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Diffusion and usage of public e-services in Europe: An assessment of country level indicators and drivers

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ABSTRACT

We analyze the state of the art of indicators on e-government, e-health, e-procurement and e-participation. We survey the main methodological properties of these indicators, and highlight their heuristic potential. Further, we address empirically the issue of the explanation of the availability scores, i.e. how the supply of the various e-services in each country is affected by political, institutional and socio-economic differences, and is followed by actual usage. The econometric analysis uncovers the importance of broadband penetration and higher education as drivers for most of the types of e-services and users (citizens and businesses). Moreover, a corruption-free and agile public sector proves to be an important pre-condition for more effective supply and usage. Despite data limitations and the complexity of the underlying diffusion phenomena, our study is the first truly longitudinal contribution aimed at disentangling the common drivers of such an important phenomenon – the e-services availability and usage across European countries. As such, this work appears useful to inform the policy debate and practice, in a phase characterized by a prospective reorientation of the public e-services provision and policy agenda.

1. Introduction

As public e-services initiatives continue to gain global momentum, diffusion indexes, measures and benchmark studies are rapidly expanding. Academic researchers, NGOs, and private and public sector organizations have produced numerous methodologies for measuring and evaluating e-government development locally, nationally, and internationally. Despite the wide interest in public sector innovation in general and in e-government indicators in particular, the evidence about their availability, usage and broad consequences is still quite scattered and often contrasting (Hardy & Williams, 2011; Carbo & Williams, 2004; Melitski, Holzer, Kim, Kim, & Rho, 2005). Further, although the first studies referred to the US, at different aggregation levels, the following ones dealt with large and heterogeneous sets of countries, while a specific focus on Europe is still in urgent need, in the face of the extensive efforts paid by EU institutions to promote e-services development and their benchmarking. Moreover, most of the existing comparative studies concentrate on generic e-government, while a systematic analysis of specific public e-services is lacking.

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In this paper we analyze the state of the art of available indicators on e-government, e-health, e-procurement and e-participation, addressing empirically the issues of the underlying construction methodologies and informative potential. Then, we present an econometric analysis of the experiences of e-services diffusion and usage in European countries. In detail, we aim to uncover how the supply (or availability) of the various public e-services in a cross country and macro perspective can be associated with noticeable socio-economic, institutional and political differences. Then, as a last step, we also investigate the degree of their actual utilization (demand side), discussing the extent and the possible reasons for the basis of the gap – in some countries very large – between availability and usage. The ensuing policy reflection discusses the macro reasons that should move a society based on the use of traditional services (at the shelter) towards one based on e-services.

The paper develops as follows. In the next section, a systematic analysis of the main public e-service indicators produced so far at the worldwide level is undertaken. Section 3 presents the dataset construction, the descriptive statistics, the econometric method and the results of our empirical analysis on the candidate determinants and correlates of country-level e-services diffusion in Europe, with respect to the supply and demand sides, and their gap. The final Section concludes, pointing to some open questions and making a connection with the current "European Digital Agenda" debate and policy-making.

2. Indicators of public e-services

2.1. Informative content

To carry out this survey, a preliminary comprehensive research has been carried out in order to review all public e-service indicators produced from 2001 to 2011, and their related benchmarking initiatives. This detailed research included many specialized sources – *in primis*, websites of official international bodies (European Commission (EC) and United Nations (UN)), statistical institutes, private consultancy firms and national governments' and agencies' portals. Due to the statistical heterogeneity of this wide array of sources, and their underlying diverging methodologies, we complemented the phase of data collection and analysis with frequent discussions and experts meetings.[1] The indicators finally selected are those (a) which have reached a high development stage, being internationally harmonized and regularly published at the country level,[2] and (b) which focus specifically and strictly on the provision of e-government, e-health, e-procurement and e-participation services. In particular, the latter criterion means that we chose not to include other benchmarking initiatives dealing with ICT (for example, indexes of e-readiness[3]) and/or with Information Society or broader targets connected to it, for example, level of trust in online environments, quality of the country ICT legislation (for an early but still useful classification, see Janssen, Rotthier, & Snijkers, 2004). Furthermore, the analysis presented here refers to the most recent editions of such benchmarking reports and accompanying manuals.[4] Table 1 lists the e-service indicators preliminary chosen for discussion.

The 10 indicators summarize the state of the art of public e-services benchmarking in Europe. They cover four broad typologies of services: e-government,[5] e-participation, e-health and e-procurement. Five indicators measure the provision of services by public administrations (henceforth, PA), while the other four indicate the level of usage by individuals and businesses; last, the indicator of e-participation, due to its truly interactive essence, can be considered a mix of the two market sides/phenomena. A synthetic methodological description of these indexes follows.

2.1.1. e-government

The European Commission's annual e-government benchmark study, carried out by Capgemini, is one of the flagship initiatives in measuring public e-services.[6] The benchmark is designed and carried out with the participation of the EU Member States' representatives,[7] and uses a comprehensive and harmonized ranking system to identify those European countries which implemented the most mature e-government services; in other words, the focus is on efforts aimed at

[1] In particular, we are indebted to the other members of the EIBURS-TAIPS research group (http://www.econ.uniurb.it/eib_project) and its Workshops participants for fruitful discussions and interactions.

[2] For this reason, reports focusing on benchmarking cities or specific regional e-government projects were not included in this analysis.

[3] The World Economic Forum (WEF) and the Economist Intelligence Unit (EIU) publish two examples of such reports: respectively, the WEF Networked Readiness Index and the EIU e-readiness Ranking. e-readiness indexes measure the presence of adequate ICT infrastructures, skills and of an ICT-conducive environment, but do not arrive to include the measurement of actual public e-services provision.

[4] We need to add that these benchmarking exercises and their underlying datasets have undergone across time several revisions. Our analysis focuses on the latest methodologies, relative to the exercises carried out during the most recent data waves.

[5] As described *infra*, this label covers different services, so that, in some cases, it overlaps with the other categories of e-services.

[6] Annual reports and current updates are available from a variety of sources, including https://ec.europa.eu/digital-agenda. The concerned edition (short version) is downloadable at: https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/egov_report.pdf

[7] This step involves some forms of negotiations with the country's expert delegates, due to the need of adapting the general survey framework to the countries' specific situations. Inevitably, these negotiations accommodate some discretionary power from both sides and may engender improper dynamics of strategic maneuvering of benchmarking at the State level.