E-GOVERNMENT: A DRIVING FACTOR FOR STIMULATING INNOVATION PERFORMANCE IN ROMANIA?

Preda Ana-Maria
Romanian-American University, Bucharest, Romania

Stanica Justina Lavinia
Romanian-American University, Bucharest, Romania

Crisan Daniela Alexandra
Romanian-American University, Bucharest, Romania

Coculescu Cristina
Romanian-American University, Bucharest, Romania

The development of public services is one of the priorities on the agendas of all policies, both national and European. One of the most recent concerns of the European Commission, as shown in the 2010 Innobarometer, is to find ways and develop strategies to support the innovation in the public administration sector, in the context of the continuously changing economic background. In this paper, we'll investigate the relationship between e-Government, and the overall innovation performance at national level, for some European Union countries. e-Government is already a known concept, widespread in the world, promoting the implementation of information and communication technologies in the public administration, in order to provide better public services to citizens and businesses. A main component of the e-Government concept is the "counter reform", aimed to streamlining administrative act quickly in order to respond to the demands of citizens, businesses and government structures. Innovation in e-Government will be measured with two Eurostat indicators – "e-Government on-line availability" and "e-Government usage by individuals" – while for the overall innovation performance we'll use a composite indicator – the Summary Innovation Index (SII) – from the Innovation Union Scoreboard (IUS). In Romania, even if the values of these indicators are not at the level of other EU countries, we can say that the situation has improved and electronic public services are being used increasingly often. The study also includes a comparison between two „modest innovators": Romania and Bulgaria. Regarding the overall innovation performance, according to the 2010 Innovation Union Scoreboard ranking, Romania is the leader of the "modest innovators" countries, overcoming Latvia, Bulgaria and Lithuania. However, in the field of e-Government our country has major shortcomings. Romania has registered a significant progress in the years after the EU integration, followed by a setback in 2009, still having values below those of other EU countries, including Bulgaria.

1. Introduction

European Commission's recent concerns are focused on innovation, inclusive in the public sector. Through the "Innovation Union" flagship initiative, launched within *Europe 2020 Strategy*, the European Commission proposed, among others, monitoring innovation in the public sector using a "European Public Sector Innovation Scoreboard". A first step towards achieving this instrument was the "Innobarometer 2010", which was devoted to an analytical study of innovation in public administration. This document, based on a survey of 4000 public administration institutions in all 27 Member States of the European Union (EU), has shown a relatively high degree of innovation in this sector ("*at the EU level, two-thirds of public administration institutions introduced a new*

or significantly improved service in the last 3 years" (European Commission 2010a: 8). The report also highlighted out *the positive effects of innovation on the activity of the public administration institutions, among which: the improved user access to information, improved user satisfaction, more targeted services, faster delivery of services, simplified administration, improved working conditions or employee satisfaction, and cost reduction resulting from innovations* (European Commission 2010a: 9).

E-Government or electronic government is the use of ICT in public administration in order to improve public services provided to citizens and businesses. Implementing electronic government is not an easy process. Providing user-centered public services designed to reduce bureaucracy involves profound organizational changes. Thus, the transition to e-Government meets resistance because many times, although efforts involved are obvious, benefits they bring can be seen only over time. These benefits, however, play an important role in social and economic model of Europe, being the starting point in ensuring a higher level of welfare for its citizens, leading to economic and social cohesion and supporting the development of a functional market economy.

In this context, we have analyzed the relationship between e-Government and the overall level of innovation at country level, in order to determine the main factors that stimulate the innovation process. This is of special importance for Romania, given that our country is still a "modest innovator" within the European Union.

2. The SII indicator – measure of Innovation performance

SII (the Summary Innovation Index) is a composite indicator that measures the overall innovation performance at country level. It has been computed since 2001 and annually published in the European Innovation Scoreboard (EIS), under the surveillance of the European Commission, through the PRO INNO Europe initiative (EIS 2001, 2002-2006, 2007, 2008, 2009, 2010). Over time the SII structure and methodology have changed, and starting with 2010, the European Commission has proposed to "abandon" the EIS and create a new instrument, called the In novation Union Scoreboard (IUS).
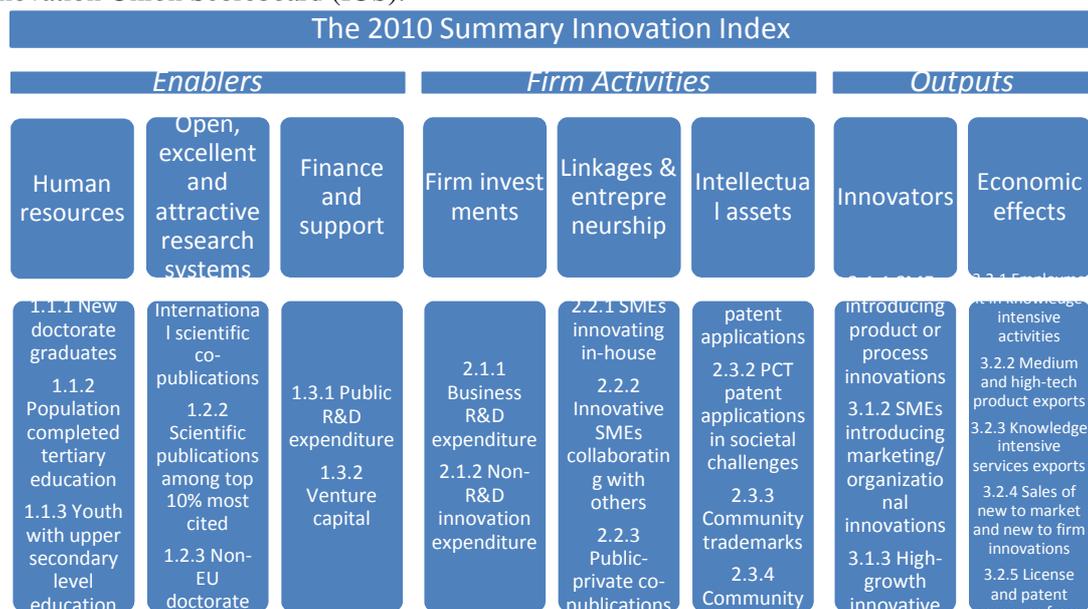

Figure 1. The structure of the 2010-SII indicator: the first level represents the three main types; the second level includes the eight dimensions which contain 25 sub-indices (Source: figure made by the authors)

The IUS purpose is to monitor implementation of innovation policies and strategies under the flagship initiative "Innovation Union". Thus, in February 2011, the first edition of the IUS –

IUS 2010 – was published, using a new structure for the SII indicator. The SII 2010 is a composite indicator that summarizes the performance of research and innovation systems at country level using 25 sub-indices, grouped into three main categories – "*Enablers*", "*Firm activities*" and "*Outputs*" – and eight dimensions of innovation (Figure 1). SII 2010 includes 18 of the 29 sub-indices used in SII 2009 and 7 new sub-indices. Due to the lack of data for each of the sub-indices used in the SII 2010, only 24 of them could be effectively taken into account (the exception is the sub-indicator 3.1.3.). However, out of the 24 sub-indices, 4 relate to information in 2007, 10 to data of 2008 and 10 gives the values for the year 2009; therefore, the SII 2010 does not capture the full impact of the economic and financial crisis on innovation. Depending on the SII 2010 values (ranking), the 27 EU member states have been divided into four groups (clusters) of innovation:

- "*innovation leaders*": Denmark, Finland, Germany, Sweden;
- "*innovation followers*": Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia and the UK;
- "*moderate innovators*": Czech Republic, Greece, Hungary, Italy, Malta, Poland, Portugal, Slovakia and Spain;
- "*modest innovators*": Bulgaria, Latvia, Lithuania and Romania.

3. Econometric tests

We have investigated the existence and the intensity of the correlation between "e-Government" and the innovation performance at country level, registered in the EU. In this regard, we approached the "e-Government", both in terms of the "supply" of electronic public services ("*e-Government on-line availability*") and the "demand" for these services ("*e-Government usage by individuals*"). Our working hypothesis was that e-Government (both the demand and the supply) is closely linked to innovation, influencing it and being influenced by this one.

3.1. The correlation between e-Government and innovation performance at country level for some EU countries, in 2006-2010

We have calculated the correlation coefficients between the overall innovation indicator *SII* and two representative e-Government indicators, respectively "*e-Government on-line availability*"[1] and "*e-Government usage by individuals*"[2] for 22 EU Member States [3]. The results, presented in Annex (Table 1) and plotted in Figures 2 and 3 reveal the four clusters of innovation (the leaders in innovation on the right side, the modest innovators on the left side).
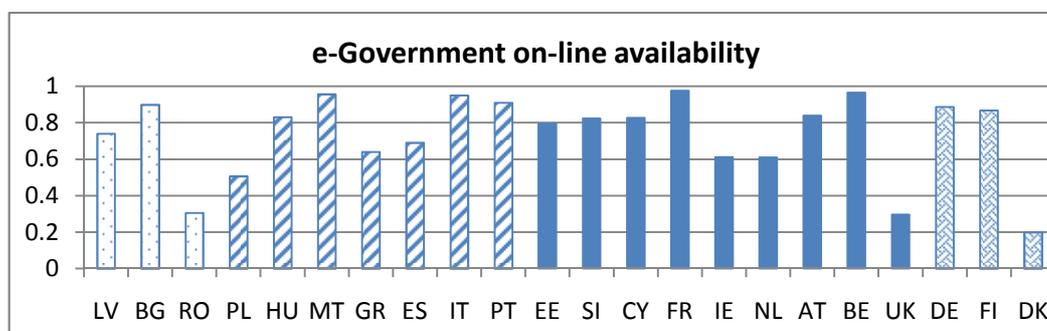
Figure 2. Correlation between "e-Government on-line availability" and innovation performance for 22 EU countries in the period 2006-2010
(Source: figure made by the authors)

Statistically, data presented in Figure 2 show that – although there are three countries (including Romania) that do not register a significant correlation between the two indicators, and for another six countries there is a weak linkage – the most of EU countries analyzed had a significant

correlation (above 0.75), and even a strong one (above 0.90, for five countries, including Bulgaria). Generally, countries with moderate innovation level, considered as "*moderate innovators*" and "*follower innovators*" countries (according to the IUS 2010 report) present a high correlation between the innovation performance and the availability of the public service indicator.
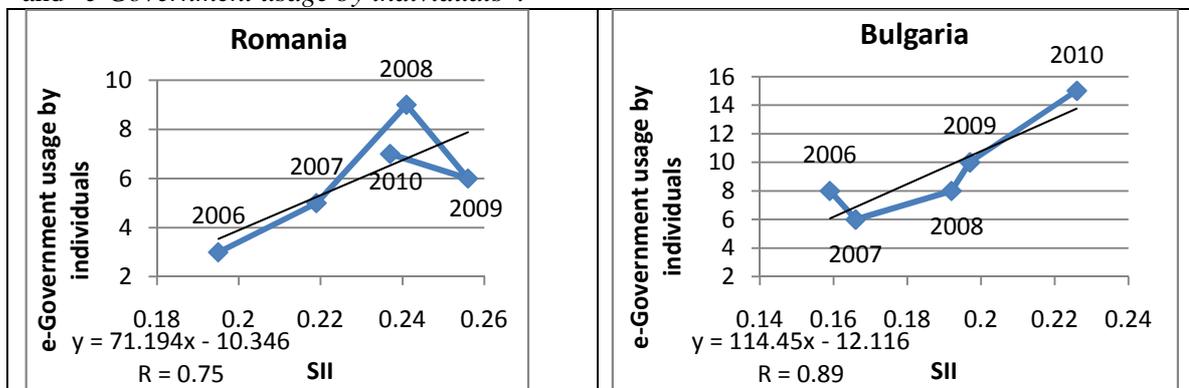

E-government usage by individuals
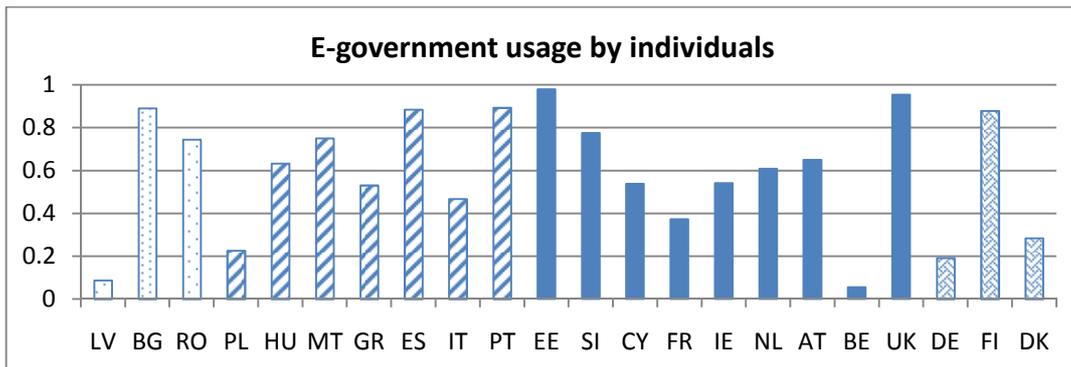
Figure 3. Correlation between "e-Government usage by individuals"
and SII for 22 EU countries in 2006-2010
(Source: figure made by the authors)

In figure 3 it can be noticed that the degree of correlation between the two indicators is significant in most countries with medium level of innovation (the "followers in innovation" and the "moderate innovators" groups) and even very strong for Romania and Bulgaria, who are leading innovators within the group "modest innovators".

3.2. The correlation between "e-Government usage by individuals" and SII for Romania and Bulgaria during 2006-2010

In order to describe the relationship between the degree of interaction of citizens with public administration, using Internet, and the overall innovation performance for Romania and Bulgaria, we have examined, for the period 2006-2010, the correlation between the indicators: *SII* and "*e-Government usage by individuals*".

Figure 4. The correlation between "e-Government usage by individuals" and SII
for Romania and Bulgaria during 2006-2010
(Source: figure made by the authors)

As it can be seen in Figure 4, the correlation between the analyzed indicators for both countries is significant, Bulgaria reporting even a very strong correlation. Both countries have made progress in terms of overall performance in innovation, following the integration in the European Union, but they had different evolutions in the period 2009-2010. Thus, Romania, unlike Bulgaria, recorded in 2010 a decline of SII value (from 0.25 to 0.23), while remaining yet the leader of the

"modest innovators" group of countries, according to the classification published in the IUS 2010 report and overcoming Latvia, Bulgaria and Lithuania. Regarding the indicator "*e-Government usage by individuals*", Bulgaria after its integration into UE, progressed steadily, with significant values that have increased from 6 in 2007 to 15 in 2010. As for Romania, it has made a significant progress after its integration into EU (from 5 in 2007 to 9 in 2008), but has reported a significant decrease in 2009 (down to a 6), and a slight recovery in 2010 (value 7).

4. Conclusions

After the integration in the European Union, Romania recorded a real progress in innovation performance, reaching in the year 2010 a top position in the group of the "modest innovators", according to the classification published by the European Commission in the IUS 2010 Report, overcoming Latvia, Bulgaria and Lithuania. However, the SII indicator value is still very low and therefore there is a major concern of stimulating the innovation in all fields and to identify factors that can stimulate it. Through a set of econometric tests, our approach proves that the e-Government system can be such a driver.

In general, the indicators of the "supply" and the "demand" for electronic public services (e-Government) are significantly correlated with innovation performance at country level, as measured by the SII indicator for most countries of the European Union between 2006 -2010. This suggests that improving the performances of the e-Government system in Romania, at least reestablishing the position from 2008 as a very near future desiderate, could yield to the increase of the innovation level.

5. Notes

[1] The "*e-Government on-line availability*" indicator is provided by EUROSTAT and it is measured as the percentage of online availability of 20 basic public services. The data are last updated in March 2011.

[2] The "*e-Government usage by individuals*" indicator is provided by EUROSTAT and it is measured as the percentage of individuals aged 16 to 74 using the Internet for interaction with public authorities. The data are last updated in April 2011.

[3] The 22 UE countries are: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Germany (DE), Denmark (DK), Estonia (EE), Spain (ES), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI) and United Kingdom (UK).

6. References

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Annexes

Table 1. The correlation coefficients between the indicator "e-Government on-line availability", respectively „e-Government usage by individuals" and SII for 22 EU countries during 2006-2010 (by group of innovation)

Modest innovators			Moderate innovators			Innovation followers			Innovation leaders		
State	Coeff1	Coeff2	State	Coeff1	Coeff2	State	Coeff1	Coeff2	State	Coeff1	Coeff2
LV	0.740	0.088	PL	0.506	0.226	EE	0.795	0.979	DE	0.887	0.192
BG	0.899	0.892	HU	0.831	0.634	SI	0.822	0.775	FI	0.868	0.880
RO	0.306	0.745	MT	0.956	0.751	CY	0.827	0.539	DK	0.199	0.284
			GR	0.640	0.531	FR	0.975	0.373			
			ES	0.690	0.885	IE	0.611	0.541			
			IT	0.950	0.468	NL	0.610	0.608			
			PT	0.910	0.894	AT	0.839	0.650			
						BE	0.965	0.055			
						UK	0.296	0.954			

Note: Coeff1 – The correlation coefficients between the indicator „*e-Government on-line availability"* and *SII*

Coeff2 – The correlation coefficients between the indicator „*e-Government usage by individuals"* and *SII*

Table 2 (a). Statistical analysis of the correlation between "e-Government usage by individuals" and SII for Romania during 2006-2010

Regression Statistics	
Multiple R	0.745
R Square	0.555
Adjusted R Square	0.407
Standard Error	0.018

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.183	0.025	7.172	0.006
Egovernment	0.008	0.004	1.936	0.148

Table 2 (b). Statistical analysis of the correlation between "e-Government usage by individuals" and SII for Bulgaria during 2006-2010

Regression Statistics	
Multiple R	0.892
R Square	0.795
Adjusted R Square	0.727
Standard Error	0.014

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.123	0.020	6.094	0.009
Egovernment	0.007	0.002	3.414	0.042