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Local e-Government Bench-learning

Towards a new methodological framework to benchmark electronic services provision and adoption in local public administration

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Abstract

A new methodology to benchmark electronic service provision and adoption in local public administration is introduced in the framework of e-government research and compared with existing ones. This methodology was tested in a first benchmarking survey, led by the research report author, carried out in 2008 with a sample of 15 European cities, whose results are also discussed. The main innovations of this methodology are the addition of adoption, beyond provision; an extension of the Baum and Di Maio stages model of e-government with a “web 2.0” stage; a bottom-up services categorisation more suitable to local administrations; and a results presentation based on charts where cities are placed with respect to averages. The survey focus on local administration is novel, and thus the results themselves. The need of more extensive surveys (of local e-government especially) is revealed, as they will provide more reliable data and allow deeper and more refined analyses. Measuring adoption remains a research challenge; the hypothesis formulation, data analysis and visualisation of the results should be improved for these more extensive surveys, and new scores should be introduced to facilitate temporal comparisons in the future.

En el marc de la recerca en e-government, es presenta una nova metodologia per realitzar estudis comparatius de provisió i adopció de serveis electrònics a l'administració pública local, i es compara amb les existents. Aquesta metodologia va ser provada en un primer estudi, liderat per l'autor d'aquest treball de recerca, que es dugué a terme l'any 2008 a 15 ciutats europees, i els resultats del qual es presenten també. La innovació més important d'aquesta metodologia és la inclusió de l'adopció dels serveis a part de la provisió; una extensió del models de nivells de Baum and Di Maio incloent un nivell per “web 2.0”; una categorització de serveis construïda de baix a dalt més adequada per l'estudi de l'administració local i la presentació dels resultats basada en grafics en els que les ciutats es poden comparar amb la mitjana. L'enfoc especific en administració local és també nou, i per tant, també ho són els resultats en si mateixos. Es posa de manifest la necessitat de realitzar més estudis, especialment en l'àmbit de l'administració local, ja que aquests aportarien dades significatives que permetrien anàlisis més en detall. Mesurar l'adopció és encara un repte; la formulació de les hipòtesis, l'anàlisi de les dades i la visualització dels resultats haurien de millorar en aquests properes edicions de l'estudi. Convindria també introduir un nou sistema basat en un indicador únic a fi de facilitar comparatives al llarg del temps.

Se presenta en el marco de la investigación en e-government una nueva metodología para realizar estudios comparativos de provisión y adopción de servicios electrónicos en la administración pública local, y se compara con las existentes. Esta metodología fue probada en un primer estudio, liderado por el autor de este trabajo de investigación, realizado el año 2008 en 15 ciudades europeas, y cuyos resultados se presentan también. La innovación más importante de esta metodología es la inclusión de la adopción de los servicios a parte de la provisión, una extensión de los modelos de niveles de Baum and Di Maio incluyendo un nivel por "web 2.0", una categorización de

servicios construida de abajo a arriba más adecuada para el estudio de la administración local y la presentación de los resultados basada en graficos en los que las ciudades se pueden comparar con la media. El enfoque específico en administración local es también novedoso, por tanto, también lo son los resultados en sí mismos. Se pone de manifiesto la necesidad de realizar más estudios especialmente en el ámbito de la administración local, ya que estos aportarían datos significativos que permitirían análisis más en detalle. Medir la adopción es todavía un reto, la formulación de las hipótesis, el análisis de los datos y la visualización de los resultados deberían mejorar en estos próximas ediciones del estudio. Convendría también introducir un nuevo sistema basado en un indicador único para facilitar comparativas a lo largo del tiempo.

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1 Introduction

The research discussed in this report deals with benchmarking e-government services provided by local public administration. Although local public administrations are the most active in public service provision to citizens and businesses, our literature review shows that there are no studies, and no benchmarks confronting supply and demand, that is, services supply and citizens' adoption at the level of local public administration.

An innovative study, reported in the *Local e-Government Bench-learning* (Batlle, Calderón & López, 2009), based on an innovative methodology was launched in 2008 to cover this lack of benchmarks. This study, where the author of this research report played a directive role, is deeply analysed in this memoir, both in terms of the methodology adopted and the results obtained, and grounded in a literature review of the field.

The results are interesting in themselves, but the pilot character of the study limits their significance. On another hand, our analysis provides us with improvements that can be included before launching the second edition of the bench-learning study.

Let us frame first local public administration in the current e-government trends.

Generally, e-government is described as the use of information and communication technologies (ICT) in government processes, and the high potential of ICT to transform governmental organizations into more efficient, accessible and accountable ones is widely recognized. According to EUROSTAT, the public sector is responsible for almost 40% of the European GDP. The combination of both statements points out the capital importance of the e-government transformation of the public sector for the European economic growth.

Surveys performed in Europe show that between 50% and 80% of the citizens interaction with public bodies takes place at sub-national level (Heeks, 2006), i.e., with local and regional public administrations. While e-government takes place on all public organizations at state, regional and local level, such as autonomous communities, counties, regions..., it is in cities where it takes special relevance, because cities are closer to citizens and deliver the largest number of services directly to people (Moon & Norris, 2005).

Nowadays, all city governments and administrations find themselves in a transition from the old model of local public organization to a new one, claimed to be more efficient, as e-government improves efficiency, accuracy, timeliness, and effectiveness, among other things (Moon & Norris, 2005). Electronic government is no longer just an option but a necessity for countries aiming at better governance (Gupta & Jana, 2003).

The relationship of cities with their citizens is also changing from a scenario based on a multiplicity of specialized counters to a “one-stop-shop” model attended by multivalent civil servants supported by ICT. At the same time, cities are evolving from situations in

which citizens are asked time and again to submit this and that, to offer a more intelligent organization capable to know who the citizen is and which the citizen's needs are in each case. In other words, public organizations are reforming themselves to be proactive and to efficiently provide services to citizens. This transition is creating the current framework to understand the important role of e-government in the modernization of the public administration, and, most especially, the local one.

Let us turn now towards the focus of our research: methodologies to benchmark local e-government.

The e-government transformation touches the core business of the local public administrations. e-Government is, at the same time, a process and involves multiple stages or phases of development (Al-Hashmi & Darem, 2008). Therefore, cities must carefully manage the process to shorten it and ensure a successful outcome. City managers can and should use the experience of previous innovators as a guide to make informed decisions (Kaylor, Deshazo & van Eck, 2001).

City managers need tools to measure, evaluate and compare this process. They must understand the current status of e-government development, work out the extent to which their objectives have been reached, validate the effectiveness of strategies and action plans, ascertain strengths and weaknesses or shape new guidelines (Kunstelj and Vintar, 2004).

Private sector can provide tools to better manage this transformation. Businesslike measurement models have been introduced in public sector management in order to account for public sector performance (Noordegraaf, 2003). Benchmarking is an usual business management practice used mainly for marketing and sales purposes. In the e-government field, benchmarking also means reviewing comparatively the performance of (e-government) organisations (Heeks, 2006). This comparative exercise contributes to a broader view of the transformation process in which public organizations are immersed, allows to identify leaders and followers, to understand different stages of growth and points out best practices (Heeks, 2006).

In European context, benchmarking e-government is a key tool to measure the progress made in achieving the objectives established by the European Council. The European Commission stressed the importance of benchmarking in the *eEurope 2002 Action Plan* (EC, 2000) because benchmarking "aims to ensure that actions are carried out efficiently, have the intended impact and achieve the required high profile in all Member States". And more specifically highlights the importance of benchmarking e-government in the *eEurope 2005 Action Plan* (EC, 2002-1) as well as in the *i2010 e-Government Action Plan: Accelerating e-Government in Europe for the Benefit of All*" (EC, 2006).

However, there is very little information at the local level. Up to now most of the available information, data, measures and comparisons of e-government evolution refer to state level administration, the best example being the benchmark of the online availability of public services commissioned by the European Commission and yearly

performed by Cap Gemini from 2001 up to now (Cap Gemini, 2002, 2003, 2004, 2005, 2006, 2007, 2009). Some information is also available at regional level but only few studies deal with the local level. Moreover, indicators and metrics defined at the state level (EC, 2002-2), are not applicable at the local level, as we will discuss latter on. As a consequence, is not possible to perform sound comparisons between different city cases across different countries.

The few surveys aiming at benchmarking local e-government are focused on general aspects of the official website of the local administration, in terms of content, accessibility, quality and usability. Moreover, they focus on the services offering and deal neither with e-services quality nor with citizens' adoption.

A complete view of the e-government process in cities is not possible today. Research papers suggest also that current approaches to monitor evaluation and benchmarking e-government development do not support a comprehensive e-government assessment and need to be improved in order to give policy makers elements for their decisions. Therefore, additional research is needed in the field of benchmarking online public services (Kunstelj and Vintar, 2004).

To fill the gap in local e-government benchmarking the author of this research report designed and launched a pioneering field study of several key European cities (entitled *Local e-Government Bench-learning)* in 2008. This study tried to introduce several innovations in the services catalogue including a wider coverage of services adapted to local administrations, with a focus based on a new maturity stages model, on the quality and services adoption, and with a classification identifying standard services as well as diversity. On the other hand, the study adopted a novel city charts visualisation to offer decision makers material suitable to inform future decisions on e-government development strategies.

In this research work, I will review in depth the applicability and correctness of the *Local e-Government Bench-learning* study comparing it with the state of the art in e-government benchmarking - at different administration levels -, discussing its main findings and contributions, especially the methodological ones, at the local administration level, and proposing further improvements.

After this introduction, the second chapter starts by a literature review about e-government definitions underlining how wide the term is, and the need to focus on some specific issues, such as those raised above, and how these definitions are applicable to the local public administration will be discussed.

In a second section, I present the different existing e-government benchmarks, how some of them focus on citizen's e-readiness, while others pay attention to internal IT adoption of process re-engineering. And it could be seen that the majority of existing benchmarks are devoted to compare the electronic service provision while no benchmarks can be found in electronic services adoption.

The following section of the chapter is devoted to the analysis of different e-government

maturity models. Most of these models were designed ten years ago (2000 and 2001) to explain the general evolution of e-government and we discuss whether they still can be applied to electronic services provision and which are the limitations almost 10 years latter.

The third chapter presents the *Local e-Government Bench-learning* and explains it deeply. How it was conceived and why it is named bench-learning. How cities were selected and which are the main characteristics of the sample. The bottom-up methodology used is described and justified. The main outputs, the European chart for service provision and adoption, the city charts and the list of best practices, are presented as well as the partial results and the different variables used on the process, as the global services catalogue and the coverage charts for each category. The charts are discussed along with the main findings.

Chapter four revisits more thoroughly e-government benchmarking through a literature review, identifying and discussing the main benchmarks that have been proposed on online services provision. From this analysis we see the need of refining the methodology reviewing the clusters of services, adding aggregate scores, reviewing the maturity models used to still adapt it more at the local level specificities. Another section highlights how scarce the academic material in the area of online public services adoption is. And not only shows the need of more research but also justifies taking a more pragmatical approach to service's adoption assessment.

I devote the fifth chapter to analyse in depth the *Local e-Government Bench-learning* identifying strengths and weaknesses. This chapter presents in fact the conclusions of the research work. *Local e-Government Bench-learning* survey covers an important lack of information in local public administration without forcing cities to compete. The information provided allows city managers to balance the e-government plans according to general trends and facing local needs. But this study present some weaknesses as the small sample used and the self-assessment methodology used to measure maturity and adoption. Furthermore another weakness is a crude use of statistical tools. From this analysis I list and qualify recommendations to improve the quality and applicability of the methodology proposed in the study that should be taken into consideration when preparing a second edition of the *Local e-Government Bench-learning* survey.

Finally, the sixth chapter presents the final remarks of the research report. The main finding is the singularity of the benchmark introduced in our study. There are no similar studies in the European local e-government area, and only a similar survey performed in US by Kaylor et al. in 2001 tailored to US local administrations can be found. The methodology proved to be correct and it requires only some refinements, but the results presentation could be improved and the sample must be widened. However, further research, standards and new methods are clearly needed in the field of electronic service adoption measurement.

2 Background: e-government, its benchmarking and evolution models

The aim of this chapter is to present the state-of-the-art of different aspects of e-government research. We begin by an analysis of the different definitions of e-government based on a review of the related literature is presented, discussing the different meanings of the term e-government, and seeing that the e-government definition must be extended when focusing at local public administrations.

In a second section, we discuss the main working lines and trends of the existing literature about benchmarking e-government. This analysis shows how benchmarking electronic services provision is one of the most frequent benchmarks while public adoption of those services is a missing theme of the current benchmarks.

Finally, a third section is devoted to motivate the need of e-government models, and to describe and analyse the different existing models, highlighting their limitations and concluding with the need to update the current models to explain the latest trends in e-government service provision.

2.1 What does e-government mean?

There has been a succession of terms used as synonyms for the same concept: electronic government, government IT, e-governance, online government, one-stop government, digital government and, more recently, e-government, the latter being the most used in this work. e-Government is a broad concept and at the same time divergent. In this section we discuss several definitions that exist in the literature, the main sub-areas or components and how they translate into the local public administration.

2.1.1 e-Government definition

Kaylor et al. (2001) define e-government as the ability to communicate and/or interact with government agencies via the Internet in any way more sophisticated than a simple email letter. Other authors define it as the electronic provision of information and services by governments 24 hours per day, seven days per week (Moon & Norris, 2005). Both are narrow definitions of e-government because they focus only on citizens interaction through Internet, although it is probably the most popular definition of e-government (Bannister, 2007).

Usually, narrow definitions of e-government have been formulated in the context of a specific study, as, for instance, Layne and Lee (2001) definition that puts the focus on a specific technology, Internet and the World-Wide-Web, and its capability to enhance the access to and the delivery of, government information and services to citizens, business partners, employees, other agencies, and government entities, when they propose a

framework to assess government transformation when going on-line. Similarly Kaylor et al. (2001) definition above quickly followed by an interesting survey of online public services among US municipalities, and Moon and Norris (2005) by an analysis of two surveys about local government websites in the US.

Other authors, focus on the efficiency rather than the technology but narrowly again. Carter and Bélanger (2005) define e-government as the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, businesses and agencies. According to the World Bank (Lanvin and Lewin, 2006) e-government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that are able to transform relations with citizens, businesses, and other branches of government. Therefore, although they open to ICT in general and are not restricting themselves to Internet, they have a specific narrow focus.

Authors use these definitions with a twofold purpose: to define the term and to focus the attention in a specific part of the public administration functions, and thus should be considered as incomplete definitions of the term. Those narrow definition that are instrumented to justify some specific studies can only be accepted in the context of such studies.

In fact, e-government is a much more substantial transformation than e-service delivery (Löfstedt, 2005), it is lot more than using Internet or providing services through internet, or even improving the services, is much more than gathering the information, downloading files or making online transactions (Sakowicz, 2003).

e-Government refers to the use of ICT in public administration.

Such a broad definition of the term allows the researchers to see e-government in all of its extension, impacts and benefits. To be more specific, some authors (Janssen, 2003) provide a detailed definition of the term listing different components or applicability areas related with different public administration functions such as internal use, services provision or citizens participation, to mention some of them. Other authors presents e-government through the potential benefits or impacts: “e-government utilizes technology to accomplish reform by fostering transparency, eliminating distance and other divides, and empowering people to participate in the political processes that affect their lives” (Al-Hashmi and Darem, 2008). Both approaches are useful to emphasize that e-government is not simply a matter of giving government officials computers or turn the current processes into digital ones, but the new aspects the emerge with these processes.

Although all these broad definitions of the term are valid, the most used is the one provided by OCDE (2003) that summarizes the broad scope by defining e-government as the use of ICT, and particularly the Internet, as a tool to achieve better governance. Or, in its long formulation, “e-government applies to the use of information and communications technology to public administration tasks and processes, and aiming at reshaping government to citizen relationship, government to government, public

services provision, internal efficiency and citizens participation".

This broad definition of e-government is the one we share in this research report as its wide view gives room for different sub-disciplines.

2.1.2 e-Government components

As we see, the OCDE definition of e-government is not restricted to specific technologies or tasks. As technology evolves and is applied to more fields e-government will extend inside other public administration functions not yet involved in e-government. Let us mention, as an example, the city infrastructure management which is currently experiencing a deep transformation thanks to the new ICT solutions based on sensor networks and command centres. This should be also considered as part of e-government.

As e-government is embracing all the functions that a public administration is doing, different aspects of ICT have to be considered, and several themes or components are included in e-government research. One of these themes, for instance, is ICT internal adoption, which refers to the use of ICT in public administration to change structures and processes of government organisations (Lambrinoudakis, Gritzalis, Dridi, & Pernul, 2003) aiming at improving internal efficiency. Other themes are the studies about internal business process re-engineering, IT management, IT project assessment, interoperability or the relation with other public administration levels, e-government evaluation, etc. Janssen (2003) takes a more systematic approach identifying five main e-government components: provision of ICT infrastructure and ICT skills to facilitate citizen's inclusion named e-society, automation of internal processes, providing citizens with better services (e-administration), including citizens in policy (e-participation), and changing the relation between politics and administration.

Both Janssen and Lambrinoudakis et al. identify a lot of common components: automating internal processes, providing citizens with better services, etc. But let me highlight that in both cases there is a component directly related with the public services provision, which means the interaction between citizens and public administration and companies and public administration it is what Janssen (2003) calls e-administration.

e-Administration aims to provide citizens with effective and efficient service delivery.

This component includes not only the services' provision but also other related aspect as the online services take-up or adoption, the multichannel service provision, the service quality or user satisfaction.

Latter on in this research report we will focus our attention on e-administration, but now we turn to local e-government, discussing the importance of local e-government, its specific components and the applicability of the previous concepts to local administrations.

2.1.3 Local e-government

While e-government takes place on all public organizations at state, regional and local level, such as autonomous communities, counties, regions, ..., it is on cities where it takes special relevance because cities are closest to citizens and deliver the largest number of services directly to them (Moon & Norris, 2005).

Local government is the front-end of government services. According to Heeks (2006) local governments are the main point of contact for delivery of services in developed countries, who also states that surveys performed on Europe show that services to citizens reach the highest importance in local public administrations since between 50% to 80% of the citizens interaction with public bodies take place at sub national level. The same happens in US where local governments are the governments closest to the people. According to Norris (2005), local governments are key player because what they do directly impacts citizens, far more and more immediately than the actions of state or federal governments, because local governments deliver the vast majority of services that directly touch the lives of citizens. And this proximity to people makes it also important in e-participation and e-democracy (Sakowicz, 2003).

The importance of local e-government is increasing day by day. According to Lanvin and Lewin (2006) specific e-government services are increasingly handled at the local rather than the national level. This is the case, for instance, for small and medium-sized enterprise (SME) registration, vehicle and drivers' licenses, enrolment at educational institutions and vocational programs, furthering human resources skills, or professional authorizations and licenses (for example, for shops, pharmacies, and so on). A similar trend is detected in Australia where municipalities had to re-frame their processes to accommodate the expectations of their communities (Shackleton, Fisher, & Dawson, 2004). This importance is being reinforced by the increasing role played by cities as, according to the World Bank (Lanvin and Lewin, 2006), in the last 50 years the proportion of population living in cities had increased to one-half, and it is estimated that, by 2050, six billion people (that is, two-thirds of the world population) will live in cities. In such a context, maintaining adequate levels of production and delivery of key public services is a major challenge for cities.

e-Government at local level has its own specificities. All the definitions and components presented in the section before apply to local e-government, but in addition, cities and municipalities are developing specific functions that cannot be found at other levels. City services provision and city management (traffic management, public transport, environment, pollution, cleaning, garbage collection, public lighting, culture, education, social care, crime contention, floods control and disaster management...) are traditional functions of the local public administrations that are increasing considerably the use of ICT, and are not included in other public agencies. In addition, in some countries, cities have to deal with basic service provision as water supply, gas and electricity. All of these are specific functions that can not be found in other levels of public administration. Therefore they are giving a special flavour to local e-government by adding specific components.

These two characteristics make local e-government an interesting research subject. However, despite the rising importance and own specificities of local e-government, it lacks information and research related. According to Wohlers (2007), "an increasing body of research examines the breadth of e-government at the international and national levels, while a systematic analysis of e-government at the local level and across different population sizes remains scant". In the following section we will have the opportunity to see more this unbalanced situation.

2.2 Benchmarking e-government

Now we turn towards the specific aspect of benchmarking e-government. Through an overview of the literature analysing current benchmarks I will show that the majority of the existing benchmarks focus on service delivery and how little benchmarks has been done combining provision and adoption of electronic services. In addition here again the local dimension is missing since the vast majority of benchmarks focus at international or national level.

2.2.1 Evaluating, measuring, benchmarking

Nowadays, e-government "is a major paradigm shift in the way that government and public administration have to function" (Peristeras, Tsekos, & Tarabanis, 2002). In this process e-government in all its extension is being deployed to transform public organizations into more efficient and effective organizations, delivering higher quality services, and increasing transparency, citizens' participation and accountability (EC, 2007). And it is a process that carries out enormous investment by governments (Alshawy, Alahmary, & Alalwany, 2007).

This transformation that started some years is no longer just an option but a necessity for countries aiming for better governance (Gupta & Jana, 2003). As it is an evolutionary phenomenon, "e-government initiatives should be accordingly derived and implemented" (Layne & Lee, 2001). Policy makers and city managers must carefully manage the process to shorten it and ensure a successful end. They can and should use the experience of previous innovators as a guide to make informed decisions (Kaylor et al., 2001), to answer some of the questions they have:

- How my is city doing in e-government?
- Are the current e-government strategy/investments showing expected results?
- Is the e-government strategy well-balanced?
- Which are the most advanced areas of e-government service provisions?
- Which are the best practices in Europe?
- Where and how should my city improve the e-government agenda?

The answers to these questions can only come from evaluating, measuring and

comparing e-government. According to Kunstelj and Vintar (2004), the evaluation and comparison are the key tools to discover the current state of e-government development, work out the extent to which objectives have been reached, validate the effectiveness of strategies and action plans, ascertain strengths and weaknesses, shape new guidelines or look for examples of best practice. And that is why the European Commission is also promoting e-government evaluation, measurement, benchmarking and case-based impact and benefit analysis based on common indicators (EC, 2006).

But what is the difference among evaluation, measuring and benchmarking? Jones, Irani, Sharif, and Themistocleous (2006) state that evaluation aims to determine the value and benefit derived of the e-government investments. According to Jones, Irani, and Sharif (2007), this analysis should investigate various perspectives, not only citizens in general, but also require the inclusion of specific needs of the specific target groups of citizens that are using a particular e-government services (Janssen & van Veenstra, 2005), identify and quantify benefits and consider social and technical context of use (Alshawy et al., 2007).

Benchmarking is a well known practice in business world used mainly for marketing and sales purposes. It referrers to perform systematic comparisons with competitors in order to visualize leadership and position of a company into a list or ranking of companies. According to Heeks (2006), in e-government field, benchmarking means undertaking a review of comparative performance of e-government organisations at the national and international levels.

These comparative exercises contribute to a broader view of the reform process in which public organizations are, identify leaders and followers, understand different stages of growth and identify best practices (Heeks, 2006). Hence benchmarking becomes time by time a more common practice in public sector management acting as a "reality check" for managers and policy-makers and allow them to measure the progress (Pacific Council, 2002). In a successful execution of an e-government strategy, benchmarking through indicators is critical component of the implementation process (Graafland-Essers & Ettedgui, 2003).

Both, evaluation and benchmarking are private sector techniques introduced into public sector management in order to measure public sector outcomes and performance (Noordegraaf, 2003; Cole & Parston, 2006). Although recognizing the importance of e-government evaluation, this research report deals with e-government benchmarking.

After understanding the importance and the real dimension of e-government, in the next section an in-deep assessment of the state-of-the art in e-government benchmarking is performed.

2.2.2 Different proposals of e-government benchmarking

The different e-government dimensions that have been discussed in previous sections bring different possible benchmarking exercises. According to Bannister (2007) these

multiple dimensions of e-government creates problems for would-be benchmarkers. Following in this section we will review the existing benchmarks and comment the general characteristics to see that not only there is a clear lack of local benchmarks but also there are no benchmarks facing supply and demand of electronic services.

Kustelj and Vintar (2004) offers a view of the benchmarks carried out in e-government area up to 2004 which is still interesting despite the years passed. In that study, each benchmark is characterized by the e-government dimension in which it is focused. The e-government dimensions that Kustelj and Vintar take into account are: government e-readiness (which includes citizens e-readiness and business e-readiness), back-office

Overview of approaches to monitoring e-government development by areas and aspects they cover

Study by:	Area (M = main, S = supplementary)						Countries/geographical region
	E-readiness		Back-office	Front-office		Effects/ impacts	
	Government	Citizens & businesses		Supply	Demand		
Accenture [6]				M			world-22
Burgess and Houghton [66]				M			Aus
Booz Allen Hamilton [9]	M	M		S		M	G7 countries, Aus, Swe
Bartelsman Foundation – BEGIX [7]	M			M			UK, Ca, US, NZ, Est, Swe, Ger
BISER [8]		M			M		EU-15
The Henley Centre and MORI [72]	M	M			M		UK
Cullen and Houghton [63]				M	M		NZ
CapGemini Ernst & Young [13]				M			EU-15, N, Icl, Sui
PLS Ramboll and Eworx [61]					M	S	EU-15
Erin Research Inc. [26]					M		Can
EuroBarometer [25,33]		M			S	S	EU-15
Vintar et al. [50]	M		M	M			SI
Vintar et al. [48],			S	M		SI	
Leben et al. [2]				M			SI,F,It,Sp,UK,Irl,A, Ger,Ca,Sin,HK,Aus
Gant and Gant [36]				M			US
Hart-Teeter [31]	S	S			M		US
TietoEnator Trigon [73]				M			EU-15, Ca, US, Aus, Sin
Kaylor et al. [11]				M			US
KEeLAN [41]				M			EU-15
Muylle et al. [68]					M		B, NL, UK, F
Momentum [53]		M			M	S	ZDA
Canavate and Navarro [4]				M			Sp
NACO [54]	M		S	S			US
NAO [55]	S	S		M			UK, Aus, US, Ger
NOIE [57]				M			Aus
NOIE and DMR [56]	S	S		M	M	M	Aus
Nordic Council of Ministers [58]	M		M	M		S	N, Swe, Fin, DK, Icl
Dutta et al. [67]	M	M					world-102
Birch [16]	M		S			M	UK
PTI and ICMA [62]	M			M		S	US
REGIONAL-IST [65]	M	M	S	M	S	M	Sp, Ger, It, Por, Hun
Strover and Straubhaar [69]		M			M		Texas
SIBIS [70]		M			M		EU, US, Sui
Smith [3]				M			NZ
SOCITIM [71]				M			UK
Stowers [27]				M			US
Dexter and Parr [1]		S			M		world-32
UN [74]		M		M			world-191
COMNET-IT [15]	M	S		M			world-86
Demchak et al. [12]				M			world–102
West (a) [18], (b) [19], (c) [17]				M			(a) US, (b) US, (c) world-198

Table 1: Benchmark surveys from Kunstelj and Vintar (2004)

(which includes organizational aspects), project management and internal process re-engineering, front-office (that includes official website and e-services, supply and demand), and finally, effects and impacts as generated public value. It should be noticed that a benchmark can be positioned in more than one dimension in this table (table 1).

A total of forty-one benchmarking surveys were identified: fourteen of them dealing with e-government readiness, fifteen are about citizens and business readiness, only two deal with the back-office as the primary focus (although other four included it in some way); twenty-six had services provision as main topic, fourteen studied services' adoption in some way, but only three benchmarked both the supply and demand of online services[1], with four focused on e-government impacts or effects as a main topic, while six more took this topic as supplementary.

Codagnone, Caldarelli, Cilli, Galasso, and Zanchi (2006) in the eGEP project updates[2] the Kunstelj and Vintar (2004) list of e-government benchmarking. This new edition reports sixty-four benchmarks and studies about e-government measurement classified in four clusters or categories: e-readiness, supply side, demand side, impacts. The main results of this survey is that the overwhelming majority of the reports focuses on supply-side indicators (number of services available online) and/or e-readiness (presence/absence of structural and institutional conditions for the development of e-government and more in general of the Information Society), while an increasing, but still limited number, considers the demand side (i.e. take-up and satisfaction with services).

Despite the potentially broad scope of e-government, the majority of benchmarks are focused on the front-office (Janssen, 2003; Kunstelj & Vintar, 2004), which is the area related with official web pages and citizen-related e-services. This is not surprising since it contains the most visible parts of e-government. In addition, it has to be mentioned that there is a tradition of e-government models and standard indicators that provide a good basis to perform measurements and comparisons in that area, as we will see later on in the next section.

Another interesting dimension shown in the Kunstelj and Vintar table (table 1) is the geographic area in with these benchmarks are performed. Only seven applied to Europe Union countries (EU-15 that time) and seven world wide. Unfortunately, the focus on local public administration is not analysed, but that is the point in the next section.

To summarize, benchmarks have mainly evaluated only service delivery (without taking into account demand or adoption) at the national government level (Löfstedt, 2005) despite the importance of local administration in relationship to citizens. This characteristic will be deeply analysed in chapter four.

[1] These 3 studies are Cullen and Houghton (2000) in New Zealand, NOIE and DMR (2003) in Australia, and REGIONAL-IST (2003) developed in Spain, Germany, Portugal, Italy and Hungary.

[2] Although Codagnone et al. (2006) do not mention Kunstelj and Vintar (2004) works, the coincidence in the survey of the performed e-government benchmarks, the proposed classification and the labels used in the resulting table give enough clues to understand that this group of researchers knew the work performed by Kunstelj and Vintar.

2.2.3 Local e-government benchmarking

As we have already commented, Kunstelj and Vintar provide information about the geographic scope of the benchmarks (which is not the case of Codagnone et al. survey). In that analysis can be observed that there are no benchmarks focused at local level.

Other authors and researchers highlighted this lack of local based comparisons. According to Sakowicz (2003), most of studies take into consideration the whole country, i.e administrations and government at all levels. Heeks (2006) concludes that the majority of benchmarks have focused on national e-government. Although in developing countries, it is local governments particularly that are the main point of contact for delivery of services. Lanvin and Lewin (2006) remarked that despite the analytical efforts that have been made to describe local e-government initiatives and their good practices, remarkably "little attention has been granted to measuring the e-readiness of sub-national spaces, including cities". And they point out at the studies performed by the World Bank (Kaufmann, Kraay, & Mastruzzi, 2005) mainly focussed on city governance (including indicators on state capture, informal money laundering, red tape, and trust in politicians, as well as bribery in affecting utilities, laws, and permits), and the other by Rutgers University in collaboration with South Korea's Sungkyunkwan University in Seoul (analysed in chapter 4) as two of the more systematic attempts to measure "urban performance" or competitiveness made.

Why there are not benchmarks at local level? Is the opinion of United Nations Department of Economic and Social Affairs that the different role cities play in different countries makes comparison difficult. According Cole and Parston (2006), the diversity in socio-economic environments and context makes difficult compare performance across institutions. In addition, de diversity in services and functions makes even more tough data collection and comparison. Collecting internationally comparable data at the local level – where it even exists – is especially difficult due to differences in political and economic systems. A public function that is highly centralized in one country may be highly decentralized in another (UN, 2010). This different role played by cities in different countries is one of the challenges of the *Local e-Government Bench-learning* that will be presented in the following chapter.

2.3 e-Government models

The development of information systems architecture can evolve through a number of phases or stages of growth (Janssen & van Veenstra, 2005). In this section, it will be presented and discussed some of the existing models of growth applied to e-government. It will also exposed that despite their utility, e-government models do not reflect the real complexity of the e-government model and need to be updated.

Stage models aims at de-constructing information systems architecture development into a series of stages, development or evolution goes from one stage to another (Andersen & Henriksen, 2006). This general approach also applies to e-government as a

process in which information systems architecture plays a key role. In that case, it takes also the name of e-government models. Therefore, e-government models, stages of growth, models of maturity or models of sophistication are all synonyms when talking about e-government.

2.3.1 The early models

Although stages of growth were introduced years before, the main e-government models appeared in 2000 and 2001 (Baum & Di Maio, 2000; Hiller & Belanger, 2001; Layne & Lee, 2001; Ronaghan, 2002; Wescott, 2001). Several authors proposed different e-government models. All of them illustrates the organizational stage in an e-government development process (Andersen & Henriksen, 2006) and outline the structural transformations of governments as they progress toward electronically-enabled government (Layne & Lee, 2001).

e-Government models are important because they are offering a basis to measure e-government development degree and to guide strategies (Andersen & Henriksen, 2006). According Norris (2009), models are providing a good framework to asses development level easy to use and shared by other practitioners. It is thanks to the existence of these models that e-government benchmarking progressed. Therefore, e-government models proved to be a useful tool to assist policy makers in devising their own plans and initiatives (Al-Hashmi & Darem, 2008).

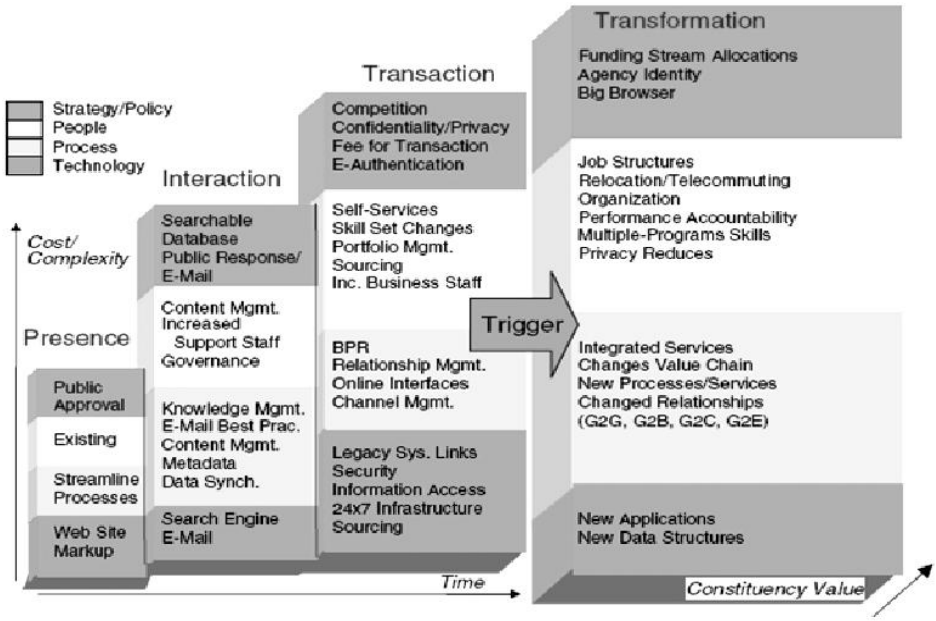

Illustration 1: Baum and Di Maio four stages model

However, the enormous diversity that is included in the e-government definition means that designing a general assessment model is very complicated and it is almost impossible to include all possible variants (Kunstelj & Vintar, 2004). This multifaceted reality of e-government is also the reason why they appeared several e-government models.

Some of them are focused in internal IT adoption and organizational changes (Layne & Lee, 2001), others[3] have been designed to model development of web content, or services provided through Internet (Ronaghan, 2002), others are oriented to classify projects in an overall evolution of and e-government Strategy (Baum & Di Maio, 2000) or focusing on technology infrastructures for e-government as the IBM model (Nguyen, Sansoni, & Le Noir, 2003)

The Baum and Di Maio model (Illustration 1) is also known as Gartner model. It was the first published in 2000. It is a four stages model aiming to classify e-government projects. The first stage is a mere web presence, in which governments provide basic information on line. Next is a stage in which citizens can interact with governments on line. In the third stage this interaction is transactional. Citizens can conduct business on line with governments. The final stage implies a transformation of the relationship between citizens and governments. These changes due to e-government produce a much more citizen centric and responsive government.

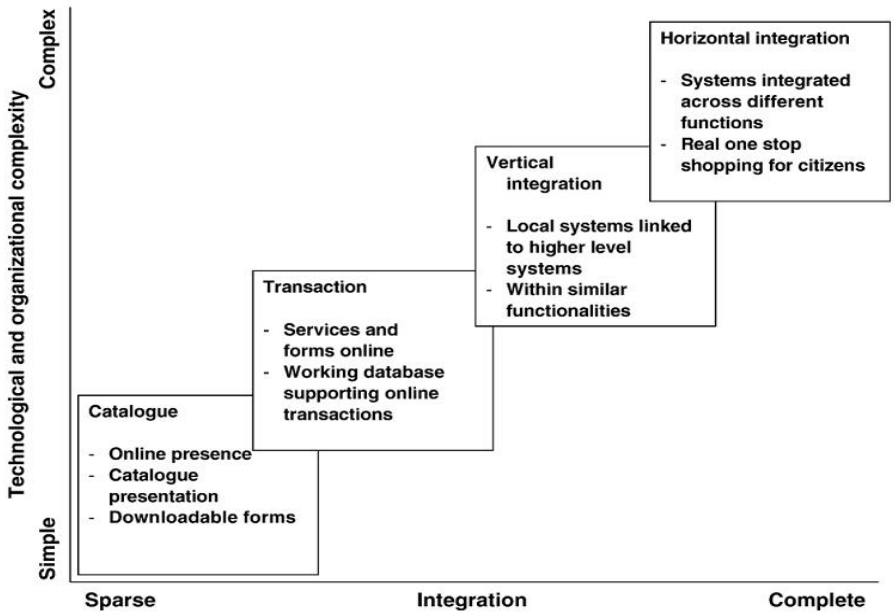

Illustration 2: Layne and Lee stages model

Layne and Lee defined in 2001 a four stages model (Illustration 2) to describe organizational changes towards a full enabled e-government. The first stage is

[3] United Nations Division for Public Economics and Public Administration

"catalogue", it is similar to the initial stage of the Baum and Di Maio model. It is characterized by a basic web presence providing static information. The second stage called "transaction" includes online forms and services supporting online database access. The third stage is characterized by the vertical integration with other public agencies processing related functionalities and finally in the fourth stage appears the horizontal integration of information and services which means the sharing online data and information across departments within governments and among governments to provide the final service.

The Hiller and Belanger model, also introduced in 2001, has five stages. It starts with "information", followed by "two-way communication". The third is "integration", followed by "transaction" and finally "participation". This latter stage, what makes the difference with previous models, is close to e-democracy and permits citizens to participate electronically in their governments.

Despite the existence of several e-government models, the European Commission chose a new model (from now Cap Gemini model) based on the method developed by the Dutch government. It is a four stages model to measure the level of online sophistication of the services. This model was adopted for Cap Gemini Ernst & Young in 2001 (Cap Gemini, 2002, 2003, 2004, 2005, 2006) to perform the survey on electronic public services commissioned by the European Commission in the framework of the *eEurope 2002 Action Plan* (EC, 2000), becoming a standard de facto. The four levels are defined below:

1. Information: online info about public services
2. Interaction: downloading of forms
3. Two-way interaction: processing of forms, includes authentication
4. Transaction: case handling; decision and delivery (payment)

Another stage model designed for official website assessment that worth to be commented is the used by United Nations in its e-Government Survey performed in 2003, 2005, 2008 and lately in 2010.

Initially the proposed model defined by Rutgers University was based on four stages being the first when does not exist on the website information at all, thus scoring zero. Therefore, to better compare this model with the previously exposed it can be considered as a three stages model. The stages are defined as follows:

1. Information about a given topic exists on the website (including links to other information and e-mail addresses)
2. Downloadable items are available on the website (forms, audio, video, and other one-way transactions, pop-up boxes)
3. Services, transactions, or interactions can take place completely online (credit card transactions, applications for permits, searchable databases, use of cookies, digital signatures, restricted access)

These first models suggest a lineal, stepwise and progressive evolution increasing in

complexity and sophistication (Baum & Di Maio, 2000; Layne & Lee, 2001). Each further step in the models' predicted evolution of e-government produces more e-government and e-government qualitatively better (Norris, 2009). As it has been said, their strength is that they propose a practical and comprehensible framework (Baum & Di Maio, Layne & Lee) easy to use.

In the models defined before 2006, there are some problems; one is regarding pro-activity and services simplification/integration which leads to a service suppression as the highest stage of e-government maturity. According to Janssen, Rotthier and Snijkers (2004), that means "neglecting the more fundamental process of re-defining service delivery in an online environment", a process that leads towards less but better services.

When analysing advanced public services, those models are not working correctly. There is a problem with levels of interactivity and interoperability or integration. There is no way to reflect reach interaction and participative service provision by means of web 2.0 technologies.

The purpose of the Cap Gemini model is services maturity assessment. It is using four stages to reach transaction level while other models are using only two (Layne & Lee) or three (Baum & Di Maio) to reach the same sophistication level. This characteristic makes the model more suitable to explain the e-services development, since it offer a more detailed and incremental stages of sophistication. On the other hand, it evaluates neither organizational e-government action like the e-government re-designing of back-office procedures, nor service availability through other channels, nor the adoption and the use of these services, nor the impact of the e-government programmes.

But although focusing in service delivery, the model is well developed for single services evaluation but do not take into account service integration (Janssen, 2003; Kunstelj and Vintar 2004). And it is again a lineal model, although it is recognized since its inception that not all services can evolve through all sophistication levels.

2.3.2 The extended models

Janssen (2003) observed that the existing models proved to be a useful tool for incipient and mid term e-services development but are not reflecting correctly the characteristics of the most advanced actions in service provision. And stated that more research was needed in this area. In that sense the extended version of Cap Gemini and UN models are proposing some corrections to solve the aforementioned problems.

Janssen, pointing out at what have to be the aim of e-government in service provision, noticed that existing models are not useful in high levels of sophistication. According to this author, the highest levels of sophistication might actually be the proactive completion of the transaction within government or even its elimination.

In that sense, the Cap Gemini model evolved in 2007 adding a 5th level of sophistication named "personalisation" to reflect the concept of pro-active service

delivery, (i.e. the government pro-actively performs actions to enhance the service quality and the user friendliness), and the idea of automatic service delivery (i.e. the government automatically provides specific services to citizens or business, so there is no need for the user to request the service)(Cap Gemini, 2007, 2009).

Also, the UN model was further extended in order to take into account new trends in electronic service provision based on the introduction of web 2.0 technologies. Therefore, the model was presented as a four levels model in the 2010 edition as follows:

1. Emerging information services. Government websites provide information and links to ministries, departments and other branches of government.
2. Enhanced information services. Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen, such as downloadable forms for government services. Some limited e-services enable citizens to submit requests which will be mailed to their house.
3. Transactional services. Government websites engage in two-way communication with their citizens. Electronic authentication of the citizen's identity is required.
4. Connected services. Government websites have changed the way governments communicate with citizens. They are proactive in requesting information and opinions from the citizens using Web2.0 and other interactive tools. E-services and e-solutions cut across the departments and ministries in a seamless manner. E-services are targeted to citizens.

But these extended models still do not explain the observed evolution of some services in terms of interactivity and interoperability. This problem was already pointed out by Kunstelj and Vintar in 2004. This author noticed that lineal models do not allow to explain the right levels of interactivity and interoperability or integration in electronic services. Sophistication and integration should be seeing are two different variables, two different dimensions. One, the sophistication of a service is a a front-office measure of how much can be accomplished online, the other one, integration of a service reflects how mature and advanced is the back-office (Heeks, 2006). Therefore, according to Kunstelj and Vintar, two-dimensional models should be developed.

As a conclusion it should be noticed that according to Norris (2009), the models of e-government "were developed in a vacuum". Which means that they were not based on research or on a careful reading of relevant bodies of literature. They were also technologically deterministic. As such, "they were almost certainly destined to be wrong". And that must be taken into account when evaluating a specific e-government area. Models are providing a good framework to asses development level easy to use and shared by other practitioners, but at the end, they are an incomplete description of the reality.

3 The *Local e-Government Bench-learning* survey

3.1 Overview

The *Local e-Government Bench-learning* study, is a bottom-up grounding exercise that intends to cover the lack of useful information helping to measure e-government at city level and providing a methodology for further measures. It is an ongoing study carried out by a group of 15 European cities led by Barcelona, with the technical support of PENTEO ICT Analyst company and the Pompeu Fabra University in Catalonia as Scientific Advisor, within the Knowledge Society Forum of the Eurocities Network.

The aim of this study has been to perform a benchmark on e-government services and applications provided by several local administrations. All the benchmarks undertaken so far has been mainly focused at a national level, and the cities believed in the need to patch the lack of global indicators that can be applied at local level. The study should result in a measurement framework and a common set of indicators that would help decision-makers in municipalities to better manage the e-government transformation process. Furthermore, it should provide the basis for the future assessment of the effectiveness of e-government strategies.

Up to now, benchmarks typically have been restricted to the services offering, i.e., e-services delivery or provision. The study intends to make a significant contribution in e-government measurement by extending it to the citizens' adoption (in European cities). In addition, this approach leads us to an improved learning process as it allows us to identify best practices based on the deeper analysis of the citizens' adoption. This is why the study was called a “bench-learning” project.

The methodology used has been based on an information gathering process divided in four stages: data collection of sample cities common services, provision of a measurement framework, surveys delivery to assess maturity and acceptance level and, finally, analysis and a final report covering the expected outputs.

An innovative common measurement framework has been defined which should be the base for further analysis. When comparing with existing benchmarking methodologies several innovations can be identified.

The first important differentiating characteristics is the corpus of common services shared by all the European Union cities despite different member state policies and public administration organization. That corpus, denoted as standard services is the basis for all the measurements performed. A part from the standard services the study has take into account the additional services that are offered by city administration aiming to solve local needs of their citizens or just trying to raise citizens awareness.

The second innovation of the study is the Global Services Catalogue which groups

services into nine thematic categories (i.e. transport, social care, education...) thus providing a sound view of the services offered to citizens. Results are provided according to these nine thematic categories. Two variables called standard coverage and diversity have been introduced to characterize the defined categories. Analysis of these two variables gives interesting conclusions about policy impact. An innovative services maturity stages framework has been defined, extending the Braun and Di Maio four stages framework to reflect the web 2.0 characteristics of most advanced services. When aiming at benchmarking success of e-government services, provision should be confronted with citizens adoption, that is why a measurement framework for citizens adoption has been introduced in the study.

A third and most important innovation lies in the departure from the typical ranking list that benchmarks use to offer as main output. The survey is neither providing a ranking of cities nor an indicator to condense the results of the data analysed for each city. The Local e-Government Bench-learning provides an innovative format to present the results through the use of maps presenting at the same time maturity and adoption level with a strategy of comparing each city results with European averages, that provides a way to represent the results in a comparative way without falling into fostering a negative competition among cities. To better characterise the e-government city profile, a new variable has been introduced (lambda) informing about the coherence in the e-government development across all nine categories and finally, a new variable (rho) has been defined to measure the "distance" of a service regarding the European average. This variable allows both to identify in a numerical way which services can be considered as a best practice and also to qualify or score the good practice.

The results obtained in this survey show, first of all, that there is an important corpus of standard services shared by all European cities. This corpus reaches a 53% of the services analysed (43 services of a sample of 81) thus providing a good basis for measurement and comparison. A second finding to be mentioned is that services provision ranges between 2 a 3,5 in all the categories which means that, services mainly are at interactivity and transactional levels with a few at the transformational one. According to the results obtained it can be derived that adoption of online services is not an issue as they are used, on average, more than expected.

However, all these results are not significant at a European level, as the sample of cities is very small. The main objective of the survey is to define a methodology to benchmark online public services provision and citizens adoption in European municipalities. As a consequence of the methodology definition a first round of measures is performed and so the survey will also provide the first set maps describing the overall situation and the details per service category and per city. Finally, the survey aims to supply a selection of best practices.

The project team was composed by the project director[4] (belonging to the Municipality

[4] The author of this research work has been also the project director of the *Local e-Government Bench-learning* survey and who conceptualized the bench-learning methodology as a bottom-up exercise aiming to provide useful information for e-government managers and covers the existing gap in how

of Barcelona, a support technician (from Barcelona as well) an IT analyst from PENTEO IT Analyst and an academic advisor from Pompeu Fabra University.

3.2 Methodology

The methodology was based on PENTEO METRICS methodology with some ad hoc modifications to ensure a bottom-up approach. PENTEO METRICS methodology is based in a five steeps process: design, measuring, analysis, benchmarking and report. In the design steep, it take place the definition of participants, calendar, roles, definition of indicators, questionnaires and data-gathering process. The second steep is "measuring", is in this steep when data is gathered, usually using interviews, questionnaires and documentation. In analysis steep, data is processed and indicators are generated. The benchmarking phase is in which data from each participant is compared with a reference group and scoring is calculated performing the typical ranking list. Finally in the report phase, the final results and recommendations are elaborated and presented.

A bottom-up approach was needed to ensure that meaningful results are obtained at the end of the survey. Therefore some modifications were introduced in the methodology. First of all a project committee was created with the participation of all cities. The committee, chaired by the project director, meet regularly a minimum of one time per phase to asses the progress and discuss about next steeps. Second, all data gathering was based on self-assessment using questionnaires to be fulfilled by each city e-services leader. Neither interviews were performed nor other documentation was used. Benchmarking phase was also modified in order to compare data only with the European average. Finally, specific report was designed to make results more useful for cities to progress and guide further steeps in their e-government plans.

Cities were involved from the beginning, participating in several meetings to provide feedback about which services should be benchmarked and how to group these services in a meaningful way which we describe latter on, how to assess online services maturity and also adoption; and finally how results should be presented for bench-learning to provide useful information to city managers.

A first questionnaire was designed to ask for the list of main services provided by each city. Data gathered was compiled and a first general list of services was created. A second questionnaire was circulated among cities showing the list of all compiled services. This second questionnaire was used to ask cities about which of the services provided by other cities are also provided by them.

After this two rounds a list of 81 services was compiled. During the gathering process was discovered that on each European country cities have slightly different role an that give some differences in the set of functions to accomplish. Therefore, different set of services are found. In some cases cities are not responsible for a service provision but

local public administrations are performing in e-government. It was, at the same time, who designed the project team and recruited its members.

they are offering information and even access to the service provider (usually a higher level public administration). Therefore, it was needed a third round of questionnaires to pick up detailed information about each service provision.

The assessment of the maturity and adoption was also discussed and prepared with the participant cities. The information was gathered using questionnaires which were answered by service's responsible of each city. The most mature services were double checked, and detailed information was asked to be provided to ensure that highest levels of maturity were understood and applied correctly.

There was no reference group to compare with. This is one of the differences of this study versus a traditional benchmark, here each participant city has been compared against the European average of the sample.

3.3 The sample of cities and its analysis

The participant cities were recruited through mailing in two European networks of cities: EUROCITIES with more than 130 members and Major Cities of Europe. The cities were asked to pay a fee of 3.000 Euros to participate in the survey thus allowing to partially cover the cost of the study. During the recruitment process, eighteen cities joined the study and started working. Throughout the process, three cities in the survey dropped: Malmo (Sweden), Sanliurfa (Turkey) and Lyon (France).

The reasons that moved cities to joint the study were also diverse. An important part of the cities were at the middle of the e-government plan deployment process (Birmingham, Barcelona, Turin, The Hague, Vienna) and were checking there were on the right way. Other cities were in the process to draw a e-government strategy (Murcia, Milan) therefore searching for information about possible services and good practices. Some cities were just released the e-government strategy and starting the deployment (Bergen) thus willing to stablish an initial international comparison to further assess the progress. Other cities with a recognized leading position were searching to validate its position at European level (Helsinki, Enschede)

The sample of cities was formed by a total of 15 European cities (Table 2). It is a rather heterogeneous sample reflecting the diversity of urban areas in Europe. It includes capital cities as Tallinn, Helsinki or Vienna, second cities as Milan, Birmingham, Barcelona, Bergen or Rijeka. Cities over a million inhabitants as Birmingham, Vienna, Milan or Barcelona, Medium cities as Helsinki, and small cities with less of 250.000 inhabitants.

Out of the 15 cities, 20% are capital cities and 33% are second cities in their countries. In total, the fifteen sample cities represent:

- 10.087.736 inhabitants which is the 2% of the EU27 population. Cities are going from144.043 inhabitants from Rijeka, to 1.677.867 inhabitants from Vienna. The average population per city is 672.516 inhabitants.

- 214.334 civil servants (going from 455 civil servants of Rijeka to 57.000 of Birmingham. The ratio of habitant per civil servant goes from 15 for Bergen and Helsinki to 241 for Tallinn or 317 for Rijeka.

	Inhabitants	Civil Servants	Population with university degree	Population average age	Household Internet Access(%)	Per Capita GDP	Inhabitants/ civil servant
Antwerp	464.038	7.949	12,90%	39,25	65,00%	30.000	58,4
BCN	1.595.110	13.393	21,30%	43,00	60,70%	25.651	119,1
Bergen	250.985	17.123	31,00%	38,30	64,00%	60.322	14,7
Bilbao	354.180	2.504	17,00%	44,00	45,70%	19.648	141,4
Birmingham	1.000.600	57.000	22,40%	33,00	55,00%	23.213	17,6
Bologna	372.256	4.926	26,20%	47,70	55,60%	35.156	75,6
Enschede	155.000	1.700	6,00%	38,30	83,00%	25.200	91,2
Helsinki	560.994	38.623	28,30%	40,00	85,00%	27.258	14,5
Milano	1.304.263	17.640	17,00%	37,00	43,00%	39.442	73,9
Murcia	422.861	2.058	11,10%	37,00	39,40%	20.312	205,5
Rijeka	144.043	455	18,49%	41,20	45,00%	12.305	316,6
Tallinn	401.372	1.664	43,40%		67,90%	16.576	241,2
The Hague	475.904	7.850	34,00%	38,10	91,00%	12.400	60,6
Torino	908.263	12.000	9,00%	44,90	50,00%	19.604	75,7
Vienna	1.677.867	29.449	33,00%	41,00	65,30%	29.449	57,0
Average	672.516	14.289	22,07%	40,20	61,04%	26.436	104,2

Table 2: Cities characteristics

The sample is quite representative in terms of GPD per capita since the sample average is 26.744€ (going from 12.305€ per capita of Rijeka to 60.322€ per capita of Bergen) close to the EU27 average GDP that is 25.100 for 2008. In terms of GDP per capita variation, our sample is slightly more homogeneous than the EU27 reality since the European GDP varies from 1 to 6 across the EU27 (source: EUROSTAT) while in our sample it varies from 1 to 5.

Regarding household internet access the sample is also representative of the European reality since the sample household internet access is 61,4%, ragging from 39,40% in Murcia to 91% in The Hague, while the EU27 average is 60% in 2008 (source: EUROSTAT).

Furthermore, it is also a representative sample in terms of population age, since the sample average is 40,2 when in Europe was 40,6 in 2007 (source: EUROSTAT).

However, our sample has a higher share of people living in cities over a million, the 55%, (49% including Lyon, Malmo and Sanliurfa) while EU27 has an average of 33%.

Apart from the excessive weight of large cities, that could have been corrected including more small and medium cities, the sample is quite representative of the European urban reality.

3.4 Services maturity levels

Service maturity has been measured since the beginning of the e-government. The most accepted framework is the four maturity levels proposed by Baum and Di Maio (2000): information, interactivity, transaction and transformation. Our study uses this framework as the starting point extending it including a fifth level on top of them. This level reflects a more advanced degree reflecting new features in user's interaction taking into account the use of emerging web 2.0 technologies. This new trend means letting and promoting citizens' participation in service provision, quality evaluation and discussion about services' improvement. This is why the new level is called the "participation level".

Therefore, the measurement framework used to assess e-service maturity was based in the five levels defined below:

1. *Information Level*: Ability to offer relevant information in a basic provision process, usually website based.
2. *Interactivity Level*: Users can generate basic content -email, template, queries- which is introduced in the government databases. It is a one-way interaction process in which the user can start but not complete a procedure on-line. Physical attention at the municipal counters is still required.
3. *Transaction Level*: The achievement of this two-way interaction level implies the possibility to completely perform a service –payments, certificates- through the use of electronic means.
4. *Transformation Level*: Full availability on-line, implying a full integration for all e-government services into a single portal. Users can access all the services from a single virtual office from any place. This level usually implies a business process re-engineering both in the back office and the front office.
5. *Participation Level*: Let and promote citizens participation in all e-services so that opinions are taken into account to enhance quality and effectiveness. This fifth level provides an indication of the extent to which on-line provision is based on new models to use available information obtained from the citizenship, reaching a high degree of pro-activeness in services' delivery. In short, this level is based on the application of the web 2.0 strategies to the on-line municipal services delivery.

3.5 Service adoption levels

Most studies so far did not face measuring the e-service adoption because of its inherent difficulties that we will explain in deep in chapter four. Web site visits or number of pages served, are indicators commonly accepted to assess the popularity of a website. But adoption or take up of an e-service can not be measured by access only.

We need to find a suitable adoption indicator. Data on transactions performed trough an

e-service application is a better indicator. However, it might not be applicable to the whole range of services due to their different levels of maturity and the heterogeneity of IT solutions used to provide them. Cities have found difficulties to share a single magnitude to measure adoption in a consistent way and the best magnitude could be different for each e-service.

There are other factors that must be taken into account to measure real adoption different. Each service is focused on a specific target group of citizens (youngsters, elderly people, entrepreneurs, immigrants…). As not all services are focused on same group of citizens, the characteristics of the target as literacy, digital literacy or ratios of internet access, for instance, define success in a different way. Furthermore, a multichannel perspective is needed to assess the success of e-services delivery. That is why only few benchmarks and studies have faced this issue up to now.

In our study, we measured the perceived adoption instead of measuring the citizens adoption. Each service's responsible measures perceived adoption by comparing the current use with the use initially expected. This variable can be measured by self-assessment using a measurement framework based on five levels. Each level defines a degree of the perceived adoption, ranging from a complete failure to a big success as defined below:

1. *No adoption*. The service has been a complete failure and the municipality is considering its withdrawal.
2. *Low adoption*. The service is being used by fewer citizens than previously expected.
3. *Medium adoption*. The service is being used by the average of citizens expected.
4. *High adoption*. The service is being widely used among citizenship.
5. *Excellent adoption*. The service has been a complete success and the municipality is devoting more investment on it.

3.6 The global services catalogue

The Global Services Catalogue has been developed following a common agreement among the participant cities, and integrating all the common and outstanding services that they offer. Each city has drafted a list with a description of the most relevant e-services they provide. Amongst all the e-services gathered, a common set of services has been selected on which the bench-learning exercise has been performed.

In total, this first release of the Global Services Catalogue includes eighty-one services that have been grouped according to nine main categories, listed below:

1. *Channelling* consists in 10 services (6 standard, 4 additional) related to enhance the contact between the citizenship and its municipality. It includes city's web pages, personal folders or bulletins.

2. *Citizens' Engagement* consists in 10 services (6 standard, 4 additional) devoted to satisfy citizens' expectations, attract their attention and consolidate its bonds. It encourages the relationship between the citizens and their administrations promoting or being on themselves a pre-stage of e-democracy.
3. *Education* consists in 13 services (8 standard, 5 additional) related to satisfy citizens' educational needs. It includes services related to children, adult and virtual learning services, cultural projects and libraries.
4. *Employment & Business* consists in 7 services (4 standard, 3 additional) devoted to help citizens obtain a work, facilitate business procedures, recruitment, tendering and small business promotion.
5. *Environment* consists in 7 services (3 standard, 4 additional) related to environmental care, including garbage collection and maintenance of the communal properties as well as encouragement of habits related to sustainable urban growth.
6. *Lifecycle* consists in 10 services (6 standard, 4 additional) devoted to ease the necessary transactions among citizens and municipalities related to their daily life, such as personal certificates, digital documents management systems or census.
7. *Social Care* consists in 14 services (5 standard, 9 additional) related to integrated services that are available from public health and social care providers, including housing services and care for people with special needs (disabled, children or aged people).
8. *Transport* consists in 6 services (2 standard, 4 additional) devoted to satisfy citizen's mobility needs.
9. *Urban Planning* consists in 4 services (3 standard, 1 additional) related to land use and property related issues like construction permits, building regulations, certificates or land acquisition.

Once categorized, all the services have been divided according to their percentage of coverage between standard and additional services. European coverage is understood as the percentage of cities that provide a service. Therefore, if a concrete service is offered by all the sample cities its European coverage is 100%. If a service is offered by 50% or more cities it is a Standard Service. On the contrary, it is an Additional Service. In total, 43 services from 81 has been identified as standard services and 38 from 81 are classified as additional.

Standard services are the 53% of the identified services. They show common interests in European municipalities and the route map that the sample cities have been recently following in e-services deployment. On the other hand, additional services, 47% of the identified services, show the wide variety of services provided by European cities.

A chart showing the standard services list and which cities are offering them is presented to summarize the main characteristics of each category. Therefore, the study shows 9 charts for services provision. In each chart, services are characterized according to whether the service is provided by the city or not.

3.7 European standard coverage and diversity

While standard services seems to identify general patterns, additional services should surely complement them since the fact that a general pattern exist doesn't mean that there aren't important and interesting exceptions. These exceptions will be expressed in the form of a diversity mark focusing in the variety of circumstances that exist while studying e-government in several cities. In short, the study of diversity avoids an exclusive focus on what is common or on dominant patterns, a defect commonly done in previous benchmarks at national level.

Diversity compares the current coverage of all services (both standard and additional) to the perfect scenario: the total provision of all services by all cities. Therefore, diversity of a category is defined by the following mathematical expression:

$$\text{Diversity} = 1 - (\text{services provision}/\text{perfect coverage})$$

Diversity takes always a value between zero and one.

As it has been defined, diversity helps analysing the variations in government provision in Europe. Specifically, in this study, it is useful to compare coherence in cities delivery of services for each of the nine considered categories. A large diversity would imply a big difference in service provision among European cities. A category with a diversity of 0.67 will show low coherence, that is European cities would offer quite different services achieving only a 33% of coincidence in services delivery in a given category.

On the other hand, it is also of great interest to restrict our attention in the delivery of standard services: those services offered by 50% or more of the participant cities. It is important to see how common interests have affected e-services deployment and have helped to create a shared vision of e-services' delivery. Hence, it will be helpful to connect the coverage results with the diversity mark achieved by each one of the nine categories considered in this study.

3.8 European maps and city maps

The most important innovation of the survey lies in main results presentation. This study does not score all surveyed cities an provide the typical ranking list that benchmarks use to offer as main output. It is also my opinion that focusing in only one score or indicator can lead to a behaviour in which organizations avoid experiments and innovation (Janssen, 2003). The *Local e-Government Bench-learning* project innovates in results presentation through the European and city maps (Figure 3). These maps are

bar charts presenting at the same time maturity and adoption score for each category.

Having defined the different levels of maturity and adoption and having gathered and qualified all the services according to maturity and adoption, the results are plotted per category (illustration 3). This chart provides an interesting view of the European average local e-government degree of development, and helps to find correlations among maturity and adoption.

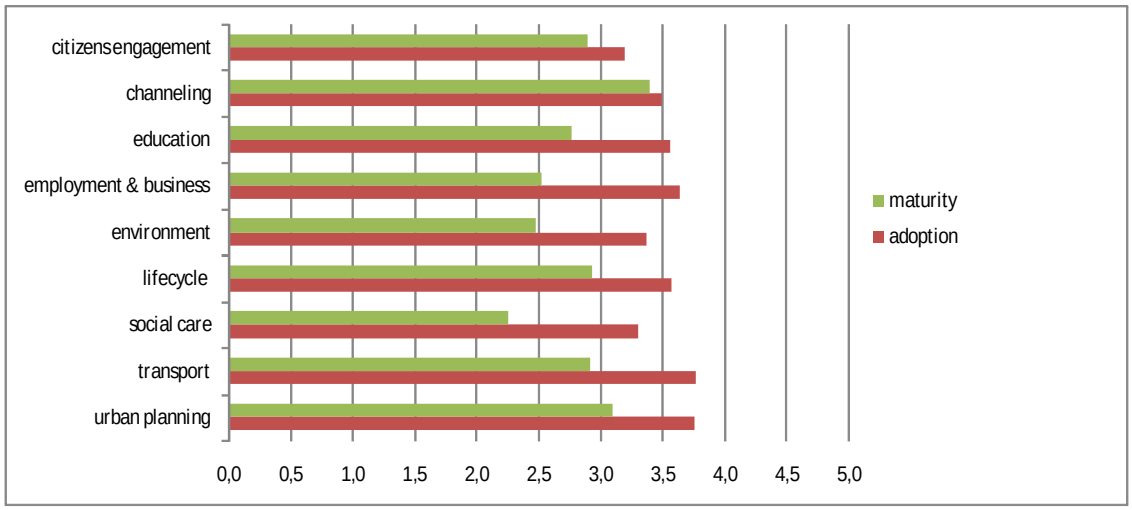

Illustration 3: European map of maturity and adoption

As it can be seen (illustration 3), this chart not only show the variables' value for all the categories, but also to grasp a general mark for European e-government. In addition it makes easier to compare maturity among categories, thus showing the harmonisation in services provision. Moreover, plotting together maturity and adoption, the chart allows to visualize correlation among both variables, if it is the case.

When plotting separately standard services and additional services, maturity, adoption and possible correlation among variables are more clear.

Regarding cities results, rather than providing a ranking the survey use the city maps. City maps show city's e-government profile against the European average values per category in a similar format that the European map do. In that case, two charts are used one for maturity and one for adoption. Using these charts each city can see in which categories are more developed and in which they need to improve.

The strategy of comparing each city results with European averages, provides a way to represent the results in a comparative way without falling into fostering a negative competition between cities. In addition, to better characterise each e-government city profile, a new variable has been introduce (lambda) informing about the coherence in the e-government development across all nine categories. High marks on lambda would indicate that the e-government development is inhomogeneous thus having categories with a high levels of services' maturity and at the same time categories presenting low

marks on services maturity. And the other way around, a low mark on lambda would indicate that the city has a homogeneous and well balanced set of e-government services.

3.9 Best practices

The best practice list is one of the key outputs of the survey. In fact is what brings the real learning dimension to the study. The proposed methodology brings to us a list of selected best practice for each category that are related with the real maturity stage of each category. That means that it is not necessary to register a high mark on maturity to be a best practice, what is important is how is the maturity of the best practice candidate regarding the average maturity of the category. To make easier this exercise a new variable (rho) has been defined to measure the "distance" of a service regarding the European average. This variable helps us not only to identify in a mathematics way which services can be considered as a best practice but also to qualify this good practice. However, there is a second dimension which is adoption. A best practice has to be not only a highlighted service (behind the average) but also, should be characterized by a good acceptance, therefore, rating higher than 3 in adoption. The higher the better.

There is no need to tell what a best practice is, but it is important to draw your attention to the current methods used to identify best practices which are rather arbitrary and subjective. Here, in this study the innovation is that the best practice selection is a consequence of the measurement framework and over all methodology defined to compare different services.

3.10 Results discussion

First of all, the findings show at first glance the existence of a set of standard services shared by all the participant cities. Despite the existing differences in public administration organization across European countries, an important number of common services shared by all local public administration can be found.

Second, that corpus of common services was distributed in 9 categories. Coverage and diversity allow some reflections. It is quite remarkable that all the Global Catalogue categories achieve percentages of coverage in a range between 67% and 83%. In general, if a majority of cities show a common services agreement, a category could be considered as consolidated. However, it is important to pay attention, at the same time, to how populated is a category regarding standard services. A consolidated category will show: a well established set of standard services and a good European standard coverage.

When a well established category shows at the same time high diversity, there is the case of *Lifecycle* or *Citizens' Engagement,* means that it is an active category in which cities are working and putting efforts due to the interest of citizens (demand) or

politicians (strategic plans or even European recommendations).

Urban Planning and *Channelling* show the lowest diversity marks, hence appearing to be the most stable categories in which municipalities provide very similar services. But, in the case of *Urban Planning* this stability is also accompanied of a low activity in service provision since it's the second less populated category.

On the other hand, high diversity scores with a low populated set of standard services – having big or low standard coverage- which is the case of *Social Care, Transport* and *Environment,* clearly means that the category is not well established, there is a lack of common European understanding despite being an active working area. This could be related with current EU-funded programs that intended to foster concrete key areas[5]. Currently, these categories are on the focus of current European policies.

Third, local e-government development in Europe is still below transaction level, being only more advanced than level 3 in only two categories: *Channelling* and *Urban Planning*.

Fourth, local e-government is in general, perceived as highly adopted by citizens. The European average of perceived adoption is always above 3 and even above 3.5 for five out of the nine categories, which means that in average e-services are being used by more people than initially expected. Therefore, the provision of public services by electronic means should be considered as well accepted by citizenry.

Fifth, web 2.0 is being incorporated to local e-Services provision, since several cities have yet started delivering level 5 services.

Sixth, additional services are more advanced than standard services. When analysing maturity it can bee seen that additional services show greater marks than standard services.

Seventh, there is no evidence of relation between service maturity and perception of adoption. Although it could initially be thought that more advanced services will also be more adopted, this survey, based on the information analysed, does not prove that relation. No correlation can be observed among maturity and adoption.

Eight, when plotting standard services a part from additional services, it can be observed that additional services show higher maturity than standard services but a quite similar adoption values, which seams to indicate that additional services are no more adopted than standard services.

[5] European Commission funding programmes are currently focussing in social care, mobility and environment among other areas.

4 E-services benchmarking and adoption literature revisited

The aim of this chapter is twofold. First the state-of-the-art in e-government services benchmarking is reviewed, and the most important benchmarks identified are described and discussed in terms of applicability to local level e-service benchmarking. The second part of the chapter is devoted to understand the adoption measurement problem. It starts by analysing the state-of-the-art in e-government services adoption and highlighting the importance of measuring adoption to have a complete view of the e-government service provision. Finally, we show the current difficulties to perform adoption assessments.

4.1 Benchmarking electronic services provision

As we discussed in chapter two, despite the potentially broad scope of e-government, most studies to date have concentrated on measuring maturity in electronic service provision, either by proposing stages of growth models or by examining web-based service delivery (Janssen, 2003; Kunstelj & Vintar, 2004; Griffin, Foster, & Halpin, 2005; Heeks, 2006), which is not surprising, as according to Peristeras et al. (2002), the major changes brought by electronic government introduction "appear to have profound effects, forcing even a reconsideration of what types of outcomes public administrations should produce, and what kind of interrelations with civil society actors should maintain in order to fulfil their essential social functions", and that directly impacts in the service provision.

Two important aspects are contributing to maintain e-services benchmarking on the focus of practitioners and academics. One is the inherent importance of the front-end: in public administrations, the front-end includes web official web page and e-services provision and both are the most visible parts of e-government (Janssen, 2003). This means that, in practice, e-government is still perceived mainly as delivering governmental information and services electronically 24/7 (Norris, 2009).

The second is the existence of a well established standard in terms of models and indicators. e-Government models to measure service sophistication are widely known, comprehensible and simple to apply. For instance, the benchmark of online public services introduced in 2001 by the European Commission established an e-government model for services maturity assessment, and a set of basic services to be evaluated. The European Commission defined also the percentage of online public services as the main indicator to measure the contribution of the European e-government to the objectives of the Lisbon agenda. This benchmark, commissioned to Cap Gemini from 2001, has been yearly measuring the progress of European e-government and its methodology became a de facto standard in Europe.

Before turning to the most relevant benchmarks so far, let us state some limitations of

current benchmarks that we will discuss later in this chapter.

Benchmarking online service provision should not be confused with benchmarking official websites as it usually happens. Official websites benchmarking try to measure to which extent public organizations have adopted the web tools as means to contact, and provide services to, citizens and business. These benchmarks usually cover aspects such content, navigation, public outreach and communication, accessibility, privacy and security, online services, and citizen participation. (Panopoulou, Tambouris, & Tarabanis, 2008). Electronic services provision is one of the common components of the official websites benchmarking, and when benchmarking websites the focus is to determine to which extent the service provision is a relevant component of websites.

Benchmarking online service provision is not benchmarking only web service provision. Usually, benchmarks focus on web services delivery thus considering only those services delivered through official websites. But benchmarking electronic service provision should take into account all electronic channels used to delivery services to citizens. It is not only web services provision, but also it includes the use of kiosks, digital TV and mobile devices when used to deliver services to citizens. Although the web services provision is the most used delivery channel, taking the web as the only medium for e-government service delivery the multichannel efforts are missing (Janssen, 2003).

Another limitation is that mots of the existing benchmarks focus on state level services with no applicability to local level public administration. Most of them provide a score as a main result giving little information about how a city is doing in terms of service provision.

Finally, according to Panopoulou et al. (2008), current benchmarks only measure the "supply" side and not the actual use or take-up rate, the "demand" side. Is the opinion of this author that this gap encourage countries to get good grades for making lots of applications but it does not matter if these applications are actually used by citizens. And this should be corrected more and more by the use of usage indicators and by weighing them together with output indicators.

In the following sections I analyse the most relevant benchmarks and comparative studies in electronic service provision to demonstrate the aforementioned limitations.

4.1.1 Online Availability of Public Services benchmarking, the European de facto standard

The European Union has a systematic evaluation and follow-up of the e-government development in member countries since October 2001 when the European Commission defined and launched a benchmarking methodology to measure and compare electronic services provision among member states[6]. The benchmark has been performed yearly by

[6] The Cap Gemini benchmark was defined by the European Commission in the framework of the e-Europe Action Plans for Member States aiming to ensure a generalized electronic access to main basic

Cap Gemini and now constitutes a valuable source of information to study the evolution of the European e-government. However, it is not suitable for local level measurements and has some limitations in terms of maturity stages.

One of the main contributions of this benchmark is that it became a de facto standard to benchmark online government in Europe. The standard indicators defined by the European Commission were: percentage of basic public services available online, public use of government online services for information/to submit forms, and percentage of public procurement that can be carried out online (EC, 2002-2), although the benchmark only measures the first one.

The benchmark is based on the maturity assessment of a list of 20 basic public services (12 for citizens and 8 for business) using a four stages e-government model (see chapter two). The list of the 20 basic public services were grouped in 5 categories, allowing a more grounded analysis (see table 3).

Category	Services
Tax collection	1. Tax declaration, notification of assessment 2. Corporation tax: declaration, notification 3. VAT: declaration, notification 4. Customs declaration 5. Social contribution for employees
Registration	6. Car registration (new, used and imported cars) 7. Certificates (birth, marriage): request and delivery 8. Announcement of moving (change of address) 9. Registration of a new company 10. Submission of data to statistical offices
Citizen services	11. Job search services by labour offices 12. Public libraries (availability of catalogues, search tools) 13. Declaration to the police 14. Health related services (e.g., interactive advice on availability services in different hospitals; appointments for hospitals)
Financial content	15. Social security contributions: unemployment benefits, family allowances, medical costs (reimbursement or direct settlement student grants 16. Public procurement
Permit and licence request	17. Personal documents (passport and driver's licence) 18. Enrolment in higher education / university 19. Application for building permission 20. Environment-related permits (including reporting)

Table 3: Cap Gemini basic public services

In addition, the benchmark introduced the services categories to group similar services

public services (Cap Gemini, 2002).

allowing a more grounded analysis. Despite its evolution and refinement over the almost ten editions, the benchmark is not applicable to local public administrations. A quick look at the services services shows that most of them are not provided at local level thus confirming the focus on state level.

Even though the Cap Gemini benchmark contributed to the popularization of a four levels model of e-government services sophistication, it does not take into account the use of web 2.0 technologies in the service provision. Therefore, there is no way to reflect rich interaction and participative service provision by means of web 2.0 technologies that are nowadays emerging.

4.1.2 MeGAP: a US local public service benchmarking

In 2001, Kaylor et al. conducted a benchmark of local public services provision, motivated by the initial request of the city of Ann Arbor (Michigan, US). The benchmarking study surveyed 38 cities whose population ranged between one and two hundred thousand inhabitants in the 1990 census, since Ann Arbor falls within that range. According to Kaylor et al., the set of functions that municipalities tend to offer is small relative to the private sector, therefore, benchmarking the progress of e-government implementation should be a simpler matter in the public sector. With a pragmatic approach Kaylor et al. selected a palette of services that are performed by local administrations in the US. A total of 51 services were identified and grouped in 12 categories. Each service was evaluated using a four levels services sophistication assessment framework. The results were consolidated per category. Then, a summary statistic was defined to encapsulate all the results and was de base for a score used to rank cities. Let us to discus this approach more deeply.

A problem with presenting a score is that its meaning is by no means transparent: high scores could indicate both, a wide range of functions that are web-enabled, or a large degree of technological sophistication -the latter happening in fact in most cases. Another issue is that the score provides little information about e-government development.

The services sophistication levels assessment framework used by Kaylor et al. was defined as follows, for each giving topic:

1. information about the topic exists at the website
2. a link to a relevant contact (either a phone number or email address) exists at the website
3. downloadable forms on the topic are available online
4. transaction or other interaction can take place completely online

Although it does not differ substantially from other e-government models, Kaylor et al.

model is not based on previously existing ones[7] such as those presented and discussed in chapter 2.

The definition of services categories made possible the discussion of different degrees of sophistication per category and helped to identify some patterns among cities useful to make final recommendations.

It is interesting to notice that during his research Kaylor et al. found a variety of services that were not anticipated. It was observed that quite a few cities had developed innovative and sophisticated functions online that were not reflected in the service' catalogue used in the benchmarking survey.

This benchmark defined the methodology named MeGAP (The Municipal E-Government Assessment Project) as a benchmarking tool to assess the status of city/town e-government. The methodology was updated by the Public Sphere Information Group (PSI Group) in 2005 and it is currently at its third version (MeGAP-3). In this version, the catalogue contains 68 local services to be evaluated in USA cities. These services are grouped four categories.

1. Information dissemination (e.g., city codes, official minutes, traffic information, municipal government directory)
2. Interactive functions (e.g., bidder applications, down-loadable forms, building permit process, business license)
3. E-Commerce functions (e.g., utilities payment, property tax look-up and payment, code enforcement)
4. E-Democracy (e.g., e-meetings, e-forums, user customization,volunteer opportunities)

The initial services sophistication assessment framework has been maintained.

This methodology has been applied or partially applied in some other benchmarking surveys as (Flak, Olsen, & Wolcott, 2005) in Norway with a sample of 30 municipalities and a palette of 68 local services, and (Arslan, 2007) in Turkey with a sample of 3.228 municipalities and a specific palette of 25 local services. Apart from that, it has been performed twice in United Sates cities by Public Sphere Information Group. One of the criticism is that the categories are made mainly in terms of interactivity, therefore, they are not reflecting thematic areas of services. Second, is that the provision of a score is hiding important details in how a city is deploying e-government. Finally, it does not help to identify best practices, although provides the ranking of cities according to the

[7] But, were they existing? Kaylor et al. benchmark was commissioned in June 2000 "On June 19th 2000, the City Council of Ann Arbor (Michigan) passed a resolution authorizing the exploration of the possible expansion of the role of the Internet in providing city services" (Kaylor et al., 2001). The benchmark started in September 2000, which means that it is contemporary to the definition of first e-government models of chapter 2. The first one, the Baum and Di Mayo four phases e-government model, was published in November 21st of 2000, therefore Kaylor et al. actually started the benchmark before the publication of the first e-government model.

obtained score and a set of interesting conclusions based on the per category aggregated score.

4.1.3 E-Government at the American Grass-roots

Norris examined in 2005 the likely future trajectory of local e-government in the U.S. The Norris' research was based on the data provided by two surveys[8] conducted in 2000 and 2002 about local government adoption of e-government in the United States . The 2000 survey was mailed to 3,749 local governments obtaining a 50.2% of responses. The 2002 survey included 7,844 local governments with 52.6% of responses. Norris complemented this information with a focus group with 40 local governments. The study analysed the average maturity of the e-government at local level and the likely future trends.

Despite it was focused on local level, and mainly in electronic services provision, the study can not be considered a benchmarking exercise.

4.1.4 Evolution of Local Government E-services in Australia

Shackleton, Fisher, and Dawson carried out in 2004 a research work to determine the evolution of government e-services in Australian local public administration. The research was based on a benchmarking exercise mixed with a case study. The Municipal Association of Victoria identified 22 main functions or services undertaken by Australian municipalities (particularly those based in Victoria).

These services were grouped in four categories.

1. e-management basic information Web, site navigation, contact details
2. e-service: product and service details, product and service support
3. e-commerce: transaction handling
4. e-decision making/e-democracy: sense of community, links

The research started with a quantitative study of the characteristics of 20 local government websites. This quantitative study identified common features and provided some indication of maturity levels of those sites. As a second steep, was performed a case study of the approach of one municipal council and a resultant examination of its maturity level in the implementation of e-government services (Shackleton et al., 2004).

Again here, although the research was focused on local level, the first part consisted

[8] The author used the data provided by the International City/County Management Association (ICMA) in their Local Government Survey performed in 2000 and 2002. (http://icma.org/en/press/home). ICMA is a organization of professional local government leaders building sustainable communities to improve lives worldwide. ICMA, provides member support; publications, data, and information. The Association is an internationally recognized publisher of information resources ranging from textbooks and survey data to topic-specific newsletters and e-publications.

more in a official website benchmark than in a benchmark of online services. As all the municipalities surveyed were placed in the same state sharing same legal framework, is was easy to list the set of services to be evaluated. This model is not applicable at international level. A second criticism is derived to the lack of a well referenced e-government model for services sophistication assessment.

4.1.5 Digital Governance in Municipalities Worldwide: a biased perspective

United Nations has performed three editions of its Digital Governance in Municipalities Worldwide. This prestigious benchmark is based on the Rutgers-SKKU Municipal E-Governance methodology. The survey is a benchmark of the city's official website. The first of such survey was conducted in 2003 through a collaboration between the E-Governance Institute at Rutgers, the State University of New Jersey, Campus at Newark and the Global e-Policy e-Government Institute at Sungkyunkwan University and co-sponsored by the Department of Economic and Social Affairs, United Nations. The survey was conducted again in 2005 and finally in 2007.

The methodology was defined in an previous Holzer's work (Holzer, 2003) as a reaction of the first survey performed by Kaylor et al. (2001). Holzer tested the methodology benchmarking a sample of ten New Jersey largest cities. The resulting ranking score can be seen in table 4.

City	Population Ranking	E-government Ranking
Newark	1	4
Jersey City	2	10
Paterson	3	9
Elizabeth	4	8
Edison	5	3
Woodbridge	6	7
Dover	7	5
Hamilton	8	1
Trenton	9	2
Camden	10	6

Table 4: New Jersey results (Holzer, 2003)

The used methodology consist on analysing official websites established by city governments. The instrument for evaluating them consisted of five equally weighed components: (1) Security and Privacy, (2) Usability, (3) Content, (4) Services, and (5) Citizen Participation. For each of the five components, 18–20 measures were applied, each coded on a scale of two to four points.

The study provides a ranking of cities per component in addition of the overall ranking

of cities. Since the same study was also performed in 2005 and 2007, the progress can be visualized and analysed. (Holzer & Kim, 2003, 2005, 2007).

The first and more important limitation of the survey is that how the sample of cities is selected. The selection was made taking from ITU data these cities with an online population greater than 100,000. Researchers selected 98 countries with the highest percentage of Internet users, and then "examined the largest[9] city in each of those countries as a surrogate for all cities in the country" (Holzer & Kim, 2003). In this sample the larger city in each country has been taken as the representative city of the country no matter whether it is the most advanced in terms of e-government. This bias should be taken into account when interpreting the results provided for the survey.

A second observation is that the survey is benchmarking official websites, analysing different aspects in which services provision is only one of them.

Furthermore, even evaluating service provision, the survey only takes into account those delivered through website. That means that electronic service provision through other channels such as Digital TV or kiosks are neglected. Finally, the study does not provide a selection of good practices.

4.1.6 Summarizing the evolution of electronic service benchmarking

In this section we have been reviewing and discussing the main benchmarks related with public service and local government. The European most well know benchmark of electronic services, the "Online Availability of Public Services" benchmark, has been deeply analysed and discussed by many authors (Janssen, 2003; Bannister, 2007; Heeks, 2006). We would like to highlight here that this benchmark only focus on service provision and provides no data regarding adoption. In addition, it is performed at state level, therefore provides no data at local level.

An interesting benchmarking methodology has been found in "The Municipal E-Government Assessment Project" performed by Kaylor et al. in 2001. This benchmark is the most interesting since the methodology is based on a bottom-up approach, focused only in cities and what cities are providing in terms of electronic services. Nevertheless, it neither measure adoption nor provide a best practice selection.

"E-Government at the American Grass-roots" is a secondary study based on two previously performed surveys. It analyse data to discover web adoption patrons in local public administration. It is not focused on electronic services. Therefore, it is not

[9] In the first study performed by Holzer benchmarking New Jersey municipalities (Holzer, 2003), he uses a sample of cities formed by the most populated cities of the state. He supports his criterion with existing literature that suggests a positive relationship between population and e-government capacity at the local level. However, from the results obtained in this first study it can be derived that this correlation does not exist (see table 4). Despite this evidence, Holzer used the same argument to justify a quite arbitrary sample of cities made by the most populated cities on each of the most advanced countries in terms of e-readiness.

relevant in our research.

The "Evolution of Local Government E-Services" performed by Shackleton, Fisher, and Dawson in 2004 in Australia is again an interesting exercise since it is based on the services cities are offering to citizens. Nevertheless, here again it lacks of adoption measurement.

Finally, the "Digital Governance in Municipalities Worldwide" designed by Holzer and Kim in 2003 is probably the most important for capital cities since it has became the standard methodology of the UN benchmarking of world capital cities performed in a by-annual basis although it is focused on official websites.

From this revision it can be seen that no benchmarks can be found focusing both local level and measuring, at the same time, electronic service provision and adoption.

4.2 Measuring electronic services adoption

The aim of this section is to analyse through a literature review the state of the art in e-government services adoption and highlight the importance of measuring adoption in order to have a complete view of the e-government service provision. In spite of that, the section also show the current existing difficulties to perform adoption assessments.

4.2.1 Adoption is not demand

Adoption is not demand. Warkentin, Gefen, Pavlou, and Rose (2002) describe adoption as the intention of citizens to engage in e-government to receive information and request services from the government. Also Carter and Belanger (2005) define it as intent to use, and Gilbert, Balestrini, and Littleboy (2004) establish it as the willingness to use e-government services. The three definitions are pointing at the same concept, the intention or will to use electronic services.

But intention is not real use. Although some authors have found that intention-to-use an e-government service is a strong predictor of actual usage (Belanger & Carter, 2008) there is a clear difference between intention to use and real usage of a service. Both authors redefine adoption as the real usage of e-government services and introduce a new concept, which is demand as the willingness of citizens to use e-government services.

4.2.2 The importance of measuring adoption

The service adoption measurement is important as it has been stated by different authors. According to Kumar, Mukerji, Butt, and Persaud, (2007), the main reason is that the ultimate objective of e-government programs ought to be the frequent and recurring use of online services by citizens. Heeks (2006) states that matching e-

government supply to demand is of paramount importance to manage change in e-government programs. Moreover, when delivering services through different channels, which is the general trend, measuring adoption and comparing adoption of electronic service delivery with other channels usage is an important instrument to manage the delivery channel shift towards cheaper channels (Janssen & Wagenaar, 2004). In the three cases measure adoption is identified as key to successful manage the e-government program.

But this importance is not reflected into the existing benchmarks. As we saw in early chapters, several authors have found that the majority of performed e-government benchmarking focuses on supply-side indicators (# of services available online) while an increasing, but still limited number, considers the demand-side (i.e. take-up and satisfaction with services) (Janssen, 2003; Kunstelj & Vintar, 2004; Janssen et al., 2004; Heeks, 2006; Codagnone et al., 2006; Panopoulou et al., 2008). Nowadays, United Nations (2010) recognize that most of the statistics are derived from supply side indicators and often by website assessments alone. Little information is yet available on the demand side of e-government. Few surveys exist that would indicate 'how' citizens use these services and 'what' they see as maximizing public value. (UN, 2010).

The real objective of e-government services is misunderstood. This abundance of supply-side survey unbalance with a scarcity of demand-side studies leads to a misinterpretation of what is e-government service progress. The existing benchmarks are pushing countries to prioritize getting good grades for making lots of applications without paying attention whether are actually used by citizens or not. (Janssen et al., 2004). This situation points out at an existing gap between the demand for and the supply of e-government performance information (Panopoulou et al., 2008) that needs to be covered.

4.2.3 Measuring adoption

There is no shared framework for adoption assessment. As the main studies about e-administration or service to citizens are only focusing in measure the "supply" of e-government services and say nothing about the actual use or take-up of online services, which is the "demand" side (Janssen, 2003), no framework for adoption measurement has been discussed into the research community.

The research on adoption is mainly focused on the overall adoption process description or more specifically focussed on barriers and enablers. It can be found few studies about the technology adoption life-cycle models and the diffusion theory for the adoption or acceptance of a new product or innovation, according to the demographic and psychological characteristics. A more interesting group of academic work pays attention to actual use of websites, portals, e-services, information content and other elements of supply focusing in the level of interest in using and reasons for not using these elements as well as evaluations of the quality of them as perceived by the users and evaluation of their perceptions, requirements and needs (Kunstelj & Vintar, 2004; Kumar et al., 2007;

Alsuwaidi, 2009).

How to measure adoption remains unattended. Only few studies face the adoption measurement of e-Service due to inherent difficulties (see chapter 2). It only can be found some clues in literature about web access analytic tools. There is a clear lack of a suitable framework for adoption assessment. Therefore, how to measure adoption remains unattended in terms of research and Löfstedt recognize (2005) that there should be more research into this factor, and more elaborate models and methods should be developed to understand citizens adoption of e-services. Is United Nations opinion that what's needed is international consensus about how to assess e-government performance (UN, 2010).

4.2.4 e-Government services target

In a measurement exercise a reference, a target, should be established before performing any measurement. In the case of adoption of an electronic service, the reference should be the group of citizens and companies identified as potential users of the service. To know which are the target users of e-government services is probably one of the most difficult questions to solve since many factors are influencing the real target of e-government services.

Each service has its specific target. According to Janssen and van Veenstra (2005), when evaluating e-government success, the first challenge is the investigation of various perspectives which may not only include addressing and meeting the general needs of a target group such as citizens, but also require the inclusion of specific needs of target groups of citizens that are using a particular e-government service. Although e-government services is often seen as a unit, actually it is composed by a multiplicity of different services. In general, each service is targeted to specific groups of citizens such as the unemployed, families, pensioners, architects, lawyers, students, etc. (Alshawy et al., 2007). Therefore, a case by case analysis of the target should be performed.

Social, cultural and technical context of use and age modify the real target. In this analysis social, cultural and technical context of use are also important factors to take into consideration in e-government evaluation (Alshawy et al., 2007) (Patel & Jacobson, 2008) since they impact in the real target of users. Moreover, it is recognized the importance of including the variable of age on the ability to use and subsequently the intention to adopt new technological advances (Gilbert et al. 2004).

Therefore, the definition of the e-government service target of users is a complex issue. Several factors must be taken into account and require a case by case approach and needs further research.

4.2.5 How often citizens consume e-government services?

Frequency of use is a factor to determine the adoption threshold. How often citizens

consume e-government services is an important questions that must be know and complement the existence of a well known target before measuring e-government services adoption.

Different studies determined that citizen contact with government is relatively rare. Surveys performed in the US shows that only half of respondents had contacted any level of government in the previous year. Two thirds of those, contacted any level of government less than every few months (Horrigan, 2005).

That is not an estrange phenomena. Bannister (2007) notice that most transactions with government (at least for the individual citizen) occur once a year (tax, car and television licences), many documents are renewed even less frequently (passport, driving licence ...) and some documents, such as death or birth (and in some cases marriage) certificates, are once in a lifetime events. This low frequency of use will also apply to e-government services defining a maximum level for electronic services adoption which should be lower than total number of contacts.

4.2.6 Variables to measure adoption

Several variables are needed tot measure adoption. Although a short number of variables should be desired actually there are different views and proposals. In Janssen et al. (2004) study of the current benchmarks, the authors identify a set of variables that are used to measure usage or adoption of electronic services:

- Number of individuals that have made use of electronic services offered
- Number of businesses that have made use of electronic services offered
- Percentage of citizens that has visited government websites to search for information
- Number of businesses that have made payments online
- Percentage of internet traffic that pertains to electronic service delivery

In a similar survey performed by Codagnone et al. (2006), the author propose a set of web metrics to measure electronic services adoption:

- Number of hits or user contact sessions
- Number of document downloads
- Amount of time users spend on a site
- Number of transactions completed
- Web analytic (click streams, repeat use, cross-usage)

Different sophistications levels needs of different variables. The measurement of electronic service adoption is tightly related with the sophistication stage of the service. Therefore, in general the variable or indicator will be different according to the maturity or sophistication level of the services. When analysing official websites, visits or

number of pages served are both indicators commonly accepted to assess the popularity of a website. But adoption or take up of e-services is not only access. These variables can be suitable to measure adoption of those services being at stage 1 in the Baum and Di Maio e-government model (see chapter 2).

When a service reaches stage 2 in Baum and Di Maio model, although number of pages can partially explain how adoption is, the number of forms downloaded is a more realistic indicator. Similarly happens in stage 3 where the key in that case, is data transactions performed trough e-services applications. However, data transaction is not directly applicable in higher levels of sophistication where integration tends to reduce the number of transactions performed by citizens when using electronic services.

Therefore, no indicator can be used in all range of electronic services due to their different level of maturity and the heterogeneity of IT solutions used to provide them. As we see, each e-service needs to define which is the best magnitude to measure adoption. To arrive at a nuanced view of usage, we should combine indicators for information seeking, information provision, and transactions (Janssen et al., 2004). Here again a case by case analysis should be performed thus adding a level more of complexity in the adoption measurement.

4.2.7 Measurement methodologies

A variety of measurement methodologies are used to assess e-services adoption. A fact that is linked with the diversity of indicators we saw in previous section.

Surveys are the preferred source of adoption information. Heeks (2006) found that in general, use measurement is mainly performed by surveys. The lack of a single indicator to measure real use of electronic services, the complex process of measuring the real use of a palette of different services in different stages makes practical the use of surveys in which citizens are asked about their use of e-government. Many studies are using this methodology.

The same author also noticed that self-assessment is one of the most commonly used despite its drawbacks. Is the opinion of Heeks that internal self-assessment works well for some things, such as reporting of lessons learned. It works less well for others where there can be a "public relations bias": the respondent is aware that their response will be publicly reported and will thus produce a good or bad reflection. Here again the same reasons would move to perform adoption assessment using this technique, in addition this methodology is the cheapest one.

Codagnone et al. (2006) point out to the emerging use of web metrics/crawlers as an even richer source to assess service use in certain situations if they can be objectively reported. This includes not merely usage indicators such as number of page hits or completed transactions but also the introduction of the e-commerce concept of conversion rate to understand how effective are the e-government solutions when evaluating specific e-government solutions.

4.2.8 Summarizing adoption

The inherent difficulties to define the e-government service target of users. The lack of a consensus in a measurement framework, the variety of indicators and the existence of different practices to measure adoption undermine cross-country benchmarking.

4.3 Summary of the electronic service benchmarking

In this chapter we have been revisiting literature to analyse the main benchmarks related with public service and local government and the difficulties around the public adoption measurement of public service.

Although some benchmarks tailored at local government have been found, none of them measures both provision and adoption of electronic services at the same time.

One of the reasons for the scarcity of local level surveys is that the differences existing in the role of cities across different countries undermine extensive comparisons in public services at local level. A second reason is the lack of an adoption measurement framework and the difficulties to stablish standard indicators for adoption, as it has been discussed in section 4.2.

In such a context, some critical decisions must be taken to proceed with such exercises. The first is to reduce the geographical scope to European Union, which is an area with cultural similarities and under a convergent legal framework. A second pragmatic decision is the measurement of the perceived adoption instead of measuring the real adoption. Both decision have been driving the *Local e-Government Bench-learning*.

5 *Local e-Government Bench-learning* improvements

The aim of this chapter is analyse the local e-government methodology while applying the knowledge brought by the previous chapters. An analysis of the strength and weaknesses of the study is performed. And finally, some improvements to the *Local e-Government Bench-learning* methodology are proposed.

5.1 The *Local e-Government Bench-learning* most interesting innovations

The *Local e-Government Bench-learning* has specific characteristics that makes it a pioneering experience in its field. The literature review confirmed that there is a lack of benchmarking studies confronting provision versus adoption of e-services; and that no information is available comparing development of local e-government in Europe either. The literature review revealed that the *Local e-Government Bench-learning* is one of the few surveys analysing and confronting both provision and public adoption of electronic services, and the first European wide benchmarking study focused on electronic services provision at local level.

Moreover, it has been found that some authors (Janssen et al., 2004; Heeks, 2006; Bannister, 2007) are critics with benchmarking practices considering them not useful enough because often the purpose is not clear then are not well designed and tend to compare things not really comparable in addition they not provide the needed information for practitioners. The authentic aim of a benchmarking study is to learn from those who are really doing better. Therefore, these studies should clearly provide a best practices identification. However, actually they are only offering a best players (best scoring) identification sometimes complemented with some relevant practices description. In consequence, these studies do not offer the kind of information as the key to e-government success.

Local e-Government Bench-learning intents to go far beyond academic oriented surveys, offering more useful information to managers that it is usually provided, allowing them to learn from those cities which are really doing better as the key to e-government success (Janssen et al., 2004).

The Bench-learning name comes from combining the words benchmarking and learning. The aim of the survey is to go further than measuring and comparing European wide electronic services provision in cities: it should provide more useful information and in better ways for city managers to learn and improve e-government development strategies.

The typical benchmark provides as a main result a ranking of cities going from best to worst, while our bench-learning provides first of all, a set of charts showing the European averages and comparing each city with the European average. Therefore it

helps practitioners to easily identify areas in which the city is performing better or worst.

As a second output it provides a list of best practices that are obtained as a consequence of the measurement and comparison performed. This list is organized of services. In this study, it is not necessary to register a high maturity mark to be a best practice, what is important is how is the maturity of a service regarding the average maturity of the category. In addition, for a service to be a best practice, not only it has to be far from the average maturity, but also, it must be characterized by a good acceptance, therefore, rating higher than 3 in adoption. The current methods used to identify best practices are quite arbitrary and subjective. Here, in this study the innovation is that the best practice selection is a consequence of the measurement framework and over all methodology defined to compare different services.

Apart from the aforementioned innovations, other methodological innovations aim to adapt better to the specificities of both: the local government characteristics and the confrontation of services provision versus adoption.

In that sense, the first innovation introduced has been the definition of a services catalogue shared by all surveyed cities which is itself service-oriented and fits with the European local administrations role. This catalogue was made through a bottom-up approach and showed at the same time the diversity of innovation carried out by cities in electronic services provision. It has been developed following a common agreement among the sample cities and integrating all the common and outstanding services that they offer. Amongst all the e-services gathered, a common set of services has been identified and used a a basis to perform comparisons. In addition, the catalogue has been used to show the diversity of innovation carried out by cities in electronic services provision. These are the additional services which represent the 47% of the identified services, and represent the wide variety of services considered by European cities showing the innovation leaded by cities in the field of services provision.

A new maturity stages model designed to measure local level services sophistication and current trends on services provision has been introduced. As it have already been commented in chapter 2, existing e-government stage models are not reflecting new features in service provision. In our study we took the four maturity levels proposed by Baum and Di Maio (2000) as the starting point, extending it to include a fifth level on top of them. This level reflects a more advanced degree reflecting new features in user's interaction taking into account the use of emerging web 2.0 technologies.

Although it not solve the lack of consensus in how to measure services adoption, the bench-learning propose an innovative approach to tackle the gap on adoption information. Therefore it allows to confront provision and adoption at the same time.

5.2 Some important limitations revealed by the study

Unfortunately, some of the innovations were difficult to introduce. The service catalogue has been made to stablish a set of common services in which perform measurements and comparisons. The consensus have been reached with and important number of services because only European cities have been analysed. This set of services must be considered an European set of common services and it can not be applied to perform more extensive comparisons including different continents because existing differences in the role cities play undermine possible comparisons. In the case of willing to extend the methodology to a wider geographical area a new set of services should be build.

We had to take a pragmatic approach in adoption measurement choosing internal self-assessment to measure it, therefore, moving from measuring adoption to actually measuring perception of adoption. A measurement framework was defined with the involvement of all participant cities, but as each service responsible applied it, an homogeneous criterion cannot be assumed. Improving the adoption measurement framework should be a priority in future research.

Regarding maturity assessment, even though providing common instructions, it is not possible to assure a complete homogeneity among city's results, along with the risk of misunderstanding maturity level 5 due to its novelty. Therefore, a general refinement at the measurement process is needed to reduce data subjectivity.

In addition, future works should include a larger sample of cities in order to increase statistical reliability. Having a larger sample would allow a segmented analysis distilling reference types for comparison according to city characteristics such as size or GDP per capita.

5.3 Improvements

Some of the future improvements can also be derived from the literature review. In the following pages I discuss the main improvements in the methodology that should follow a second edition. Of the bench-learning study.

5.3.1 Hypothesis formulation

An explicit formulation of the hypotheses would clarify not only the purpose of the study but also the outputs. The first edition of the study lacks it. As a first step, now we make the following hypotheses more explicit:

- H1: *European cities are sharing an important corpus of common services.* This corpus is the basis to perform sound comparison at European level. The importance of this hypothesis is clear, should it be not true benchmarking can not be performed. To verify this hypothesis it should be investigate service

coverage with cluster analysis to see whether a cluster of services with high coverage can be identified.

- H2: *The most mature or sophisticated services are also the most widespread*. I seems at first thought that the more mature or sophisticated is a service the more used by citizens it will be. For practitioners, this is an important hypothesis to verify or reject since usually the more sophisticated is a service, the more expensive is the development. To verify this hypothesis we have to investigate whether exist a significant correlation among sophistication and adoption.
- H4: *Cities are developing special sophisticated services to attract citizens attention.* There is a trend for cities to create especial and sophisticated services to attract citizens interest and rise citizens awareness towards new electronic channels thus pushing for a channel shift in service provision. To verify this hypothesis we should investigate whether exist a significant increase of sophistication in additional services in comparison with standard services.

In addition, and after testing the methodology in a first survey and having analysed the results, the methodology proved to be useful to identify whether European policy in e-government impacts in local government cohesion. Also, it helps to discover whether small cities are performing better than big cities. Although it is widely recognized the agility of small cities in services innovation, there is no clear basis to such statement. To verify or reject it, city maps should be analysed and compared.

However, it has to be said that through the literature review performed in 2.2 and 4.1 no benchmark with explicit hypothesis formulation has been found.

5.3.2 Statistical analysis

As the study was exploratory, it did not go beyond using simple average calculations. However, even at this pilot stage, there are already more than 1.200 entries, the use of statistical tools would have been justified. Let us to mention some initial ideas: cluster analysis is fundamental to identify groups and classify elements into these groups. It might allow us to identify and better justify the groups and categories of standard and additional services. Here also analysis of variance would have helped to asses differences among different groups of services.

When comparing provision and adoption of public services, computed correlations of sophistication and adoption levels for standard and advanced services could be used to reject or confirm hypothesis.

When introducing a score (see 5.3.8) then both correlation and cluster analysis can be applied for cities results themselves, provided the sample is larger and segmented as it is discussed in next section. Also here cluster analysis and analysis of variance would help to assess the existence of different groups of cities in terms of how they are developing e-government projects.

5.3.3 The sample

To lack of a good sample of cities can undermine the applicability of the results obtained (see 4.1.5). In our survey (see table 2), a bigger sample of cities is needed to have statistical significance, and hence to offer a more rigorous knowledge of the European results. In particular there would be better grounded average values, which is the basis for cities to be compared with.

With a larger sample of cities, maintaining the representativeness of the European local public administrations as it has been discussed in 3.3, it makes sense to segment the sample with cities by similar characteristics, such as GDP, social aspects, citizens e-readiness, etc. Performing a more detailed analysis within the segments themselves, and also comparing one of each other, the benchmark would provide a richer view of the European local e-government reality.

5.3.4 The services catalogue

The global services catalogue has been developed following as a bottom-up exercise. Compiling and analysing all the services provided by the sample cities, we reached a common agreement and integrating all the common and outstanding services that they offer. The services catalogue is the basis to perform a sound comparison among different cities of different countries. Without this basis there is no room for comparisons, that is why the most important benchmarks proceeded defining, first of all, this basis of common services (see section 4.1). A part from the basic services other additional services have been found (see 3.6). Although this basis must remain stable to provide a clear view of the evolution along different survey editions, a periodic revision of those services and its coverage should be done in order to detect when an additional service is becoming a standard service.

In the catalogue, the services have been grouped in nine thematic categories. Cap Gemini and Kaylor et al. proceeded in a similar way because it allow to better analyse e-government development, not only in specific cites, but also globally detecting areas of raising interest as it has been discussed in chapter 3. Nevertheless, the categories definition can be improved to better reflect thematic areas of local government responsibilities, and solve existing ambiguity and overlapping. In addition, a new definition of services category aligned with the clusters of services defined in the Cap Gemini benchmark could provide an extra basis to compare development of similar thematic areas (although with different services) across local and state level.

Here, twofold complementary improvements are proposed. First of all, an analysis of the competencies or responsibilities of cities across Europe should be performed to identify the different main areas that should map with the defined categories.

A second improvement tackles service cataloguing to solve the existing ambiguity and overlapping among categories. Semantic web technologies could be the tool to that purpose. According to Klischewski (2003), the use of Semantic web in e-government is

especially challenging due to "differences of interpretation of e.g. law, regulations, citizen services, administrative processes, best-practices, and,not the least, many different languages to be respected within and across regions".

Service category is only one of the possible e-service cataloguing mechanisms. According to Vassilakis and Lepouras (2006), the definition and development of a public services ontology is the starting point to achieve a well stablish service category.

A category definition based on semantic mapping would help to deal with conceptualization and contextualization of e-services increasing the clarity of the category definition and avoiding overlapping and miss classification. Here, as the survey is being developed in a wide area rich in cultural, historical and linguistic diversity, semantic mapping can be used as a tool to discover the relationships between vocabulary words. This tool will facilitate the constructions and population of the public service ontology. The construction of a public service ontology that has already been performed between UK, Greece and Spain in the context of Ontogov project (Tambouris, Gorilas, Kavadias, Apostolou, Abecker, Stojanovic, & Mentzas, 2004; Apostolou, Stojanovic, Pariente-Lobo, Batlle, & Papadakis, 2005), could be a starting point to extended it covering all EU countries.

5.3.5 Collection of the information

Information gathered from the sample cities has been based on self-assessment. The participant cities have assessed themselves regarding maturity and adoption scores through the use of several templates, and, a set of instructions were developed to fully explain which stages should be considered. In order to follow a common understanding, however, 15 evaluators with possibly 15 different criteria have worked on each city templates, hence making not possible to assure good homogeneity of results. An improved strategy has to be envisaged.

In the literature review (see 4.2.7) we learned that are different possibilities to collect data. Self-assessment is the cheaper one but it can introduce a bias in reported data. The most prestigious benchmarks (see 4.1.1, 4.1.2 and 4.1.5) proceeded using a team of independent experts that evaluated websites and electronic services offered. This guarantee a more systematic analysis although, increase notably the cost of the benchmark.

5.3.6 Service maturity levels

This study aimed at measuring e-government service provision and adoption in European local public administration. As it was already mentioned in Batlle and López (2007) local administrations are introducing web 2.0 technologies into e-services provision. This emerging trend is a plus in e-services sophistication that comes after the internal processes transformation, and there are no e-government stages model that take it into account. That is why in the *Local e-Government Bench-learning* we decided to

extend the e-government four phases proposed by Gartner Group (Baum & Di Maio, 2000) with a new fifth level, hence adding a not yet widely accepted stage to a well-known methodology.

When analysing the results in depth, we observe that there are a lot services that have reached maturity level 5 in a wide variety of categories, according to the self-assessment. As web 2.0 technologies in e-government is a novelty, it is possible that the surveyed cities have misunderstood the correct use of this new level.

A second problem to be solved in the model is the raising of integrated services, personalized and proactive which leads to a number of services reduction is not well reflected in the proposed model.

We need to find a suitable model to reflect both these new characteristics and the use of web 2.0 technology. In Europe, the e-government maturity model most used in public service assessment is the model proposed by Cap Gemini (4.1.1). On the other hand, Kaylor et al. benchmark, the other interesting benchmark that worth to be taken into consideration, use a primitive e-government stages model as it has been already discussed in 4.1.2. In our opinion the bench-learning survey can be improved using a new stages model defined by extending the Cap Gemini model to include a new level of sophistication to reflect the emerging use of web 2.0 technologies in e-services provision.

5.3.7 Measurement of adoption

Statistics of adoption are not widely used among European cities, not even in the surveyed cities. Generally, cities only have real take-up data about websites' visits, telephone calls or face-to-face attention. This situation is due to a lack of appreciation of the benefits of measuring adoption but also to a lack of awareness of which services, interactions or channels to measure (see chapter 4). This is an important gap to be addressed.

Let us stress that the perception of adoption measured in the study is, and must be, very different from one country to another, as anyway the perception of adoption is relative to the local situation. An example can illustrate this: Murcia city council would probably rate as a success achieving a 40% of adults' courses subscription through Internet, while in the more Internet developed Stockholm this might be rated as a failure.

5.3.8 Scoring

What usually benchmarks provide is a ranking based on a score. A score or a ranking of cities according its position give little information to practitioners. That is why we do not provide such score in our first edition.

Nevertheless, Kaylor et al. (see 4.1.2) proved that the introduction of a general score as well as a score per category, in our case should it be both for service/category sophistication and adoption, would allow better discussion of the results in some way as it is performed in Kaylor et al. benchmark.

Although benchmarks that have a strong focus on the scoring system are only useful to measure general and specific evolution from one edition to another (see 4.1.5), so we can improve our survey having a scoring system to settle a basis to assess progress in future survey editions, when adding a temporal dimension.

The *Local e-Government Bench-learning* survey aims at setting a path for further exercises of this sort and, hence, generating a stable temporal series in the near future.

5.3.9 Charts

The introduction of spider charts (also known as radar charts) instead of bar charts (see illustration 3) would provide a more clear view of the general position of a city compared with the European average. A spider chart is typically created to graphically show the size of the gaps among three to eight organizational performance areas. The chart would have a radii for each category. The score of each category is plotted as a data point in the corresponding radii, a line connects all the data points. A spider chart can show the city performance and the European average at the same times allowing quick comparisons making visible strengths and weaknesses of the city. When plotting provision and adoption per category, it easily can be derived whether a significant correlation exist among these two variables. Spider charts are being used in several editions of the Cap Gemini survey (see 4.1.1) becoming a de facto standard and creating a culture of results presentation that is worth to be imitated.

Beyond improving visualization, the new results provided by using more sophisticated tools and by the segmented analysis of a larger and more significant sample will provide better insights of the data.

6 Final remarks

To fill the gap in local e-government benchmarking the author of this research report designed and launched a pioneering field study of several key European cities entitled *Local e-Government Bench-learning* in 2008. This study tried to introduce several innovations in the services catalogue, adapted to local administrations, with a wider coverage focus based on a new maturity stages model, on the quality and services adoption, with a classification identifying standard services as well as diversity. On the other hand,the study adopted an innovative city charts visualisation to offer decision makers material suitable to inform future decisions on e-government development strategies.

In this research report I reviewed in depth the applicability and correctness of the *Local e-Government Bench-learning* study, comparing it with the state-of-the-art in e-government benchmarking -at different administration levels-, reviewing its main findings and contributions, especially, the methodological ones at the local administration level and proposing further improvements.

Literature review shows that the methodology of this bench-learning survey is innovative, well designed and tailored to local government. The first survey performed provided feasible results that are presented in a useful format for practitioners, thus proving the validity of the methodology.

The survey covers the initial objectives of providing: a general view of the European local e-government development, detailed information for each of the sample city, and a extensive list of best practices. It provides answers to policy makers and city managers main questions when managing the e-government process, to shorten it and ensure a successful end. And allow take profit of the experience of previous innovators as a guide to make informed decisions. At the same time it provides enough information to confirm or disprove the implicit hypothesis (which are explicitly formulated in 5.3.1.). Therefore, the initial objectives have already been reached in the first edition.

Nevertheless, due to its novelty, this study show some weaknesses that should be corrected in subsequent editions of the study. The new edition of the study *Local e-Government Bench-learning* is intended to consolidate a methodology to benchmark the provision of electronic public services and adoption of same by the citizens in the area of local e-government in Europe. While the methodology is to encourage the identification of best practices that are prone to be used as accelerator in the process of implementing electronic services.

The desirability of repeating the study is not justified only by the consolidation of the methodology and the increasing stringency of the measures but also for providing a perspective, a vision that allows more evolutionary view the efforts of European local authorities to improve services offered to its citizens.

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9 Annex: The *Local e-Government Bench-learning* survey