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Understanding the e-government paradox: Learning from literature and practice on barriers to adoption

Alberto Savoldelli [a], Cristiano Codagnone [b], Gianluca Misuraca [c,*]

[a] Via Piolti de Bianchi, 48, Milan, Italy
[b] Università degli studi di Milano, Via Conservatorio, 7, Milan, Italy
[c] European Commission, JRC-IPTS, C/Inca Garcilaso, 3, Seville, Spain

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ABSTRACT

We have identified a paradox in the still low adoption of e-government after more than two decades of policy efforts and public investments for the deployment of online public services. Using as evidence the focus and evolution of this focus over the period 1994–2013 in a vast body of literature produced by academia, international organisations and practitioners, we show that: a) the deployment of e-government was for a long time concentrated on more technological and operational matters and that only more recently attention switched to broadly defined institutional and political issues (hypothesis 1a); and b) institutional and political barriers are one of the main factors explaining lack of e-government adoption (hypothesis 1b). A decision making process that is still unstructured, untrustworthy, and not fully leveraging the available evidence hinder the perception of public value and citizens' trust in government, which contribute to low level of e-government adoption. We conclude suggesting that a smart government producing public value is grounded in a triangle of good decision defined by politics, values, and evidence and that to achieve it public sector should go beyond the traditional concept of service innovation. It should rather introduce conceptual and systemic innovation pertaining to a new way of thinking and of interacting with stakeholders and citizens as sources of both legitimacy and evidence.

1. Introduction

In the past 30 years the public sector in most part of the world and in Europe in particular has been shaken by various intellectual and political waves of (attempted) innovation and reform going under different names (Muccio & Mauri, 2012): 'New Public Management' (Dunleavy & Hood, 1994), 'Public Value Management' (O'Flynn, 2007), 'Reinventing Government' (Osborne & Gaebler, 1993), New Governance (Osborne, 2006; Rhodes, 1996). In the mid-1990s anchoring expectation of changes to Information and Communication Technology (ICT) represented the last of these waves (Misuraca, Codagnone, & Rossel, 2013). Following the new EU2020 strategy emphasis on being 'smart', the new drive for 2010–2015 is framed as harnessing ICT to promote smarter, sustainable, and innovative government (European Commission, 2010a). This focus on innovation in the public sector is more than normal given the sheer size of public value for which governments account for in Europe (Bauby & Similie, 2010). The focus on changes and innovation in the public sector to maximise public value rests on wider and more important function assigned to the public actor than what orthodox neoclassic economics and even the now declined New Public Management would concede. The public sector can be an innovator in many ways, not simply in the final production/provision of services and policies, but also in the way it conceptualises and designs them and in the kind of interaction it entertains with stakeholders, and external sources of knowledge (Windrum, 2008). Innovation can lead to the production of new public value, that is 'value created by government through services, law regulations and other actions' (Kelly, Mulgan, & Muers, 2002). The introduction of ICT in the public sector is a key strategy to achieve many of the different facets of public value by innovating both upstream (in the definition of policies and design of services) and downstream in their production and final provision.

A large body of inter-disciplinary literature (scientific, institutional, and practitioners generated) has accumulated on the topic and has been critically reviewed (Dwivedi, 2009; Gupta & Jana, 2003; Hassan, Shehab, & Peppard, 2011; Heeks, 2006; Kolsker & Lee-Kelley, 2008; Lofstedt, 2005; Norris, 2006; OECD, 2007, 2009; Osborne, 1993; Pratchett et al., 2009; Rana, Dwiyedi, & Williams, 2013; Reddick, 2004; Titah & Barki, 2005; UN-DESA, 2003, 2010; Wang & Wan Wart, 2007;

* Corresponding author.
E-mail addresses: savoldellia@gmail.com (A. Savoldelli), cristiano.codagnone@unimi.it (C. Codagnone), gianluca.misuraca@ec.europa.eu (G. Misuraca).

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Yildiz, 2007). As yet, however, there is still limited evidence that the expected promises have been achieved and e-government's potential remains hypothetical (Dawes, 2008; Misuraca & Rossel, 2011; Misuraca et al., 2013).

If we consider only e-government, defined as 'the process of innovation of public administration in order to achieve innovative forms of government and governance through the use of ICTs' (OECD, 2003), two decades of investments and no evidence on impacts justify the use of the expression 'e-government paradox' (Bertot & Jaeger, 2008; Castelnovo, 2010; Misuraca, Savoldelli, & Codagnone, 2014).

In the case of e-government, it seems, the paradox cannot be attributed, as was done when the 'IT paradox' was discussed for the private sector between the late 1980s and early 1990s (see review in Misuraca et al., 2013) to measurement errors or lag time. In fact, since ICT is a General Purpose Technology (GPT), it cannot produce anything unless complementary changes take place. The classical complementarity discussed in the literature on firms is 're-organisation' and this is naturally valid also for e-government. Yet, in the latter case, there is a much more important and decisive complementarity: take up on the side of citizens, businesses, and also public sector employees themselves (for internal applications, or for cross-government services aimed at seamless delivery through inter-institutional collaboration). If available online services are not used, there will be no files and transactions handled electronically and, hence, no full-time equivalent and/or dematerialisation gains.

In this respect it is easy to skim through the last two reports on the 2012 benchmarking of e-government services offering and of their usage in Europe (Capgemini et al., 2012a,b) and see a clear gap between the supply of services (where most countries reach 75% and above of the index used) and their usage (where the index of adoption is below 30%). A statistical analysis using earlier data available until 2009 found that there is no statistically significant correlation between the level of supply of e-government services and the level of usage (Fernández-i-Marín, 2011).

While in the public context the terminology may sound inappropriate, for simplicity we can say the offering of the supply side is not capable to understand, capture, and meet the 'values' sought by the demand, where we define values as representing both higher level ones (a trustable government) and lower and more concrete ones (saving time, finding what one is looking for, having quick responses, etc.). It is almost self-explanatory that if adoption does not reach significant levels, then the financial resources invested in e-government simply creates a stratification of costs (one additional channel is introduced that does not replace traditional ones) and no benefits, either internal or external will accrue.

Our claim in this article is that for a long time e-government deployment has focussed mostly on technological and operational issues, disregarding those aspects (of a more institutional and political character) that might favour adoption. More specifically we advance two related hypotheses:

H1a. The deployment of e-government has been for quite some time concentrated on more technological and operational matters and only more recently attention switched to broadly defined institutional and political issues.

H1b. Institutional and political barriers are one of the main factors explaining lack of e-government adoption.

We tested these two hypotheses by using as empirical evidence the focus and evolution of this focus over the period 1994–2013 in a vast body of literature produced by academia, international organisations, and practitioners. In particular we look diachronically and synchronically at which types of e-government barriers have been mostly addressed in such literature in different periods over the course of almost two decades going from 1994 until today.

In Section 2, we illustrate the method and conceptualisation used for the analysis of the literature, in Section 3 we report the findings, in Section 4 we discuss them with respect to our two hypotheses, and in Section 5 we present our main conclusions and suggestions on the new focus for public sector innovation research and practice, that aims at enhancing smarter governments and public value production.

2. Method and conceptualisation

The systematic and diachronic account of e-government adoption barriers we present is based on a bibliometric analysis covering different types of sources (conference proceedings, journals articles, scientific databases, research notes, policy reports, etc.) for the period early 1990–2013. In our approach we followed the criteria suggested to ensure consistency, exhaustiveness, and stability of findings (Frandsen & Nicolaisen, 2008; Gil-Garcia & Pardo, 2006; Rhoda, 2013). Clearly, we are using a second order type of empirical evidence and assume that the work produced by scholars, policy makers, and practitioners is a valid and reliable proxy of the socio-political and economic processes defining in practice the deployment of e-government.

2.1. The sources of the analysis

The first sources used were *Google Scholar*© and the advanced *Google Search engine*. The data was gathered using years (1990–2013) and key words such as: 'e-government', 'electronic government', 'on line government', 'e-government barriers', 'adoption', 'acceptance' 'diffusion', 'impact', 'implementation', 'trust', 'public value', 'participation', 'security', 'privacy', 'policy making', 'usage/use', 'challenges', and 'opportunity'. Next a similar search was performed to cross-reference the findings and extract relevant knowledge in selected scientific databases such as: SCOPUS© and the Journal Citation Report©. Finally, we systematically searched and analysed entries found in dedicated journals of e-government research such as: *Elsevier's Government Information Quarterly* (*GIQ*); *Emerald's Transforming Government Process, People and Policy* (*TGPPP*); *IGI's International Journal of Electronic Government Research* (*IJEGR*); *Inderscience's Electronic Government an International Journal* (*EGIJ*); *ACI's Electronic Journal of e-government* (*EJEG*); *IOS's Press' Information Polity* In this respect, we first applied a wider selection criterion and identified articles directly or indirectly touching upon e-government adoption and subsequently filtered them as to analyse only those strictly focussing on barriers and critical success factors. As a result we moved from an initial total of about 250 generally relevant articles to the final set of 60 articles whose analysis is presented in this article.

2.2. The dimensions of the analysis

From a synchronic perspective we identified the following three periods with respect to the key elements characterising the development of e-government: 1994–2004; 2005–2009; and 2010–2013. The different length of the three periods just mirrors the physiological evolutionary pathways with a much slower path in the first decade, where efforts went mostly to deployment of ICT infrastructures and awareness actions, and faster, later on, when the pathways were related to deployment and take-up of e-government services. It must be stressed, however, that whereas for the general conceptualisation and identification of barriers our analysis can be considered global, for the periodization our focus concerns mostly the context of the European Union. We should also note that inclusion of sources to one period or the other has been flexible, in that some scholars may have anticipated the changes occurring in the policy framing of a period but their contribution is considered as part of the latter.

Table 1
Sources of publication statistical distribution.

Sources of publication	n	%
Electronic Government, an International Journal	54	22%
Government Information Quarterly	43	17%
International Journal of Electronic Government Research	35	14%
Transforming Government: People, Process and Policy	31	13%
IFIP-EGOV	24	10%
Public Administration Review	12	5%
ICEGOV	11	4%
Hawaii International Conference on System Science	8	3%
International Journal of Information Management	6	2%
Public Administration Review	5	2%
International Journal of Public Information System	5	2%
Strategic Information Systems	4	1%
Business Process Management Journal	3	1%
Information Polity	3	1%
Journal of Global Information Management;	2	1%
International Journal of Public Sector Management;	2	1%
Total	248	100%

Following key contributions in the literature (Ebrahim & Irani, 2005; Kunstelj & Vintar, 2004; Luna-Reyes, Gil-Garcia, & Romero, 2012), we grouped the barriers along the following three main dimensions: a) technological–operational; b) managerial–organisational; and c) political–institutional.

2.3. Further hypotheses for the analysis

We limited the review of the literature to sources considering countries showing more mature levels of e-government deployment and that were in the forefront from the very beginning when the process started in 1994. In this way we can consider the three periods of analysis as a progressive evolution of e-government maturity (amongst the existing maturity models that have been developed we consider those of Andersen & Henrisken, 2006; Cursey & Norris, 2008; Esteves & Rhoda, 2008; Kunstelj & Vintar, 2009; Layne & Lee, 2001). Moreover it is widely recognised that the level of maturity of e-government is not independent from the broader level of maturity of the digital society (European Commission, 2010) within which e-government deployment and adoption are embedded (Kunstelj & Vintar, 2009; Misuraca et al., 2013). Therefore, the geographical limitation of our analysis is also preserving a certain level of homogeneity in time and context of the literature sources used.

3. Findings

Regarding the barriers to e-government adoption and looking at the three periods of analysis, the key findings are the following (see Appendix A for a detailed description and references to the sources):

- 1994–2004: this period starts with e-government being seen as a component of the 'reinventing government' (Osborne, 1993; Osborne & Gablear, 1993) movement, and at least for Europe ends with the first mid-term review of the Lisbon Strategy (Blanake & Lopez-Claros, 2004). In the Lisbon Strategy the promotion of ICT in all domains was a prominent role as a way to foster productivity, but the mid-term review highlighted that no progress was being made especially in public administrations (European Commission, 2004). This period started with optimistic views on the future performance of ICT and its potential impacts also globally, as testified by movement catalysed around the World Summit on Information Society (which took place in Geneva in 2003 and Tunis in 2005) and the launch of 'e-government for development' initiatives. In this context the key barriers to e-government adoption seemed to be lack of telecommunication infrastructures (UN-DESA, 2003) and their communication capacity (Layne & Lee, 2001) as key barriers. Both of which in turn have been associated to the lack of institutional support and standards (UN-DESA, 2003) as a source of 'political/institutional' barrier. The 7concept of "*trust in eServices usage by citizens*" was often associated with the concept of "security in transactions" and "trust in government in preserving personal data privacy, once the citizens provided them for using an eService" (Layne & Lee, 2001; Pavlou & Chai, 2002). 'Managerial/organisational' barriers were also discussed as important to overcome with particular reference to "shortage of ICT skills" in public administration (Moon, 2002), while UN-DESA (2003) sees as important barriers the

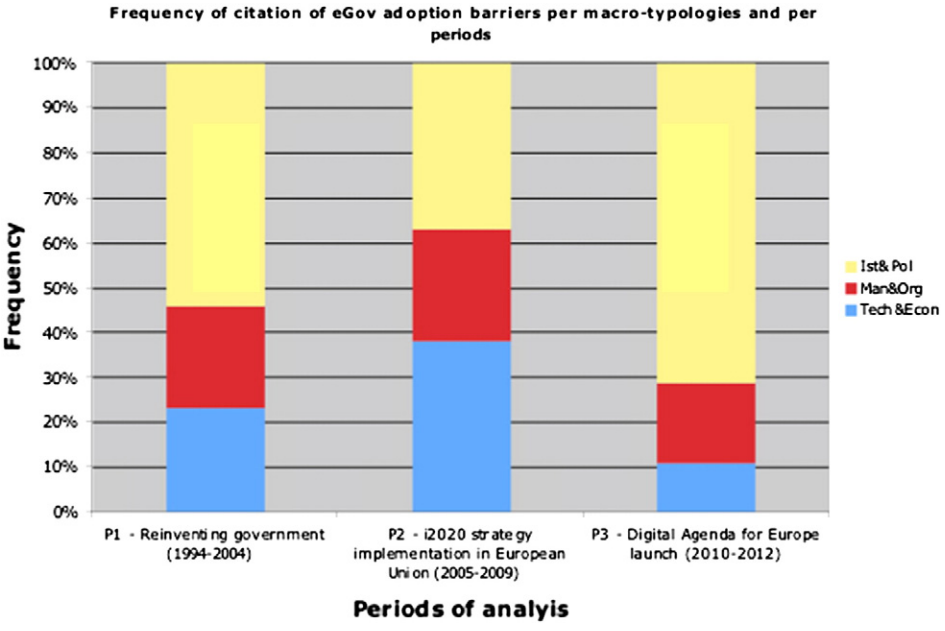

Fig. 1. Frequency of citation of e-government adoption barriers.

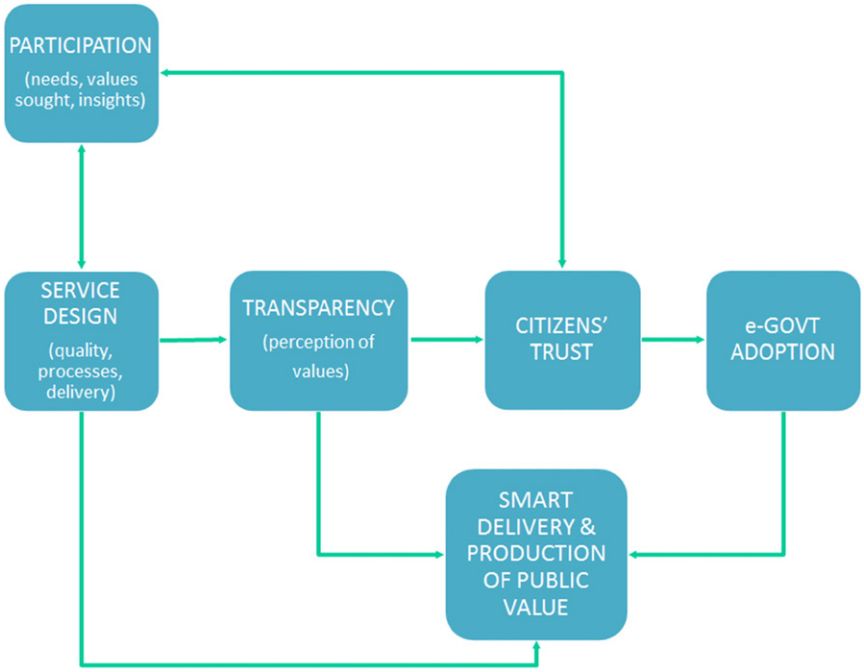

Fig. 2. Key drivers of e-government adoption and public value production.

"information mismanagement and reluctance to share information among departments".

- 2005–2009: This covers the timeframe of the i2010 strategy in the European Union (European Commission, 2005) and the post-WSIS implementation at a global scale. ICT infrastructural problems are still considered relevant and in particular operational costs and maintenance of e-government systems are seen as crucial obstacles (Ebrahim & Irani, 2005; Gil-Garcia & Pardo, 2005; Horst, Kuttschreuter, & Gutteling, 2007; Lofstedt, 2005; Modinis Study, 2006). Technological and operational barriers are still mentioned, and the most noteworthy are the "lack of integration across government systems", the "lack of knowledge regarding e-government interoperability", together with the "lack of citizens' trust about e-government services privacy and security". Lack of ICT skills in governmental organisation and lack of cooperation amongst departments together with resistance to change of the civil servants are also still mentioned (Gil-Garcia & Pardo, 2005; Lofstedt, 2005; Modinis Study, 2006; Norris & Moon, 2005; Pekka, 2010). During this period, however, the most important amongst the barriers affecting e-government adoption is recognised to be the lack of "evaluation and measurement of e-government services" (Heeks, 2006; Lofstedt, 2005), the "difficulties in establishing a firm connection between ICT innovation, benefits and outcomes" (Modinis Study, 2006; Titah & Barki, 2005) and the "digital divide" (Modinis Study, 2006). Even if still in embryonic terms, during this period analyses start to emerge on importance of the "lack of demand side involvement in the e-government decision-making process" (Heeks, 2006), the "lack of trust on government and on government reform" (Gil-Garcia & Pardo, 2005) and the "cost of the services for the users and their perception of

Table 2
e-Government adoption barriers frequency of citation in the selected papers.

	Typology of barriers	P1 — reinventing government (1994–2004)	P2 — i2020 strategy implementation in European Union (2005–2009)	P3 — Digital Agenda for Europe implementation (2010–2013)
Technological and economical	Lack of bandwidth capacity	2.4%	11.9%	
	Lack of interoperability		14.3%	9.5%
	Too high investment and maintenance costs	2.4%	7.1%	4.8%
	Lack of privacy and security	2.4%	31%	9.5%
	Lack of open sources software and standards			4.8%
Managerial and organisational	Lack of project management capabilities	2.4%	11.9%	
	Resistance to change	2.4%	11.9%	9.5%
	Lack of skills	2.4%	26.2%	33.3%
Institutional and political	Digital divide		1.5%	6.2%
	Lack of legal bases		1.5%	7.2%
	Lack of political commitment	1.5%	1.5%	
	Lack of political coordination	1.5%	4.6%	
	Lack of policy cycle management	4.6%	3.1%	12.3%
	Lack of measurement and evaluation	1.5%	7.7%	9.2%
	Lack of citizens participation		3.2%	13.8%
	Lack of trust and transparency	1.5%	6.2%	10.8%

Fig. 3. e-Government services adoption virtuous cycle.

benefits" (Lofstedt, 2005; Van Ryzin, 2006), together with the "lack of e-government policy framework that can be applied at local level" (Lofstedt, 2005; Norris & Moon, 2005).

- 2010–2013: this final period lasting up to today is incubated in 2009 during the Malmoe Ministerial Conference on e-government where the new drive of 'smarter and open' government is launched during the preparation leading to the new Digital Agenda for Europe (European Commission, 2010b) and, especially, the new eGovernment Action Plan (European Commission, 2010a). At European level earlier targets (i.e. efficiency and effectiveness, seamless cross border services) were restated and, under the label of smarter government, the importance of public sector innovation and of unachieved enabling regulatory and technical pre-conditions were also emphasised. In addition a somehow stronger (than in the past) emphasis was placed on citizens and businesses empowerment, transparency, and open and collaborative government. The new EU e-government Action Plan sets the ambitious target to have 50% of citizens and businesses use online public services by 2015. At global level (held at UN and OECD) this period sees also a broader debate on governance reforms. Within this context, the 'political/institutional' barriers have been increasingly singled out as the most important obstacle for the full take-up of e-government services, with particular reference to "lack of citizens' participation to the policy making process" and "lack of measurement system on e-government process performances and outcomes" (Besharov, Barabashev, Boehler, & Klerman, 2013; UN-DESA, 2010). According to the authors discussing them, these barriers have the side effects of producing a "lack of transparency and trust on political decisions" (Henningsson & Van Veenstra, 2010; Jain & Kesar, 2011), together with a "lack of trust and empowerment of the citizens" (Henningsson & Van Veenstra, 2010; UN-DESA, 2010). Several authors suggest a possible way for overcoming these barriers by both tackling the "lack of e-government policy framework that can be applied at local level" (Capgemini, 2010; Feeney & Welch, 2012) and the "lack of formal methods for supporting e-government decision-making process" (Henningsson & Van Veenstra, 2010; Mwangakala & Mvungi, 2011; Sarantis, Charabilidis, & Askounis, 2011). An initial attempt of analysing barriers related to the "lack of sustainability of e-government initiatives" was presented in Esteves and Rhoda (2008). At the same time 'technological/operational' barriers seem to assume less importance for the scientific community except for the "lack of open sources and open data standards" (Henningsson & Van Veenstra, 2010) and the "shortage of financial resources in public sector organisations" (Capgemini, 2010; Henningsson & Van Veenstra, 2010); while the 'managerial/organisational' barriers are considered still crucial with particular reference to the behaviour of policy makers and civil servants in supporting actions enhancing trustworthiness of the citizens, by reducing "lack of trust in the government willingness to allow citizens to have their say if their views contradict official policy", "lack of transparency and trust in government" and "lack of personalized and secure services" (Feeney & Welch, 2012; Nelson & Syara, 2012; Shin, 2012).

Using the frequency of citation of the barriers (presented in Table 1) we can show how (see Fig. 1 and Table 2): a) technological and organisational barriers were prominent in the first period; b) managerial and economic barriers remain constant; c) the importance of the institutional and political barriers emerged in the last period. The more detailed and disaggregate view presented in Table 1 further tells us that: d) in the 1994–2004 period barriers have an equal frequency of citations; e) in the period 2005–2009 we start to notice a differentiation with some barriers receiving more attention than others (i.e. *lack of bandwidth capacity*, *lack of privacy and security* and *lack of interoperability*, *lack of skills*, *resistance to change of the civil servants* and the *lack of project management capability inside public administrations*); f) only from 2010 onwards *Institutional and political issues* start to receive more attention; g) finally, *managerial and organisational issues* continue to be perceived with a high degree of importance in limiting the e-government adoption in relation to the *lack of skills* and *resistance to change of the civil servants*.

4. Discussion

The findings of our bibliometric analysis confirm our H1a that the deployment of e-government was for a long time concentrated on more technological and operational matters and that only more recently attention switched to broadly defined institutional and political issues.

In this discussion we go further into the analysis of this kind of barriers in order to support H1b that they are one of the main factors explaining lack of e-government adoption.

The review of the literature identified amongst institutional and political issues six key barriers: *digital divide*; *lack of legal bases*; *lack of policy cycle management*; *lack of measurement and evaluation*; *lack of citizens' participation*; and *lack of trust and transparency*. In particular the latter four seem the most interesting to be further discussed.

Fig. 2 depicts the model of e-government adoption drivers and public value production that we have re-elaborated combining the elements, concepts, and theories reviewed in the literature.

First of all, e-government should provide high quality services and delivery processes (i.e. multi-channel if needed depending on the constituency addressed) that are clearly geared to produce meaningful and needed public values (Codagnone, 2008; Ebrahim & Irani, 2005; Gilbert, Balestrini, & Littleboy, 2004; Heeks & Molla, 2009; Mousa, 2013; Perrin, 2006; Rose & Grant, 2010).

Yet, quality and public values cannot be defined self-referentially by the public administrations delivering them, they must incorporate in the design phase the views, needs, and values sought by the constituencies addressed. The more so because the delivery of services are appraised through the prism of public opinion's perceptions on both the value of the service deployed and the level of transparency of the related decision-making process (Belanger & Carter, 2008; Feeney & Welch, 2012; Holzer & Kolby, 2005; Jain & Kesar, 2011; Van Ryzin, 2009).

In our model, participation improves the design phase making it more respondent to needs and values sought, which in turn make

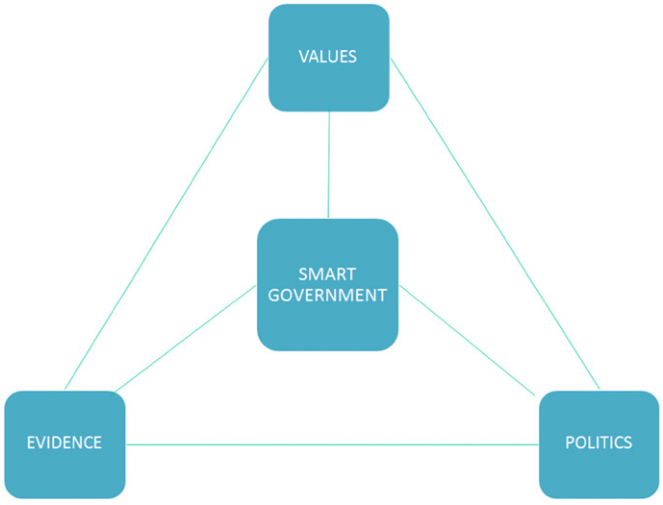

Fig. 4. The smart government triangle.

the delivery more transparent. This increases citizen's trust that can lead to more participation and to e-government adoption. Public value is produced, so, as a result of better-designed services that are more used by the citizens (and businesses). Positive perception of value of the e-government initiatives and transparency of the decision-making process, together with stakeholders' and citizens' participation, increases citizen's trust in policy makers and public administration (McDermott, 2010; Pekka, 2010; Welch, 2012) and it can stimulate e-government adoption (Feeney & Welch, 2012; Mwangakala & Mvungi, 2011).

As a matter of fact, there is clear evidence of the importance of citizens' and stakeholders' participation for improving the performances of a policy-making process (Belanger & Carter, 2008; Feeney & Welch, 2012; Jain & Kesar, 2011; McDermott, 2010; Van Ryzin, 2009; Welch, 2012). In this respect, measurement and evaluation of e-government is an additional element that is not in the model above but that represents an important dimension addressed in the literature considering institutional and political issues that we discuss next.

According to a recent survey of municipalities (Sanger, 2013), in fact, there seems to be little correlation between having a performance measurement system in place and the decision-making process. The author, then, conclude public administration should cut their spending for monitoring and measurement.

We would rather argue finding ample support in the literature that is not measurement as such that is not useful, rather the evidence used to feed measurement is limited, ineffective, non exhaustive, lack validity and reliability, and there is a lack of linkage with an appropriate rewarding system (Besharov et al., 2013; Feeney & Welch, 2012; Heeks & Molla, 2009; Misuraca et al., 2013; Rose & Grant, 2010). Moreover, participation of stakeholders and beneficiaries – also to the measurement process – would further contribute to a transparent and participative policy making process, that represent a key condition for improving the adoption of e-government services (Bovaird, 2007; Heeks, 2006; Jain & Kesar, 2011; Van Ryzin, 2009; Welch, 2012).

As put it by Yang and Holzer (2006, p. 123): "measurement of trust and performance should take a rich, integrated view that attends to government-wide (as opposed to single-agency) evaluation, political responsiveness, institutional design, and citizen input". Therefore performance measurement systems seem to be needed for demonstrating progresses of e-government services and related outcomes (Codagnone, 2008; Welch, 2012), allowing the implementation of a virtuous policy planning process truly participated by stakeholders and citizens, so to support a wide adoption of e-government services, and leading to a better policy planning process (see Fig. 3).

5. Conclusion

In this article using as evidence the focus and evolution of this focus over time in a vast body of literature on e-government and related issues produced by academia, international organisations, and practitioners, we have confirmed our hypotheses showing that: a) the deployment of e-government was for a long time concentrated on more technological and operational matters and that only more recently attention switched to broadly defined institutional and political issues (H1a); and b) institutional and political barriers are one of the main factors explaining lack of e-government adoption (H1b). Such barriers prevent the emergence of a structured and trustworthy decision making process, which in turn limits the capacity of service and policy design to be incorporated and mine the potentially available evidence using new instrument for service and policy design and modelling (Besharov et al., 2013; Charalabidis, Lampathaki, & Askounis, 2012; Lampathaki et al., 2010; Misuraca, 2012; Mureddu, Osimo, Misuraca, & Armenia, 2012).

While lack of evidence is one key element in our findings, we are not here attempting to resuscitating Comte and proposing that the move to smarter government means entrusting scientists and technocrats to solve the situation. Good and smart decisions in any domain occur within a 'virtuous triangle' defined by: politics (decisions amongst competing interests and priorities), values (symbolic and tangible needs and benefits for the constituency targeted by the decisions), and evidence (both about the values and about the ex ante and ex post effects of political decisions with respect to the targeted values).

Fig. 4 depicts in this sense what we call the 'triangle of smart government'. When anyone of the three poles is lacking and/or unsatisfactory, this can then possibly turn into a sort of 'Bermuda triangle' where public values get lost.

The move towards a smart government producing public value, both for e-government and more generally for the public sector, requires a paradigmatic shift amongst scholars, policy makers, and practitioners in the way public sector innovation is conceived. We need to move beyond the traditional view of service innovation (i.e. new services for new or existing users, or improved existing services to new and existing users) and understands that in the public sector we need conceptual and systemic innovations. Conceptual innovation is the development of new views and challenges to existing assumptions and to the thinking or behavioural intentions in policy making.

Systemic innovation pertains to new or improved ways of interacting with stakeholders and citizens as sources of knowledge. Smart and open government, then, would bring together both conceptual and systemic innovation by incorporating the values of the constituencies, by using new conceptual and methodological ways to process evidence, all within the overarching framework of policy and decision making process. This in fact remains fundamental, but is more informed by evidence and more participative. Political judgment is, in the last instance, essential; it should neither lean towards technocracy (only evidence matter) nor towards populism (only the needs and views from below matter). To avoid these extremes bringing us into the 'Bermuda Triangle' we mentioned above, policy-making should allow for participatory processes creating transparency and trust, while at the same time providing more evidence to be used in support of building smarter governments.

Disclaimer

The views expressed in this paper are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

Appendix A

Barriers to e-government adoption. Our adaptation from Ebrahim and Irani (2005), Kunstelj and Vintar (2004) and Luna-Reyes et al. (2012) models.

	Typology of barriers	P1 — reinventing government (1994–2004)	P2 – i2020 strategy implementation in European Union (2005–2009)	P3 — digital agenda for Europe implementation (2010–2013)
Technological and economical	Lack of bandwidth capacity	Layne and Lee (2001)	Ebrahim and Irani (2005), Gil-Garcia and Pardo (2005), Horst, Kuttschreuter and Gutteling, 2007, Lofstedt (2005), Modinis Study (2006)	
	Lack interoperability		Ebrahim and Irani (2005), Fugini et al. (2008), Gil-Garcia and Pardo (2005), Horst, Kuttschreuter and Gutteling, 2007, Lofstedt (2005), Modinis Study (2006)	Henningsson and Van Veenstra (2010)
	Too high investment and maintenance costs	UN-DESA (2003)	Ebrahim and Irani (2005), Gil-Garcia and Pardo (2005), Horst, Kuttschreuter and Gutteling, 2007 Lofstedt (2005), Modinis Study (2006), Norris and Moon (2005)	Capgemini (2010), Henningsson and Van Veenstra (2010)
	Lack of privacy and security	Layne and Lee (2001)	Belanger and Carter (2008), Ebrahim and Irani (2005), Fugini et al. (2008), Gil-Garcia and Pardo (2005), Horst, Kuttschreuter and Gutteling, 2007, Kolsker and Lee-Kelley (2008), Kunstelj and Vintar (2009), Lofstedt (2005), Modinis Study (2006), Norris and Moon (2005)	Henningsson and Van Veenstra (2010)
	Lack of open sources software and standards			Henningsson and Van Veenstra (2010)
Managerial and organisational	Lack of project management capabilities	UN–DESA (2003)	Ebrahim and Irani (2005), Gil-Garcia and Pardo (2005), Lofstedt, 2005, Modinis Study (2006), Norris and Moon (2005)	
	Resistance to change	UN–DESA (2003)	Ebrahim and Irani (2005), Fugini et al. (2008), Gil-Garcia and Pardo (2005), Kramer and King (2006), Lofstedt, 2005, Modinis Study (2006), Norris and Moon (2005)	Henningsson and Van Veenstra (2010), UN-DESA (2010)
	Lack of skills	Moon (2002)	Anttiroiko (2008), Ebrahim and Irani (2005), Fugini et al. (2008), Gil-Garcia and Pardo (2005), Kolsker and Lee-Kelley (2008), Kramer and King (2006), Kunstelj and Vintar (2009), Lofstedt, 2005, Modinis Study (2006), Norris and Moon (2005)	Feeney and Welch (2012), Henningsson and Van Veenstra (2010), Nelson and Syara (2012), Shin (2012), UN-DESA (2010)
Institutional and political	Digital divide		Esteves and Rhoda (2008), Fugini et al. (2008), Modinis Study (2006), Van Ryzin (2009)	UN-DESA (2010)
	Lack of legal bases		Esteves and Rhoda (2008), Fugini et al. (2008), Modinis Study (2006), Van Ryzin (2009)	Henningsson and Van Veenstra (2010), UN-DESA (2010)
	Lack of political commitment	UN–DESA (2003)	Ebrahim and Irani (2005), Norris and Moon (2005)	
	Lack of political coordination	UN–DESA (2003)	Lofstedt (2005), Modinis Study (2006), Titah and Barki (2005), Van Ryzin (2006)	
	Lack of policy cycle management	Pavlou and Chai (2002)	Andersen and Henrisken (2006), Ebrahim and Irani (2005), Kunstelj and Vintar (2009), Norris and Moon (2005)	Besharov et al. (2013), Capgemini (2010), Henningsson and Van Veenstra (2010), Jain and Kesar (2011), Mwangakala and Mvungi (2011), Sarantis et al. (2011), Welch (2012)
	Lack of measurement and evaluation	Moon (2002)	Esteves and Rhoda (2008), Kunstelj and Vintar (2009), Lofstedt (2005), Titah and Barki (2005), Van Ryzin (2006)	Besharov et al. (2013), Capgemini (2010), Feeney and Welch (2012), Henningsson and Van Veenstra (2010), Jain and Kesar (2011), Mwangakala and Mvungi (2011), Sarantis et al. (2011), Shin (2012), UN-DESA (2010)
	Lack of citizens participation		Esteves and Rhoda (2008), Fugini et al. (2008), Heeks (2006), Pratchett et al. (2009)	Besharov et al. (2013), Feeney and Welch (2012), Henningsson and Van Veenstra (2010), Jain and Kesar (2011), Mwangakala and Mvungi (2011), Sarantis et al. (2011), UN-DESA (2010)
	Lack of trust and transparency	Pavlou and Chai (2002), Gilbert et al. (2004)	Esteves and Rhoda (2008), Gil-Garcia and Pardo (2005), Kolsker and Lee-Kelley (2008), Van Ryzin (2009)	Besharov et al. (2013), Feeney and Welch (2012), Henningsson and Van Veenstra (2010), Jain and Kesar (2011), Mwangakala and Mvungi (2011), Sarantis et al. (2011), UN-DESA (2010)

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Dr. Alberto Savoldelli has worked for more than then twenty years as Contracting Professor at the Politecnico di Milano and Member of the Faculty of the MIP, the Politecnico di Milano Business School where he undertook researches on innovation and change management in public sector and for non-profit organisations. Now he works as an Independent researcher and he acts as an advisor to Italian and foreign consultancy companies and public sector organisations on projects focusing on change management, knowledge management, business process reengineering and performance measurement.
At the beginnings of the nineties his research activity has been concentrated on the development of knowledge management systems inside public and non-profit organisations and their implications in terms of change management and organisational structure of the services delivery process for citizens and customers. Then he moves his research interest in impact assessment and impact evaluation methods for measuring the outcomes generated by the e-government services, with particular focus on local government services and their impacts on citizens. During the first decades of year two thousands he enlarged his spectrum of research digging the impacts of health care systems and their transformation processes due to the usage on the new communication and information technology for patient care. In this latter research field he concentrates his attention of risk management of adverse events in health care practices and new methods of chronic disease management that consider the patient as active part of the process. As outcomes of his studies he has developed jointly with the business school of the Politecnico di Milano several advanced training courses on change management government transformation and new information and communication technology impact assessment.
At the moment his research interests address citizens' participation in public decision making processes and chronic disease management through patient empowerment. The search activity performed in this latter period get advantages from quantitative research methods as well as randomized control trial application and counterfactual analysis.
He is author of several publications in scientific journals and conferences and of several books.

Dr. Cristiano Codagnone after joining for two years the European Commission JRC-IPTS (October 2009–September 2011) as a Senior Scientist at the Information Society Unit, went back to his position as Aggregate Professor Università degli Studi di Milano (Social and Political Science Department). Since 2013 he is also affiliated with the Universitat Oberta de Catalunya (UOC) where he is a member of the Applied Social Science research group and where he founded the university spin-off Open Evidence.
He has a degree in Economics from Bocconi University (Italy), and a Ph.D. in Sociology from New York University (1995). Between 1995 and 2000 he worked as contract professor at the Institute of Sociology of Bocconi University. He also completed his post doctoral study at Utrecht University in 1996. Between July 2003 and July 2004 he was seconded and served as a Project Officer in the United Nations' "eGovernment for Development" programme.
In his 25 years of research he has followed a number of different research streams in terms of the object of research but throughout them he has maintained a neo-institutionalist perspective of analysis at the crossroads between sociology and economics and between micro and macro using both quantitative and qualitative methods. Recently as part of this research trajectory he have moved into experimental behavioural sciences with the objective to work at agency/structure juncture by integrating the sociological perspective with new insights from the behavioural and neuro-sciences, also in terms of support to policy making and policy evaluation. After the experience at the United Nations his research activity turned for quite some time towards applied policy work mostly within the context of grants and studies funded by the European Commission and in the domain of eGovernment, eInclusion, and eHealth. This work has enabled him to gather a vast body of empirical evidence, practical and theoretical insights that in the last couple of years have started to produce a stream of publications that will continue into the next 2 to 3 years.

Dr. Gianluca Misuraca is a Senior Scientist at the Information Society Unit of the European Commission's Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS) based in Seville, Spain where he is leading since 2009 research in the area of ICT for governance and policy modelling. Before joining the JRC-IPTS Gianluca was the Managing Director and Scientific Coordinator of the Global Executive Master in e-Governance coordinated at the College of Management of Technology of the Ecole Polytechnique Fédérale de Lausanne (EPFL). Previously he held several positions as lead consultant and policy advisor for different International Organisations and bilateral cooperation agencies as well as working with various consulting and industrial organisations in the area of e-government, regional development, research and innovation.
Gianluca's background is economics with focus on the interface between ICTs and public sector innovation, specialised in the area of business process reengineering. He holds a Diploma of Specialisation in European Union Economics and Law from the University of Rome 'La Sapienza', a specialisation in Security Management at the Bocconi University of Milan, an Executive Master in e-Governance and a Ph. D in Management of Technology from EPFL.
He is a recognised scholar in the field of ICT for governance and ICT for development, and he has written many publications in the area of ICTs, e-government, e-governance and Information and Knowledge Society, being a pioneer in pointing out the paradigm shift from e-government to e-governance and the need for new institutional designs for enabling a Knowledge Society. In particular, he developed a specific theoretical framework for governance "with and of" ICTs, presented in his book: "e-Governance in Africa, from theory to Action: a handbook on ICTs for local governance" (AWP/IDRC2007). He is regularly invited as visionary speaker to conferences and workshops worldwide, and he is a member of several Scientific Committees, Guest Editor and reviewer of prestigious scientific Journals in the area of ICTs and governance.