizontal integration (integration of public services at different levels of government and different functions in a single website), and citizen participation/ e-democracy (public forums, opinion surveys, suggestions and complaints, comments, chats, e-meetings, soundings, and the possibility to vote).

The model of Baum and Di Maio (2000) (Gartner Group) pioneered the establishment of a set of stages and is the most referenced in the literature, having inspired many others. Some studies that analyze the maturity levels of e-government process specifically at the municipal level are the following examples: Moon (2002), Norris (2003), Santos et al. (2003), Santos and Amaral (2003, 2006, 2008, 2012), Santos et al. (2005), Deloitte and Eurocities (2004), Esteves (2005), Torres (2006), Pratas (2007), Nacke et al. (2012), KEeLAN (2002), Arslan (2008), Batlle-Montserrat et al. (2009), Vrabie (2010, 2012), Fan (2011).

The development stages of e-government suggest a positive change in the relationship between citizens and governments by offering information and services more and more citizen-centric. The main suggestion seems to be that most e-government is better, i.e., more interaction, transaction and integration can generate e-participation and e-democracy, therefore a fundamental change in the relationship between governments and citizens (Coursey and Norris, 2008, p. 525). Although the ordering of stages suggests a continuous sequence of phases, these are not necessarily always consecutive, so not always evolution is necessarily linear and progressive in its technical development (Moon, 2002, p. 427; UN, 2003, p. 18; Coursey and Norris, 2008, p. 533; Stoica and Ilas, 2009, p. 172) and therefore the levels of sophistication are not dependent on each other (Fan, 2011, p. 932).

3. The digital capital of local governments websites

Since the objective of this paper is to define, based on the literature, the dimensions/ categories of digital capital important to the development of the local public administration websites, so the last chapters analyzed the state of the art in the subject of municipal websites management checking the main contributions in the literature.

The analysis allowed discovering that it is in the e-government area that the vast majority of studies examining the management of public administration websites is found and it was possible to identify different groups of approaches. On the one hand, the models that analyze the electronic governance composed of dimensions based on criteria mainly of technical and technological nature (security and privacy, accessibility, navigation, usability, etc.), expressing concern to show the functionality and quality of websites; and, on the other hand, studies that analyze the level of maturity of e-government, where the technological approach is equally dominant, as the succession of stages of development in which the models are based requires the continued integration of devices from different levels of technology and sophistication on the websites. Such a finding suggests that models in the e-government area intend to show that a good management of website is associated with its functionality and quality and this is because such studies and models are from engineering area and not from management or public administration.

In the literature of intellectual capital area it was not possible to find models for management of websites of local public administration. Nevertheless, it was possible to find some models of management and development of websites as the example of the study of de Terra and Gordon (2002) and Ruta (2009), where models structure contents and functionalities of websites by a set of categories of digital capital important to its development and upgrade, but they were mainly built for the management of companies' websites. The few studies that analyze digital capital, however innovative, are rare and present an exploratory and pioneering nature. So, the literature leaves open the opportunity to develop models for management of websites of local public administration based on these theories. Then this article proposes an analysis instrument that tries to fill this gap.

The analysis instrument tries to connect the knowledge areas of intellectual capital and e-government because it is more what complements than what sets them apart. To complement and to contemplate a wider and consistent number of aspects some categories from both areas were selected and intended to express that the website management can be based on the sources of intellectual capital of municipalities. Thus, the set of categories of digital capital considered important to the development of local government websites were: Services e-capital, Democratic e-capital, Relational e-capital and Organizational e-capital (Figure 1). In each category, content, applications and features important in the development, updating and management of municipal websites are included. To designate this set of digital capital elements this paper will use the term digital assets by analogy with the studies of intellectual capital in which it is defined as the set of intangible assets.

The category of Services e-capital was considered in the analysis instrument because the provision of public services is a key objective of local authorities. In e-government literature this category is a cornerstone of the concept of electronic government and it is unanimously depicted in the various models that represent the electronic governance. Based on e-government models which study the level of sophistication of e-government services, the maturity levels of these services were considered as digital assets in this category. The justification for this choice has to do with the meaning for maturity level of the service that is associated with a process of integration and incorporation of different levels of technology and sophistication of utilities, services and features on websites, which allow a greater degree of interactivity with the user. Thus, it was decided to consider the four levels of maturity of the model of Santos et al. (2003), which has been widely used in studies on the quality and maturity level of the websites of municipalities and parish councils in Portugal. They assess the state of development of websites (maturity levels of e-government process) based on the degree of interactivity through a model based on four stages: Level 1: Publication of information; Level 2: Download of forms; Level 3: Download and upload of forms and processes status; Level 4: Transaction, online payments and processes status (Santos and Amaral, 2012, p. 10). Therefore Services e-capital represents the provision of local government services through the Internet, considering the following digital assets: Information on municipal services; Services with one-way interaction (downloadable forms); Services with two-way interaction (download and upload of forms and processes status); and Transaction (possibility of payments).

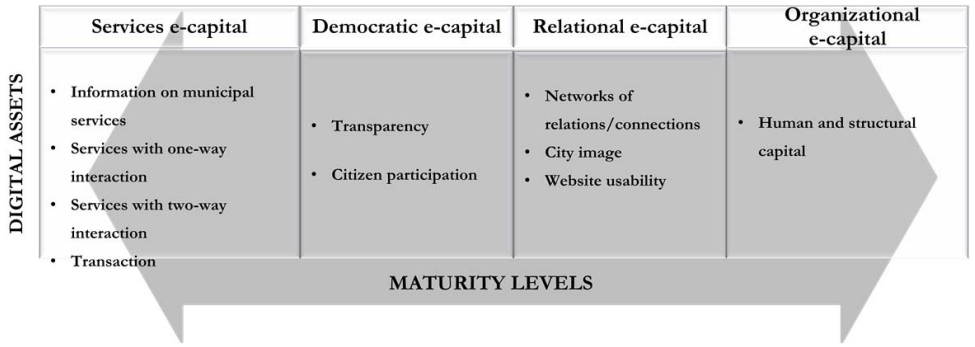

Figure 1. Categories of Digital capital of Local Government Websites

S o u r c e: Author's own elaboration.

The definition of Democratic e-capital category is justified by the role that local governments play in the exercise in democracy allowed by the principle of subsidiarity which gives them autonomy in multiple areas of the organization of local communities. The fulfillment of this responsibility leads local governments to seek ways to improve dialogue and citizen participation, as well as ways to improve accountability and transparency in the municipal decisions and activities, thus electronic government allows an opportunity to exercise those improvements. Thus, Democratic e-capital represent the local government relationship with its citizens through the Internet, and includes as digital assets: Transparency (online publication of budgets and accounts reports, legislation, meetings minutes, etc.); and Citizen Participation (features on the website as suggestions and complaints, surveys, FAQs, forums, chats, newsletters, helpdesk service, contacts, etc.).

The Relational e-capital dimension is intended to represent the web page as a communication channel with external agents. The municipal websites, as 'front doors' of a municipality, end up serving multiple interests and support the decision making of various agents. This way, Relational e-capital represents the local government relations with several players in its external environment through the Internet, and includes as digital assets: Relations/ connections network (links to government agencies, municipal associations, suppliers, etc. and divulgation of collaborative projects, partnerships, participation in cooperation networks and other agreements and alliances); Image of municipality (promotion of events, heritage, economic activities, cultural agendas, maps, tourist information); and Usability (users' registration, site map, search engine, languages, facilities for citizens with special needs).

Finally, the Organizational e-capital dimension has the intention to represent the information that the organization provides in the network about human resources, organizational structure and work processes. Therefore, Organizational e-capital represents the content available online about the composition of local government, organizational structure, competencies, political representation, human resources and includes as digital assets: Human and Structural capital.

Thus, the analysis model (Figure 1) represents the set of categories of digital capital important to the development of local government websites. The use of this instrument implies that not only the existence on website of this set of digital assets should be analyzed but it also implies the analysis of the maturity level of all digital elements in each category. In all categories the maturity level of digital assets should be analyzed because the features/ devices to be integrated on the website represent different levels of technology and sophistication.

4. Conclusions

It was intended that this paper could enable a greater understanding of issues related to management of local government websites, merging aspects of e-government and intellectual capital areas of knowledge. In literature that studies and evaluates processes of local e-government, the analysis allowed to find that the approaches with technological focus are dominant, undervaluing important aspects of public administration management (as transparency, network of relationships, etc.), since they are inspired in models of the engineering area and not from management or public administration (Coursey and Norris, 2008, p. 532).

Given this finding, the area of intellectual capital goes further, suggesting that when a critical technology base (initial priority) in the development of e-government projects is reached, the priorities should now be based on content and mechanisms that foster the creation, use and improvement of knowledge among other intangible resources, determinants to improve the management of organizations and territories such as transparency, quality of services, network and cooperative relations, human capital, social responsibility, environmental responsibility, territorial marketing. Nevertheless, the research has shown that there is a small amount of research analyzing the digital capital of public administration websites. On the other hand, the dimensions in which the digital capital is divided do not always converge, and in each case they are adjusted to specific cases that are studied, highlighting the pioneering and exploratory nature of studies, resulting in difficulty in generalizing or confirming the results and adopting general implications. Moreover, it was not possible to identify models of intellectual capital to local government websites management, verifying a gap in the literature that this study attempted to overcome. Thus, this article proposes an intellectual capital model for contents management of municipal websites, and for the construction of the analysis model a set of categories of digital capital was chosen, considered to be relevant to the development and management of local administration websites: Services e-capital, Democratic e-capital, Relational e-capital and Organizational e-capital.

This research allows to conclude that the electronic governance seems to need a broader vision, because models present in the literature show digital governance practices based mainly on technical criteria, something that does not seem to be sufficient to explain the failure situations and how to overcome barriers to the development of e-government process. The use of information technology in public organizations has a great potential for achieving savings, but the risk of this implementation is unsuccessful is also high (Carrizales et al., 2011, p. 944). The research about issues affecting good digital governance considering a greater compatibility between the challenges of technology and the challenges of organizational management can contribute to improve the development of the process. It can therefore help

local authorities to provide an answer to a demand for more efficient, effective and less bureaucratic services, taking advantage of a set of new opportunities for administrative modernization and reformulation of the forms of governing. The measuring and management of digital capital can be used to help the local governments to provide information and evaluation indicators for websites managers and therefore allow to formulate a better digital strategy trying to improve quality and to provide more valuable online services and contents to citizens and other users.

Despite the relevance of the findings, this study has some potential limitations. This work represents an initial attempt to construct the digital capital of local government websites and further work must be necessary in several ways since the present analysis model has been constructed only based on the literature. On the other hand, the fact that the proposed model is directed specifically to municipalities shows that, like other models in the area of intellectual capital, one must take care in the application of it to other cases, probably leading to adjust the categories of digital capital to the realities in question. Nevertheless, Joia (2009, p. 1389) refers that:

> A model is good not because of excessive rigor that applies to it, measured by the number of variables taken into account, but because it models and expresses adequately the reality that it faces. Complexity is not necessarily synonymous of good results, and we need some flexibility when dealing with topics for which a good deal of critical thinking is necessary.

It should be noted yet that the analysis instrument presented was applied in an empirical study that was developed in 2013 in a PhD context and it allowed quantifying the contribution of the measures of the 3rd edition of Simplex Autárquico Programme 2010/2011 to the digital capital of the websites of 125 Portuguese municipalities participating (Bailoa, 2014; 2015). In this way, a possible future work could be to apply the methodology proposed to analyze the remaining editions of the Programme (2008/2009 and 2009/2010 editions) in order to compare the contributions of the respective measures, the dimensions of digital capital with more focus, and the evolution of websites of municipalities that participated in all editions, among other aspects. One other possible future work could be the application of the methodology proposed to analyze the global state of the digital capital of the websites of all the municipalities of Portugal or other countries in order to examine the dimensions with more development, and to analyze the evolution of their digital capital in time.

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Łączenie kapitału cyfrowego i zarządzania cyfrowego: ramy dla stron internetowych samorządów

Abstrakt: Większość badań na temat stron internetowych lokalnej administracji publicznej można znaleźć w obszarze e-administracji, gdzie modele opracowane dla zarządzania oraz oceny tych stron składają się z wymiarów opartych o kryteria o charakterze technicznym i technologicznym, takie jak dostępność, nawigacja, przydatność, aspekty decydujące o jej funkcjonalności i jakości.

Jednakże pozostawiły one na dalszym miejscu analizę wymiarów związanych z zarządzaniem organizacjami publicznymi, takich jak przejrzystość, sieć relacji, kapitał ludzki, odpowiedzialność społeczna i środowiskowa, aspekty, które są akcentowane w teoriach kapitału intelektualnego. W tym obszarze strony internetowe uważa się za narzędzia strategiczne zarządzania wiedzą, niemniej bardzo niewiele jest modeli zarządzania i oceny stron internetowych opartych na teoriach zarządzania wiedzą oraz kapitałem intelektualnym, te zaś, które istnieją, dotyczą głównie obszaru biznesu.

W związku z tym niniejszy artykuł ma na celu zaproponowanie modelu kapitału intelektualnego do zarządzania treściami samorządowych stron internetowych, ponieważ literatura pozostawia taką możliwość otwartą. Wymiary kapitału cyfrowego uważane za relewantne przy opracowywaniu stron internetowych samorządów to: e-kapitał usług, demokratyczny, relacyjny i organizacyjny.

Słowa kluczowe: kapitał cyfrowy, e-administracja samorządowa, zarządzanie cyfrowe, zarządzanie stronami internetowymi, rada gminy