E-Government Adoption in the EU: Theoretical and Methodological Challenges in the Study of the Digital Divide

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Abstract

The study of e-Government adoption has generally overlooked the digital divide: not only this referring to the digital divide within countries, but also this between countries and between potential versus actual adoption. This paper supports the view that this lack of empirical investigation occurs because the existing literature utilises mostly e-Commerce research models to explain e-Government adoption and fails to incorporate institutional and political factors in the analysis. The EU exhibits a significant divide between potential and actual usage as citizens seem reluctant to engage to e-Government for which the literature has not offered answers yet. This paper presents the methodological challenges which are related with this macro-level phenomenon and suggest a theoretical framework for examining the causes which lead in growing scepticism.

1. Introduction

> *"Information and Communication Technologies (ICT) play an essential role in supporting daily life in today's digital society. […] e-Inclusion aims to achieve that "no one is left behind" in enjoying the benefits of ICT. e-Inclusion means both inclusive ICT and the use of ICT to achieve wider inclusion objectives. It focuses on participation of all individuals and communities in all aspects of the information society. e-Inclusion policy, therefore, aims at reducing gaps in ICT usage and promoting the use of ICT to overcome exclusion, and improve economic performance, employment opportunities, quality of life, social participation and cohesion"*

(European Commission 2010: the Digital Agenda for Europe)

Europe's Digital Agenda makes clear that no citizen should left behind in the Information Society and accordingly the EU has introduced policies and guidelines aiming at reducing the digital gaps within countries. 'e-Inclusion' is closely related to European policies on social inclusion, education and culture, regional development, innovation, industry and internal market (EC 2011). However, when looking closely at the EU level, two different kinds of digital divide are evident: one within countries and another between countries. This study focuses at the national level and presents a theoretical approach in the study of this phenomenon, while discussing the methodological challenges of empirical investigation. First, it makes an attempt to present the research problem in a comparative perspective, whereas the examination of the adoption rates of e-Government versus e-Commerce uncovers two important issues: first, the fact that the EU suffers not only from 'digitally excluded' but

also from 'digitally reluctant' citizens and, second, that e-Government growth rates lag behind compared to those of e-Commerce, while they exhibit an 'unexplained' variation (both over-time and cross-national).

The term 'digitally reluctant' is used here to define the people who have the skills, the knowledge and the technical means to use e-services but they prefer not to, due to unspecified factors. This research problem is unveiled when measuring the growth rates of Internet use by the general population versus those of e-Government and e-Commerce adoption rates. What it is observed then in the EU, is low and sometimes negative growth rates in e-Government, while e-Commerce follows a linear growth. For example the adoption rates of e-Government services over the period 2005-2010 had a growth rate of 39.1% in the EU-27, while those of e-Commerce had an impressive 72.2% growth rate. One may well assume that this is because of the low quality of the offered e-Government services compared to e-Commerce services. However, this is only a simplistic view of e-Government adoption in the EU, as the research unveils that e-Government exhibits much higher fluctuation over time than e-Commerce and, in fact, in 2008 a drop was observed in many European countries (Eurostat, 2011). This downward tendency is present up to date in a number of EU member states. Thus, a number of citizens who were previously using e-Government services stop doing so after a specific time point. Hence, we are talking about another kind of digital gap – this in which people are self-excluded from a category of e-services – those provided by their governments. How this 'digital gap' varies across Europe and how it is explained? This study is focusing at the gap between potential versus real usage of e-services and discusses the theoretical and methodological problems related with the analysis of this phenomenon.

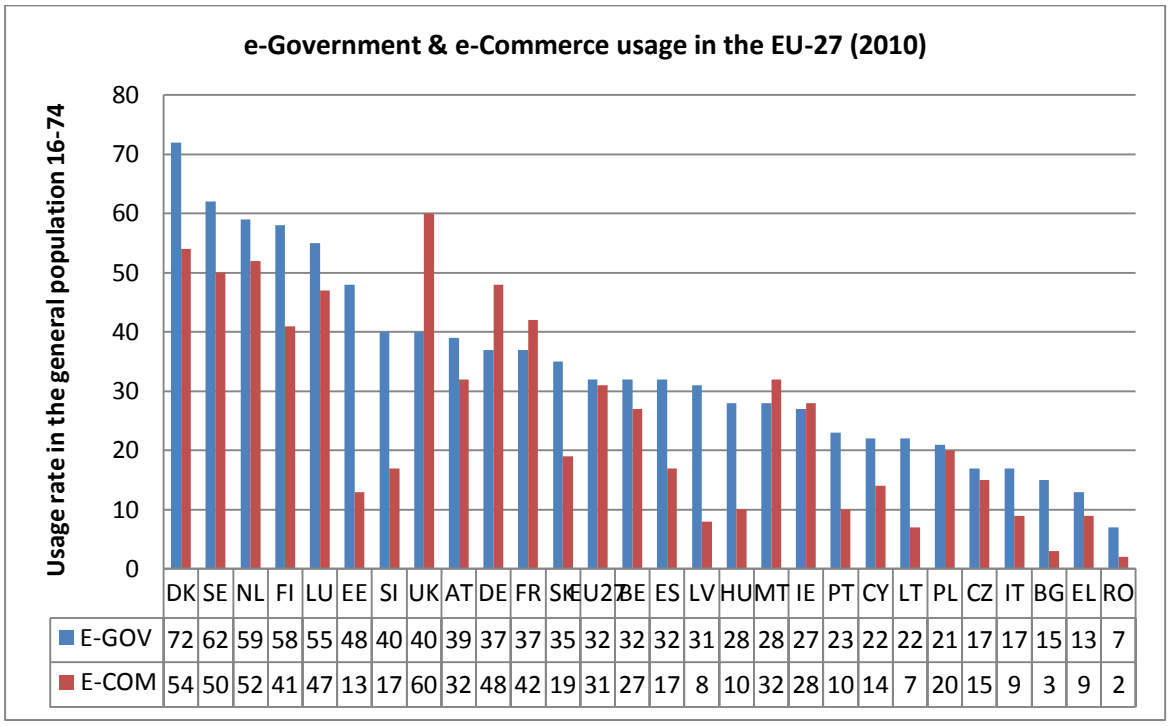
2. The 'Digitally Reluctant' Europeans

An obvious answer to the question "why citizens do not use e-Government" could be that "because the offered services are not of high standards". Yet, this applies to e-Commerce technologies and is not necessarily of equal importance in e-Government. Democratic principles and institutional factors have also been identified in literature as having a significant effect and thus a more comprehensive approach is needed. This does not imply that system quality and design issues do not matter, but rather that some more factors have an impact on the actual e-Government use. Thus, a question could be "why in a country, such the United Kingdom, with e-Government spending more the 1% of the GDP e-Commerce usage is about double than this of e-Government?" (UN, 2003). Are e-Commerce services so superior? And if yes, then it is the case only in the UK? To answer such question we need to compare the e-Government usage rates with those of e-Commerce and also to take into account the general level of Internet use in the population.

In order to present more clearly the research problem we perform one comparative analysis and one longitudinal: comparing e-Government to e-Commerce, then comparing those levels in different countries and finally analyzing the over-time variation. This may give us some insights on the possible factors that may account for the observed variation across the EU. The following figure shows a comparative view of the levels of e-Government and e-Commerce usage in the EU in 2010.[1]

[1] Data available online at:
http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=TSDGO330

Figure 1. E-Government and e-Commerce usage in the EU-27 in the general population 16-74 (2010)



	DK	SE	NL	FI	LU	EE	SI	UK	AT	DE	FR	SK	EU27	BE	ES	LV	HU	MT	IE	PT	CY	LT	PL	CZ	IT	BG	EL	RO
E-GOV	72	62	59	58	55	48	40	40	39	37	37	35	32	32	32	31	28	28	27	23	22	22	21	17	17	15	13	7
E-COM	54	50	52	41	47	13	17	60	32	48	42	19	31	27	17	8	10	32	28	10	14	7	20	15	9	3	9	2

Source: Eurostat 2011

At a first glance it is evident that the upper part of the graph is dominated by the Nordic countries along with Estonia, Luxembourg, Netherlands and Slovenia. The middle part is consisted of mainly Western European countries[2] (Germany, UK, France, Spain, Austria), while at the bottom we find mostly Eastern European and Mediterranean countries. Also, it unveils three very important 'outliers': UK, Germany and France. These three countries (along with Malta and Ireland) are the only ones where e-Commerce has, today, higher adoption rates than e-Government. In any other EU country the image is inverted, with e-Government having higher adoption levels. Another interesting characteristic of the three outliers is that they exhibit high over time variation with fluctuating usage rates.

A longitudinal analysis of the usage levels of e-Government and e-Commerce in Europe shows that the two technologies follow different trajectories with e-Government exhibiting shifting adoption rates. In more detail, e-Government usage when measured as a percentage of Internet usage exhibits a downward tendency. More specifically, e-Government exhibits a decline of - 4.3 percentage points in the general population of internet users in a six-year period, while e-Commerce rises by +5.8 perc. points over the same period (2005-2010).

However, a more detailed analysis shows that different European countries have different adoption patterns while the aforementioned decline is observed only in a number of countries. Therefore, the dynamic nature of e-Government requires a different approach that is not static and presents e-Government acceptance by the general population as an on-going process. The

1) http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=ISOC_EC_IBUY and

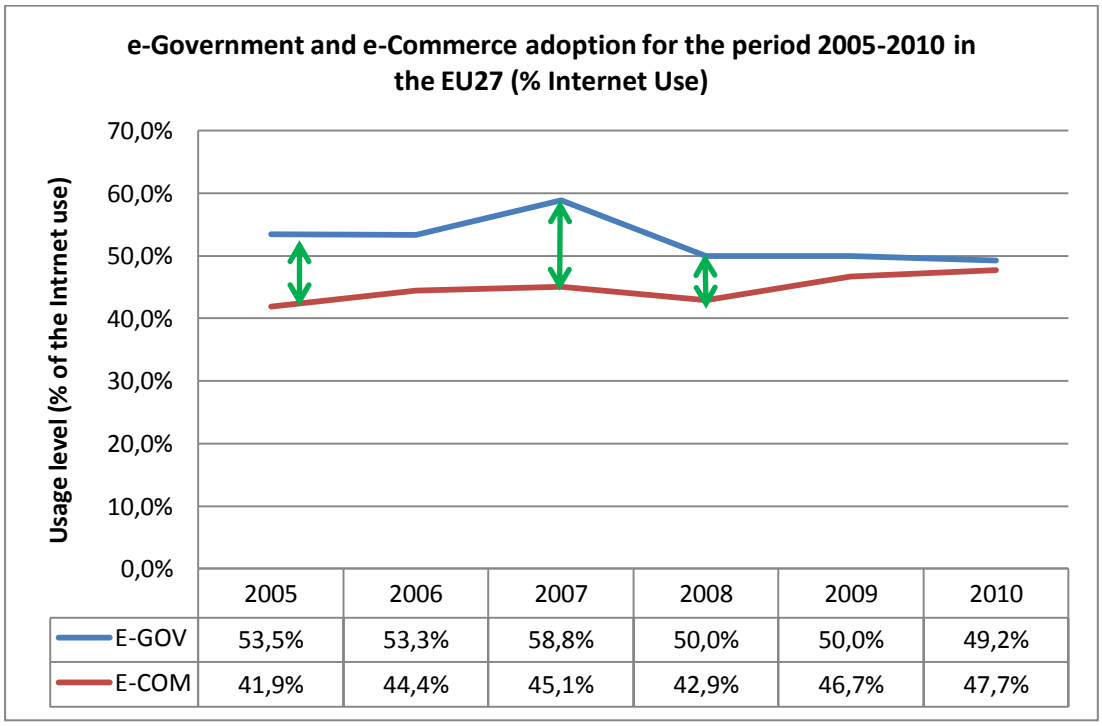
3) http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/main_tables

[2] The term 'Western' does not denotes solely the geographical position but also the cultural and economic background. For this reason Austria is classified as Western European although is not located in the West.

absence of longitudinal and comparative studies in the EU however shows that mapping, first of all, the progress in Europe is imperative in order to understand the evolution of the phenomenon. Thus, a main challenge in the study of e-Government adoption levels is that the observed fluctuation cannot be described with any of the existing research models as they do not take into account over-time variation while they focus almost exclusively at the individual level. As such, they only have quite limited analytical value when it comes to longitudinal, trans-national studies.

The following graph shows that e-Commerce, when controlling for Internet connectivity, has an almost linear growth over time while e-Government usage rates exhibit greater fluctuation. To explain the observed decline, we cannot suppose that the quality of the services declines or that there are less services offered over time. Instead, a factor (or more) that may also fluctuate over time can account for the observed variation.

Figure 2. e-Government and e-Commerce usage growth in the EU-27 (2005-2010)



	2005	2006	2007	2008	2009	2010
E-GOV	53,5%	53,3%	58,8%	50,0%	50,0%	49,2%
E-COM	41,9%	44,4%	45,1%	42,9%	46,7%	47,7%

Source: Eurostat 2011

The above summary of the adoption rates shows that e-Government usage (as a percentage of the Internet usage) in the EU-27 has a downward tendency. In more detail, e-Government users in 2010 are only a 49.2% of the total of Internet users, while in 2005 was 53.5%. The most significant drop was observed in 2008, where in Germany the usage levels of e-Government dropped by 23% (from 43% in 2007 to 33% in 2008 following a drop of about 10 percentage units) and the United Kingdom where a drop of 16% was observed (from 38% in 2007 to 32% in 2008) (Eurostat, 2011).

This trend has been generally overlooked by the existing literature while none of the existing research models can describe such trend. From the proposed factors in e-Government adoption literature only trust in Government may exhibit such over-time fluctuation that may slow down e-Government adoption. However, this explanation is also dubious as, although some empirical studies support this explanation, some others disprove it. Hence, the primary

research problem when trying to identifying the possible causes of such fluctuation is to build a research model which can describe and predict such over-time vaiation.

In short, this study aims at identifying the research challenges when analyzing the gap between different technologies in the EU. The most widely used approach for this kind of research questions is to utilize e-Commerce theories and methodologies to analyze e-Government. It seems, however, that the two technologies are not influenced by the same factors, and thus the utilization of e-Commerce research models to explain e-Government is a sub-optimal (if not incorrect) research methodology. Nonetheless, in practice, most empirical e-Government studies use research models developed in e-Commerce literature. By doing so, they fail to take into account the additional factors which produce the observed differences between the two technologies.

3. What influences e-Government adoption?

E-Government acceptance factors have become the object of various studies as the literature is slowly moving from the supply-side to the demand-side. Thus, while at its early years e-Government research was more focused on availability issues, systems architecture, software development and infrastructure, it turns now to less technical issues and it focuses more on the final technology recipients and their needs. Also, the over-optimism that initially surrounded e-Government has been now put under question and this leads to a need to re-define the purpose and the expectations from technology – this time including also citizens in the debate. *Why citizens use or do not use e-Government services?* What affects their intention to engage or not in e-Government? Why are they often reluctant and what are the underlying factors behind this attitude? Is it all purely a matter of design or there are more fundamental reasons for such scepticism?

Some parts of these questions have been answered, while some others remain still unanswered. A number of factors have been identified in the literature that leads to one or another explanation. However, none of the existing explanations provides definite answers as the empirical investigation produces mixed and sometimes contradictory results. In general, the existing explanatory variables are summarised in service quality, Internet access, environment of innovation, privacy concerns, risk perceptions and trust. In some exceptional cases other explanations have also been given. These include the regulatory framework, cultural characteristics and number of offered services. Nonetheless, there are cases where most of the aforementioned conditions are satisfied but e-Government acceptance levels remain surprisingly low - even for the e-Government forerunners. Why do the usage levels of the on-line tax filling and payments systems in the United States and Taiwan – two of the most advanced countries in e-Government technology – remain as low as 20% - 22% of the total of tax-payers the last few years? (Hung et al. 2006). Why, some advanced European countries such as the United Kingdom and Germany exhibit similar adoption patterns with high levels of digitally ‘reluctant’ citizens?

It is evident that some factors remain unexplored or under-explored and a part is missing from the research puzzle to connect the seemingly unrelated aspects of the question. Utilising static, individual level, research models to explain dynamic longitudinal phenomena can lead to inconclusive results. Individuals do not only have ‘rational’ motives as they are often influenced in their decisions by the cultural and institutional environment in which they live. Hence, research in e-Government acceptance cannot be complete without taking into account the broader political and institutional environment in which technology is developed and diffused.

The following section gathers together the different approaches in literature and examines some of the most possible explanations. The criteria according to which the reviewed studies have been classified are, first, the theoretical approach and the explanatory variables used to predict or explain e-Government adoption and second the empirical investigation of the phenomenon. There is a growing body of literature suggesting that Trust of the Internet (TOI) and Trust of the Government (TOG) has a decisive role in e-Government acceptance. Nonetheless, some studies disprove this hypothesis and this makes the trust hypothesis dubious. For this reason, special attention is paid at the trust literature, while at the final section of paper an alternative theoretical approach is discussed.

4. Theoretical Approaches and Empirical Studies of e-Government adoption

E-Government diffusion and adoption has become the subject of various studies which aim to explore and specify the factors which contribute to successful e-Government adoption by citizens. Among them, there are some studies which focus, not only to the traditional technology adoption factors, but also to the factors behind the "*digitally reluctant"* citizens. Digitally reluctant are those citizens who have the material resources and the knowledge to use ICT but they choose not to due to a lack of motivation, confidence and/or trust (Codagnone & Osimo, 2009). This category of *self-excluded* citizens seems to be the key for explaining the differences between countries which are technologically advanced but e-Government usage remains relatively low (or lower than the expected levels).

The first finding of the literature review is that there is an incomplete definition of e-Government adoption. In most studies it is not clear if the term *e*-Government *adoption* refers to the citizens who repeatedly use e-services, to the citizens who are willing to use e-services or to the citizens who occasionally use e-services. Such distinction between the individual characteristics which raise a higher probability of adopting e-Government and the behavioural intention to use e-Government is necessary in order to classify the existing approaches to the question. So, depending on the 'lenses' through which technology is viewed, some studies may focus on:
(a) the characteristics of the citizens who are already users (Reddick, 2005; West, 2004; Akman et al. 2005; Foteinou, 2010) or
(b) the availability of e-services and the service characteristics which increase users' satisfaction (Barnes & Vidgen, 2006; Choundrie et al., 2005; Gilbert & Balestrini, 2004), or
(c) the initial intention to use e-Government services (Carter & Belanger, 2008; Warkentin et al. 2002; Horst et al., 2007).
Therefore, some studies focus on more technical aspects such as digital infrastructure or quality/availability of services, while others focus on the citizens' subjective norms and perceptions which affect the intention to use e-services.

A second finding of the literature review is that most empirical studies focus on the individual level and tend to underestimate environmental factors. However, people in different countries adopt technology in different ways and for different reasons related to their subjective perceptions and norms. Trying to identify patterns of adoption non-related to a specific cultural and institutional environment poses serious challenges, especially in view of the lack of transnational and longitudinal studies. Moreover, analysing e-Government as a value-neutral technology that does not affect and is not affected by the environment in which is developed and deployed creates questions about the epistemological perspective which is adopted. Apart from a few studies which clearly mention that a rational actors approach is

adopted, the rest do not specify how technology is viewed in their analysis. Another characteristic of e-Government research is that most of the empirical studies use models and methodologies drawn from e-Commerce literature and they analyse e-Government as if they had exactly the same determinants.

However, Jane Fountain (2001) argues that studies that focus on the individual level are inconclusive and contradictory and they compare different and non-comparable technologies as if they were similar (Fountain, 2001: p.89). As a result, most of the existing studies focus on technology in isolation without assessing environmental factors or the vast differences in governments.[3] Subsequently, research captures only some aspects of the problem, following quite often a data-driven approach. However, individual level studies alone cannot offer generalizable results as they quite often ignore the broader picture, while the lack of theories specific to e-Government contributes a lot to this partial consideration of the research problem. In contrast, this paper compares critically the adoption levels of both e-Government and e-Commerce aiming at showing that these two technologies do not have the same determinants and thus a different approach is required.

5. Theoretical Approaches

Two approaches are predominant in e-Government adoption literature: the first is based on the Technology Acceptance Model (TAM) and the second refers to the on-line trust literature while some studies use a combination of the two (Carter, 2008). There are also studies which adopt different theoretical models either in combination with the aforementioned models or by utilising completely different research approaches. The most frequently cited are the theory of reasoned action (TRA), the Diffusion of Innovation theory (DOI), the motivational model and the theory of planned behaviour (Carter, 2010). With the only exception of Diffusion of Innovation theory, all the other approaches adopt a rational actors perspective and they analyse technology acceptance exclusively at the individual level.

Nonetheless, there are some studies which examine e-Government adoption at the national level by utilising the aforementioned models or by using descriptive and exploratory research methodologies. However, utilising individual-level variables to explain country-level phenomena can be quite misleading as they ignore the broader image and the national differences. At this point, it is useful to classify the theoretical models in rational actors approaches and institutional or other approaches. In the following tables the main theoretical approaches and the most cited empirical studies in each category are presented.

[3]Heeks R. and Bailur S. (2007), 'Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice', Government Information Quarterly, Vol. 24, pp. 243-265

Table 1. Main Theoretical Approaches in e-Government Adoption Literature

Theoretical framework	Studies Based on the Framework	Explanatory variables
Technology Acceptance Model (TAM)	Davis (1989), Carter & Belanger (2005 & 2008), Dimitrova & Chen (2006), Gilbert et al. (2004), Horst et al. (2007), Warkentin et al. (2001), Wang (2003), Wu & Chen (2005)	Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Previous Positive Experience, Perceived Credibility
Computer self-Efficacy	AlAwadhi & Morris (2008), Warkentin et al. (2001), Wangpipatwong et al. (2008)	Computer self-efficacy, TOG, PU, PEOU, Perceived Risk, Cultural Characteristics which affect Uncertainty avoidance, effective interaction over the net
Theory of Planned Behaviour	Warkentin et al. (2002), Horst et al. (2007), Hung et al. (2006), Kanat & Özkan (2009), Gilbert and Balestrini (2004), Wu & Chen (2005)	Risk & UncertaintyAvoidance, PU, PEOU, effective interaction over the net
Trust literature	Carter & Belanger (2005), Belanger & Carter (2008), Reddick (2005), West (2004), Riedl (2004), Warkentin et al. (2002)	Trust of the actor providing the service, General Predisposition to trust, Social Demographics (gender, education etc.), Party Affiliation, Cultural factors, Risk perceptions
Diffusion of Innovation Theory	Roger (1983), Fu et al. (2006), Schaupp & Carter (2005), Carter & Belanger (2005)	Time, Environment of Innovation
Motivational Model	Kumar et al (2007)	User Characteristics, Satisfaction, Web-site Design, Perceived Control over the process, Perceived Usefulness, User Expectations
Data-driven studies	Bavec & Vintar (2006), Boyer-Wright & Kottemann (2008),	Economic Development, Innovation, Internet Connectivity, National Performance Indicators

The literature review shows that too few studies use approaches other than those of rational actors perspectives. The few studies that examine e-Government acceptance at the national level are mostly data-driven and thus they lack a strong causal explanation.

It is common ground in e-Government literature that the lack of well-developed theories makes the analysis of acceptance or the impact of e-Government quite problematic as it usually leads in low-quality and often ungrounded generalisations (Heeks and Bailure, 2007). From the proposed theoretical approaches in e-Government literature, neo-institutionalism seems to be the most promising as it may capture the impact of institutional factors and path-dependencies very well (Fountain 2001; Yang 2003; Heeks & Bailur, 2007; Yildiz (2007)).

The following section examines an institutional approach to e-Government acceptance which puts the trust literature in a broader theoretical framework of technology acceptance.

6. An Institutional Approach in e-Government Adoption

6.1. Defining e-Government acceptance and adoption

Most of the previous e-Government adoption studies do not clearly define what is adoption. Two of the most influential authors in e-Government adoption, Carter and Belanger (2005) associate adoption with the intent to use, while Warkentin et al. (2002) consider acceptance as the initial intention of the citizens to engage to e-Government regardless of the purpose of use. Also, Gilbert and Balestrini (2004), measure it as intention to engage to e-Government. Thus, it seems that adoption is associated with the intention to use. However, it seems that, in general, the existing studies do not take into account the purpose of e-Government use (to obtain information, to download forms, to make on-line transactions etc.). Yet, e-Government adoption is a multidimensional concept as not only the purpose but also the frequency has a role; using a service once a year is not the same as frequent use. Therefore, how 'loyal' the users are and how far they are willing to go may lead to a different definition of acceptance. If, for example, the use of e-Government is legally binding has also a role in defining 'acceptance'.

Another question when defining adoption is the e-Government stage. Reddick (2005) distinguish two phases in e-Government adoption: The first is the information dissemination phase where the citizens use e-Government systems to obtain information about services, political issues etc. while the second is the transaction-based e-Government. According to Reddick, both phases are closely intertwined with the street level bureaucracy and he examines trust as an important element of e-Government adoption.

6.2.Re-conceptualising and operationalizing an under-specified term: Trust in Government

The literature review shows that researchers define trust in many different ways and this creates measurement problems; not all models measure the same thing or refer to the same thing. Thus, *'What is trust?'* is a rather important question in any research that aspires to clarify the role of trust in e-Government acceptance. However, most authors – if not all – do not adopt a definition of the term drawn from political science and instead they use general definitions drawn from sociology or psychology that mostly refer to interpersonal trust. This paper adopts an institutional perspective on the role of trust and thus it utilises trust as an endogenous factor which is influenced by institutional performance.

However, in order to define trust of the government (TOG) we need to define, first, *what government is* – or, better yet, *what citizens think government is* – and what the meaning of *'trust'* is for citizens. When examining citizens' responses to the question *'What is government?'* are likely to vary considerably; they may answer the governing political party, the public administration, the health system, the city council, the state government etc. The concept of trust has also many implications, as trust implies a level of uncertainty; but, uncertainty about what? Not all people across Europe face the same risks. Actually, citizens in different countries face different uncertainties and thus they have different expectations from their governments. So, in some countries trust in government may depend on a lack of

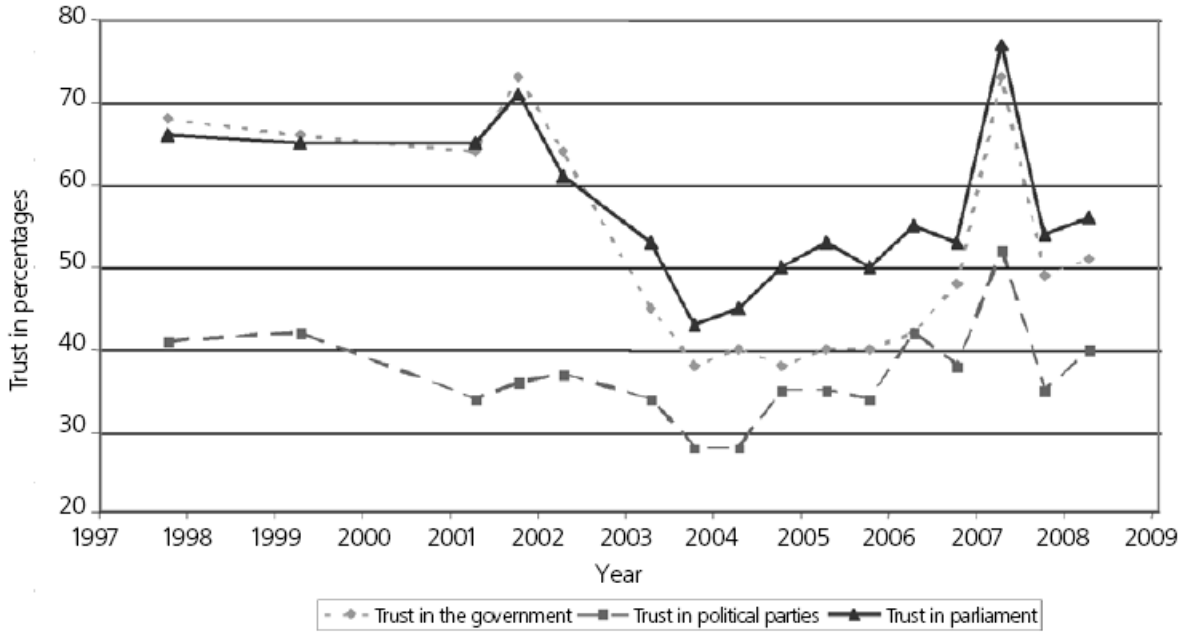
corruption, or may be perceived as satisfaction with democracy, competence of the government, efficiency and so on. Hence, trust does not have the same meaning for all Europeans and it actually depends on the different expectations citizens have from their governments. Therefore, trust does not solely depend on the actual performance or responsiveness of the government but also on the citizens' expectations and, thus, it inevitably entails a degree of subjectivity that need to be dealt with.

6.3.Operationalisation of the term

Christensen and Laegreid (2003) showed that trust does not necessarily depend on citizens' practical experiences with any specific administrative units, but instead that their trust in government is of a general nature. In fact, there is a strong correlation between trust in the different institutions as high levels of trust in one institution correlate with high levels of trust in other institutions. The authors acknowledge the fact that trust is a multi-dimensional concept and there is no one-factor explanation for the variation of citizens' trust in government. They conclude, however, that the best predictor of citizens' trust in government is the regime's performance and the level of satisfaction towards democracy. This is in accordance with the research findings by Mishler and Rose (2001) who empirically examined institutional trust in Central and Eastern Europe exploring several dimensions of trust including trust in the parliament, the courts, the police etc. The authors conclude that in this group of countries perceptions of factors such as economic performance and corruption have a significant impact. In contrast they found that socio-economic variables are not good predictors of trust .

Another research study in the Netherlands by Hendriks (2009) confirms these research results, as the correlation between the levels of trust in different institutions is evident . Figure 3 shows Hendriks' findings.

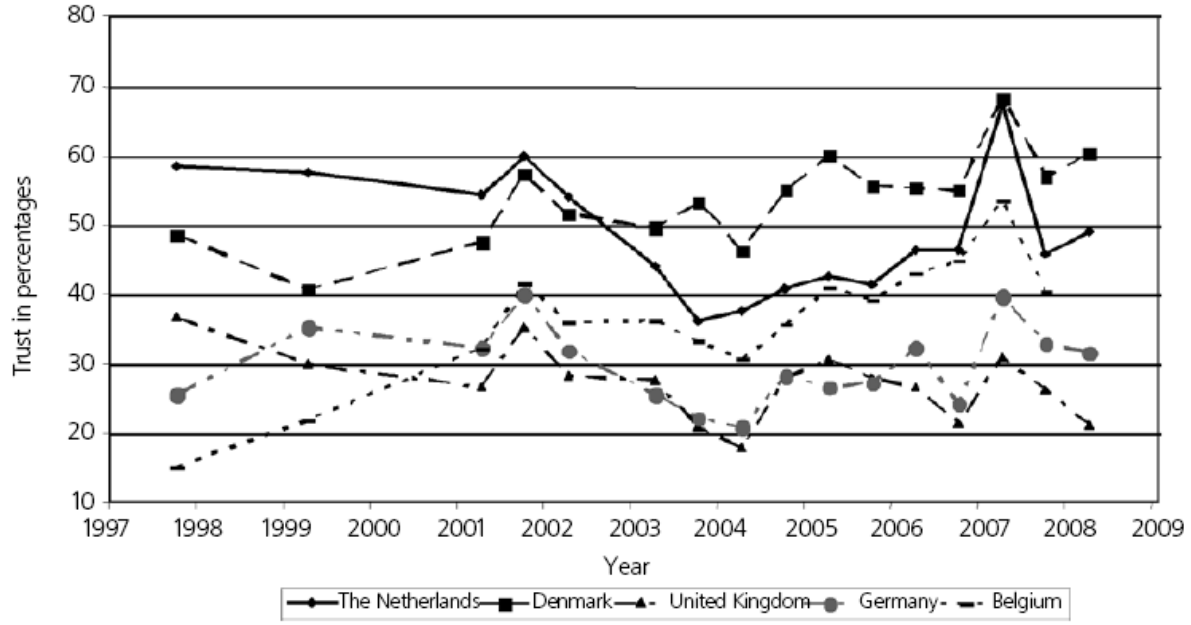
Figure 3. Trust in different political Institutions in the Netherlands (Results by Hendriks, 2009)



Source: Eurobarometer 2010

Moreover, this research demonstrates co-variance of the levels of trust between European countries and the general trends around Europe. As such, among a number of possible approaches to trust, a macro-performance approach is the most appropriate as it seems that Europeans are strongly influenced by common factors (see Figure 3) and it can also best explain the synchronous fluctuation in a number of different countries.

Figure 4. Trust in political institutions in five European countries (Hendriks, 2009)



Source: Eurobarometer

The macro-performance approach leaves aside the individuals' risk perceptions and instead focuses on the governments' performance and the level of satisfaction with democracy. It is based on the idea that citizens have clear expectations and there is a general consensus of what tasks should be performed by their government. It refers to the issues that are considered as important (and not as secondary tasks of the government) by the majority of the population; for example, economic growth, social security, unemployment etc. (Bouckaert et al., 2002; Citrin & Green, 1996). It also takes into account previous experiences with public administration that lead citizens to form opinions about the performance and responsiveness of their governments. The trust variable has been repeatedly measured in Standard Eurobarometers through the question: *"I would like to ask you a question about how much trust you have in the (NATIONALITY) Government? Please tell me if you tend to trust it or tend not to trust it."*

6.4.Theoretical Lenses: a Neo-Institutional Approach

In recent years, there has been an increasing interest on how technology can transform government or how technology may influence political regimes. On the other hand, there is the view that technology in the public sector is only the means to an end and not a driving force for change. However, the view of technology as an objective, external force, overlooks the role of human actors and implies that technology will inevitably improve the way a government operates. At the same time, there is a large volume of recent studies emphasising the social characteristics of technology and how social structures shape technology through

strategic choice and social action. Quite often, e-Government literature seems divided between technological determinism and social constructivism. Between the two extremes, however, there are many approaches which manage to reconcile these two different views of technology. This paper supports the view that technology and institutional and political structures are not independent and their interaction affects the technology adoption patterns. Therefore, in this study a neo-institutional perspective is adopted. Although there are no complete theories in e-Government, Fountain's (2001) Technology Enactment Framework and Orlikowsky's (2000) Structurational Model of Technology can contribute much in our understanding of e-Government adoption in specific institutional environments.

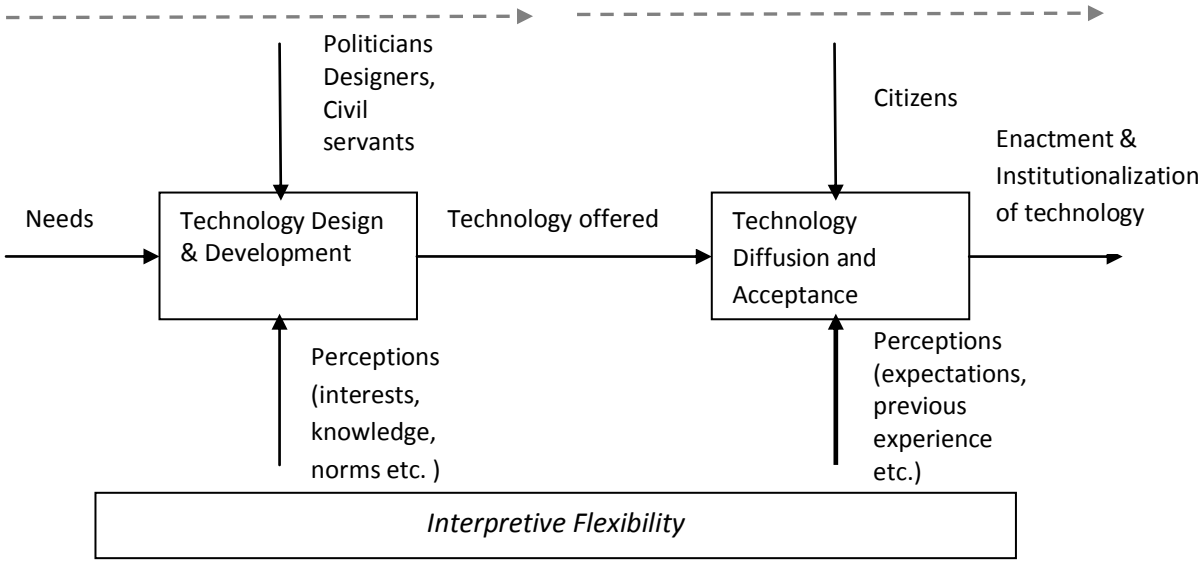
The review of the literature shows that technical, economic and cultural factors are not enough to explain e-Government adoption and thus the assumption that technology and institutions interact is quite strong. However, there is no coherent theoretical framework to produce testable hypotheses and thus most studies utilise research models borrowed from e-Commerce literature. However, utilising the same or similar research models to explain phenomena which follow different trajectories is not a correct research strategy. This paper adopts the view that perceiving e-Government technologies as both social and physical artefacts is quite useful in explaining how technology and institutions affect each other in various ways. Both theoretical approaches put emphasis in the dual nature of technology while they stress the separation of embedded and objective technology. Technology is physical and objective in the sense that is designed to meet engineering requirements and to reflect assumptions on how technology should be applied in the everyday business of public administration. Synchronously, technology is social in the sense that has embedded rules and structures which reflect norms of the institutional and social environment in which its use is nested. Thus, technology is not objective – although it has objective characteristics – and it can be viewed differently from different actors.

Orlikowsky (2000) at the Structurational Model of Technology identifies two stages in technology development and adoption: the first is where politicians, designers, civil servants etc. design and develop technology according to their knowledge, interests and norms, while the second is where users enact technology if it is in accordance with their perceptions and interests. Technology has some objective characteristics (functionality, response times, capacity etc.) but each of these groups of actors perceive technology in subjective ways. If the these actors repeatedly use technology in the way technology has been designed to be used, then this technology is 'routinised' and becomes part of the everyday way of interacting. If this process lasts for long, then technology starts affecting social structures because it gradually becomes part of the structure and thus it is difficult not to comply with these technology-mediated processes; it is institutionalised. In this last stage, if successful, we can start talking about a 'soft' type of technological determinism; technology then 'embodies' structures which (re)present various social rules and political interests and starts affecting the social structure in which its use is embedded.

However, things are not so evident because of the flexibility of the perceptions about technology. The same system can be understood and used by different actors in vastly different ways. This is the way of the 'users' to affect technology and to agree or disagree with the interests, purposes and institutional context which is embodied in technology. After a trial period, technology will be adopted, re-designed, abandoned or replaced following a technology life-cycle. Depending on the level of acceptance, technology will gradually be legitimised and institutionalised. However, things become more complicated if we look at different systems. Two e-Government systems may have exactly the same functionality – for example, they may be designed to facilitate an electronic tax declaration – but there is a

plethora of ways to design such system (even if the final output is exactly the same). The design of an e-Government system may take a number of different forms, not only because engineers have different views, but also because the legislation and norms which are embedded in each system differ in different countries. When individuals use the system, then, they unconsciously and repeatedly enact a set of rules and norms that are embedded in the specific system. From this point of view, the role of users is crucial as "structures are not located in organizations or in technology, but are enacted by users". Figure 4 shows how technology is adopted and institutionalised according to Orlikowsky:

Figure 4. The Structurational Model of Technology



But what are the determining factors behind e-Government acceptance? Fountain (2001) gives us some theoretical insights when she states that individuals are inclined to enact new technology: *"to reproduce existing rules, routines, norms, and power relations if institutional rules are clear and no salient alternative uses are visible in the environment"*. Therefore, in addition to the 'traditional' technology adoption factors (i.e. usability issues, infrastructure), Fountain explains that in e-Government institutional variables have also a role and she focuses at the norms and rules which are embedded in technology. This implies that when individuals do not trust the specific institutional context in which technology is embedded then they do not 'enact' technology by not using it. They avoid in this way the institutionalization of technology, and thus the subsequent acceptance of the rules and control mechanisms which are embodied in it. This process, although not conscious most times, offers some understanding of why trust in government may have a decisive role in e-Government adoption.

Castells (1996), however, in his seminal work, argues that the impact of e-Government stretches far beyond the limited scope of public administration and public policy as technological developments lead in new forms of political interaction. The EU has set relevant policies and guidelines to address the issues arising from the adoption of ICT's in the public sector and to ensure elimination of digital divides. The goal is to address the

challenges of developing sufficient ICT infrastructure, services and skills while stimulating the economy and preventing digital exclusion of citizens. However, in some countries it is observed a paradoxical phenomenon where intense focus on government service delivery widens the gap between citizens and public administration. Fountain (2001) argues that this happens because governments are involved in complex political processes and cannot be seen by the citizens only as agents offering services. Defining the governments as production companies and treating citizens as consumers ignore the inherent political character of the public sector and eventually leads to greater scepticism by the citizens. According to Fountain, by overlooking the notions of good governance and citizenship and focusing only on service delivery may lead in growing distrust instead of building trust.

7. Conclusions

This paper stresses the inherent weaknesses of the existing e-Government research methodologies in the study of e-Government adoption. What this paper shows is that when examining the over-time variation of e-Government usage levels we observe an unexplained variation across Europe. This variation cannot be described by the existing research models as the focus on the individual level takes only a snap-shot of e-Government usage and ignores the dynamic nature of technology adoption. Thus, the existing 'static' research models fail to take into account the macro-level factors which affect adoption and they lead in inconclusive research findings.

This study explores an alternative theoretical approach based on institutional theory that can offer some theoretical insights on the reasons which lead on growing scepticism on the part of citizens. Institutionalism has been supported by many authors as the most promising theoretical approach in e-Government research. However, the inability to extract testable hypotheses has discouraged many researchers from utilising institutionalism in empirical research. This paper shows that an institutional approach is consistent with the pre-dominant trust literature but offers the additional advantage of exploring e-Government adoption within an institutional framework, instead of exploring trust as a single factor. The only modification needed is to re-define trust not as interpersonal trust but as institutional trust that is more relevant to political phenomena. This definition of trust, unlike the existing approaches, measures trust not in specific public agents offering services, but in the government as a whole. Thus, it identifies government not as agents offering services but as political entities that form people's views and perceptions.

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