COMPARATIVE STUDY ON E-GOVERNMENT INDICATORS BETWEEN WESTERN BALKAN COUNTRIES AND THE EU COUNTRIES

Article · December 2018

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COMPARATIVE STUDY ON E-GOVERNMENT INDICATORS BETWEEN WESTERN BALKAN COUNTRIES AND THE EU COUNTRIES

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Abstract

The focus of the study is to examine the level of development of e-government in Western Balkan (WB) countries and to compare it with the EU countries, in order to cover the geographical gap in past research. The analysis is based on the seven e-government survey reports conducted by the United Nations between 2003 and 2018. The data were extracted and distilled from survey reports on both regions, in order to perform a trend analysis and descriptive comparison. The study makes a comparison of E-Government Development Index (EGDI) and its components. Findings from the study suggest that both regions have positive trends of EGDI for the whole period (2003-2018) and that the difference between the regions is slightly reducing. The results from comparing the components of EGDI showed that the highest difference between the two regions is in the online service component (OSC), followed by the technology infrastructure component (TIC), while the lowest difference is in the human capital component (HCC). The results can serve policy makers in the EU and especially in WB countries to more easily identify the potential areas for investment and improvement (in this case in OSC and TIC).

Keywords: information technology, e-government, online service, technology infrastructure, human capital.

JEL Classification: M1, M15, M21

1. Introduction

Governments have utilized computers since the earliest stages of development of this new technology. From the early sixties, governments were interested in achieving savings in terms of money, personnel and time through electronic data processing (Riche and Alli, 1960). Mitrovic (2015) investigated the level and dynamics of the digital divide in WB and EU countries using the

Broadband Achievement Index (BAI), the Data Envelopment Analysis (DEA)-based model, the Global Competitiveness Index (GCI) and the Corruption Perception Index. Findings from his comparative study showed that WB countries belong to the 'laggard' group regarding their broadband achievement and global economic competitiveness. Our study makes a comparison of both regions using another measure, i.e. the EGDI (E-government Development Index) through descriptive and trend analysis.

Therefore, the main goal of this research study is to conduct a comparative analysis of e-government development between WB countries (Albania, Bosnia and Herzegovina, Macedonia, Montenegro and Serbia) and EU countries, as two separate regions. EU has had 28 member states since its last member state Croatia joined the EU in 2013. The rationale of the study is given bellow in the following five points:

1) All WB countries have openly declared their will to join the EU and they are actively taking steps to join the EU in some near future.
2) Political and economic conditions between the countries within the WB region are not significantly different.
3) The process of political and economic convergence between the countries from WB and EU is very important for the future process of EU enlargement.
4) Through this exploratory study, we contribute towards covering the geographical research gap and we offer a valuable source of information, primarily of use to policy makers from the WB region.
5) E-government Development Index published by the UN, which was used as a primary source for this exploratory study, does not include WB countries as a separate region and does not offer this type of explicit comparison between the two regions.

The remainder of the paper is structured as follows: in the next section, we give the theoretical background regarding the concept of e-government and its benefits. In the third section, we   explain the research methodology and research process followed in this study, together with the data collection process. In section 4, we present the findings from the research study and at the end of the paper, we give our conclusions.

2. Theoretical background – The concept of E- government and its potential benefits

Various labels are used on a global scale, such as e-government, e-governance, one-stop government, digital government, and online government, that

capture the governmental quest for transformation into information society in the public sector, by pushing and pulling those within government, citizens and relevant private sector actors to adapt to the use of ICT in actions such as the use of online government services (Andersen et. al., 2010). The goal of this article is not to extensively elaborate various theoretical understandings of e-government. Thus, below in the text, we only briefly present the various strands in e-government research and practice. The concept of e-government is defined in various ways in the literature and there is not one universally accepted definition (Halchin, 2004). E-government is defined as relationships between governments, their customers (businesses, other governments, and citizens), and their suppliers (again businesses, other governments, and citizens) by the use of electronic means (Means and Schneider, 2000).

On the other hand, the Council on Digital Government Strategies (OECD) recommends distinctive definitions of e-government and digital government. According to the Recommendation of the Council on Digital Government Strategies (2014), E-Government refers to the use of information and communication technologies (ICTs) by governments, particularly the Internet, as a tool to achieve better government. On the other hand, they define Digital Government as the use of digital technologies as an integrated part of governments' modernization strategies to create public value. It is valuable to mention the difference between the two concepts of: e-government and e-governance, which are often met in research studies. E-governance is generally considered as a wider concept than e-government, since it can bring about change in the way citizens relate to governments and to each other. UNESCO's (2011) definition of e-governance is: 'The public sector's use of information and communication technologies (ICTs) with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent, and effective.'

It is useful to mention the approach of the United Nations in defining e-government, since the data used in this study are derived from the reports of e-government survey carried out by the United Nations. UN defines e-government in terms of services provided and builds an e-government development index (EGDI) as a composite measure derived from 3 indexes: *online service index*, *telecommunication index* and *human capital index* (Paoli and Leone, 2015). Paoli and Leone (2015) explain that telecommunication and human capital indices refer to more macro and contextual dimensions, with the former measuring the communication infrastructure (in terms of internet users, land telephone lines, mobile subscribers, internet subscriptions, broadband facilities), and the latter measuring literacy (adult literacy rate and gross enrolment ratio). Thus, they stress that the measure which is more

directly related to e-government is the online service index which is the result of an assessment of national central portal and e-service portals on the basis of several dimensions such as *web content accessibility*, *usability*, *design*, *user-friendliness*, etc.

Brown and J. L. Brudney (2000), categorize e-government initiatives into three basic categories: Government-to-Government (G2G), Government-to-Citizen (G2C), and Government-to-Business (G2B), while Yildiz (2007) adds additional categories: Government-to-Civil Society Organizations (G2CS) and Citizen-to-Citizen (C2C). It is interesting to mention that Yildiz (2007) places all these 5 categories as subcategories of e-government, referring that (G2CS) and (C2C) are e-governance subcategories of e-government. Again, not to go further in exploration of various labels and their meaning in the literature and practice, we only shortly present that the evolution of e-government as a concept, brought to the surface different labels, concepts, definitions and classifications of e-government practices. The research goal of this article is more exploratory and in that direction, in this article we make a comparison between e-government maturity of EU countries and Western Balkan countries. Through a comparative and trend analysis of these two regions, we want to explore the potential convergence in e-government maturity between these two regions.

The use of information and communication technologies (ICTs) in government, and the explosion of digital information throughout society, offers the possibility of a more efficient, transparent and effective government (Gil-Garcia et. al., 2017). Razani (2012) stresses the potential benefits from e-government such as relevant government information in an electronic form to the citizens in a timely manner; better service delivery to citizens; empowerment of people through access to information without the bureaucracy; improved productivity and cost savings in doing business with suppliers and customers of government; and participation in public policy decision-making. However, there is a certain controversy regarding the success of e-government initiatives in developing countries. Hence, Ciborra (2005), through the case of Jordan, argues that developing countries may not be ready for such a system where citizens are seen as customers, holding the view that e-government on its own is not suited for developing countries to obtain the associated benefits and that instead, political and social changes are required alongside the implementation of electronic media. However, Ciborra is not neglecting fully the benefits from e-government projects for developing countries, but he only points out that we should be very careful when we automatically associate benefits of e-government initiatives for developing countries (same for WB countries), because a lot of other changes in different sectors need to be made in order to achieve the wanted benefits.

3. Research methodology and data collection

The process of data collection was done through desk research and by consulting all reports published about e-government development index (EGDI) by the United Nations[1] for the period 2003-2018 (2003, 2004, 2005, 2008, 2010, 2012, 2014, 2016 and 2018). From the downloaded reports we extracted the data about the EGDI for all EU member states and all WB countries[2]. The research approach is exploratory and it is based on desk research as a documentary study. We compared the e-government indicators, their averages, maximum and minimum values for these regions regarding the whole period, and we performed a trend analysis.

The *Survey* measures e-government effectiveness in public service delivery and identifies patterns in e-government development and performance, as well as countries and areas where the potential of Information and Communications Technologies (ICTs) and e-government has not yet been fully exploited and where capacity development support might be helpful. It serves as a development tool for countries to learn from each other, identify areas of strength and challenges in e-government, and shape their policies and strategies in this area (UN E - Government Survey, 2016).

4. Results and discussion

Table 1 bellow shows the average scores of EGDI for EU and WB countries, its maximum and minimum values for the period 2003-2018. The comparison of EGDI average scores for EU and WB countries, for the 2003-2018 period, shows that the average value of EGDI for EU countries is significantly higher than the value for WB countries. Also, it is important to mention that the difference between the average scores is reducing through the years. For example, the average score difference in 2003 was 0.362, while in 2018, it reduced to 0.086. All EU member states in the last report for 2018 were scoring high with an EGDI value of 0.5-0.75, or as very high with an EGDI value of 0.75-1. This indicates that although the entrance of new member states in the EU as part of the enlargement process (especially after the large enlargement in 2004 and 2007) has maybe reduced the average value of EU-EGDI, the new EU members all substantially progressed towards high and very high levels of EGDI.

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[1]   Last EU enlargement took place in 2013, when Croatia became an EU member state. The EGDI scores of all countries were not included in the average scores for EU region for the years prior to their EU membership. UN survey is not performed each year, and that is why the total number of reports included in the study is seven.

[2]   Kosovo was not included in the analysis because there were no available data in any UN report about it.

Table 1. E-Government Development Index (EGDI) of EU and WB

Year	EU-EGDI (Avg)	EU-EGDI (Max)	EU-EGDI (Min)	WB-EGDI (Avg)	WB-EGDI (Max)	WB-EGDI (Min)
2003	0.707	0.840	0.540	0.345	0.371	0.309
2004	0.681	0.905	0.519	0.380	0.387	0.370
2005	0.699	0.906	0.579	0.326	0.463	0.196
2008	0.700	0.916	0.538	0.463	0.487	0.428
2010	0.657	0.815	0.548	0.483	0.526	0.452
2012	0.746	0.912	0.606	0.572	0.631	0.516
2014	0.729	0.894	0.542	0.526	0.635	0.471
2016	0.755	0.919	0.561	0.604	0.713	0.512
2018	0.801	0.915	0.667	0.645	0.715	0.530
Slope	0.006			0.020		

Source: Author's calculations based on data from EGDI Reports

The comparison of maximum and minimum values for the two regions shows that all maximum values for the EU region are significantly higher than the EGDI values for the WB region, for the whole period of analysis. Also, the minimum values for the EU region are significantly higher than the minimum values for the WB region, for the whole 2003-2018 period, as well. The differences between maximum values and between minimum values of EGDI, for both regions are reducing slightly (for maximum values, from 0.469 in 2003 to 0.385 in 2018, and for minimum values, from 0.231 in 2003 to 0.137 in 2018).

The trend analysis of average EU-EGDI and WB-EGDI shows that both regions have positive trends and both trends improve slowly, for EU with 0.006 and for WB countries with 0.02. In the comparison of trends (shown in graph 1) of average scores, maximum and minimum values for EU-EGDI and WB-EGDI, it can be noticed that the differences are reducing.
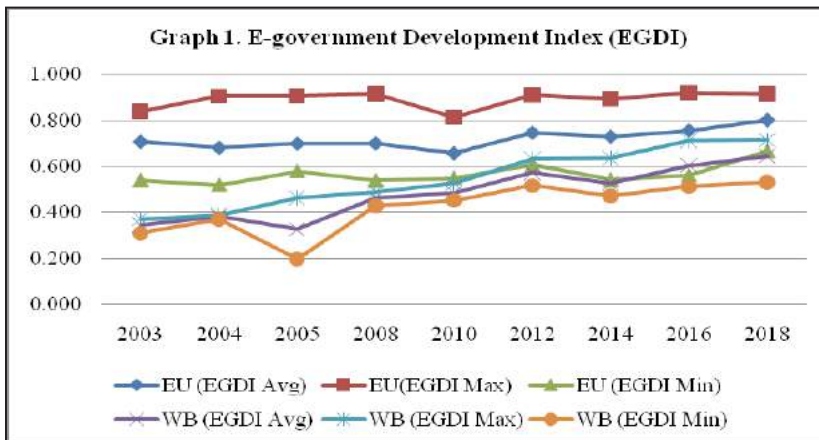
Source: Author's calculations based on data from EGDI Reports

Table 2 shows the average, maximum and minimum scores for the online service component (OSC) of EGDI for EU and WB regions. The comparison of average scores of OSC for EU and WB countries shows similar results as the average scores for EGDI. The average value of OSC for EU countries is significantly higher than the average value of OSC for WB countries for the whole period of analysis. The differences between the average scores of OSC are reducing through the years, the same as the average scores of EGDI. The difference of OSC average score in 2003 was 0.383, while in 2018, it reduced to 0.189. Similar like for the composite EGDI, all EU member states in the last 2018 report scored high with the OSC value of 0.5-0.75 or as very high with the OSC value of 0.75-1.

Table 2. Online Service Component (OSC)

Year	EU-OSC (Avg)	EU-OSC (Max)	EU-OSC (Min)	WB-OSC (Avg)	WB-OSC (Max)	WB-OSC (Min)
2003	0.562	0.777	0.328	0.179	0.284	0.083
2004	0.600	0.973	0.236	0.247	0.336	0.124
2005	0.650	0.996	0.392	0.344	0.446	0.161
2008	0.615	1.000	0.391	0.353	0.391	0.294
2010	0.490	0.775	0.289	0.289	0.321	0.222
2012	0.685	0.974	0.490	0.467	0.575	0.372
2014	0.640	1.000	0.236	0.380	0.528	0.244
2016	0.750	1.000	0.442	0.630	0.819	0.449
2018	0.846	0.979	0.653	0.657	0.736	0.431
Slope	0.014			0.027		

Source: Author's calculations based on data from EGDI Reports

The comparison of OSC maximum and minimum values for the two regions shows that all maximum values for the EU region are significantly higher than the maximum values of the WB region. Also, the minimum values for the EU region are significantly higher than the minimum values for the WB region, except for the years 2014 and 2016. For year 2014, Bulgaria scored very low on OSC with 0.236, while for the WB region for the same year, Macedonia had the minimum value of OSC with 0.244. For year 2016, Slovakia also scored very low with an OSC value of 0.442, while for the WB region, Bosnia and Herzegovina scored with a value of 0.449. The differences between the maximum and between the minimum values of OSC for both regions are reducing slightly (for maximum values from 0.493 in 2003 to 0.243 in 2018, and for minimum values from 0.245 in 2003 to 0.222 in 2018).

The trend analysis of average EU-OSC and WB-OSC shows that both regions

have positive trends and both trends improve slowly, for EU with 0.014 and for WB countries with 0.027. Comparing the trends of average scores, maximum and minimum values of EU-OSC and WB-OSC for the period from 2003 to 2018, it can be noticed that the differences are reducing. In years 2014 and 2016, the trend of minimum values of the WB region converged and even slightly surpassed the trend of minimum values of the EU region, but very soon in the next 2018 report, the trend again declined.
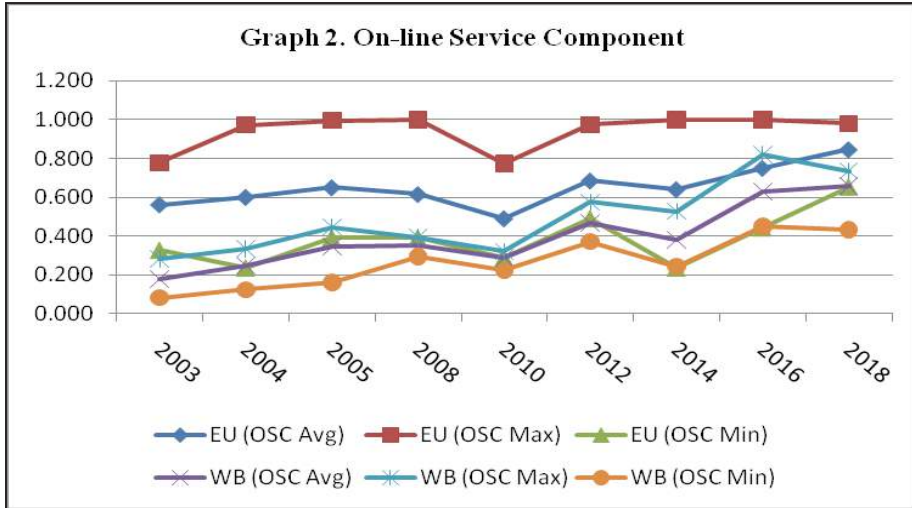
Source: Author's calculations based on data from EGDI Reports

Table 3 shows the average, maximum and minimum scores for TIC (Technology Infrastructure Component) of EGDI for EU and WB regions. Through a comparison of the average scores of EU-TIC and WB-TIC in the 2003-2018 period, it can be concluded that the average values of EU-TIC are significantly higher than the average values of WB-TIC, for the whole period of analysis. The differences between the average scores between the two regions are reducing slightly. The difference of TIC average score for EU and WB regions in 2003 was 0.497 while in 2018, it reduced to 0.174. Similarly to the previous results of EGDI and OSC, all EU member states in the last report for 2018 were scoring high with a TIC value of 0.5-0.75 or as very high with a TIC value of 0.75-1.

Table 3. TIC of EU and Western Balkan Countries

Year	EU-TIC (Avg)	EU-TIC (Max)	EU-TIC (Min)	WB-TIC (Avg)	WB-TIC (Max)	WB-TIC (Min)
2003	0.594	0.846	0.372	0.097	0.134	0.049
2004	0.493	0.860	0.335	0.112	0.131	0.087
2005	0.495	0.839	0.315	0.114	0.142	0.068
2008	0.530	0.856	0.299	0.156	0.231	0.024
2010	0.526	0.767	0.309	0.279	0.380	0.163
2012	0.654	0.864	0.423	0.430	0.537	0.337
2014	0.688	0.887	0.438	0.445	0.548	0.355
2016	0.658	0.825	0.453	0.458	0.543	0.353
2018	0.691	0.800	0.547	0.517	0.621	0.432
slope	0.012			0.031		

Source: Author's calculations based on data from EGDI Reports

The analysis of the maximum and minimum values of TIC for the two regions shows that all maximum values for the EU region are significantly higher than the TIC values for the WB region, for the whole period. The minimum values for the EU region are also significantly higher than the minimum values for the WB region for the whole period, as well. The differences in maximum and minimum values are slightly reducing from 0.712 in 2003 to 0.179 in 2018 and for minimum values from 0.323 in 2003 to 0.115 in 2018.
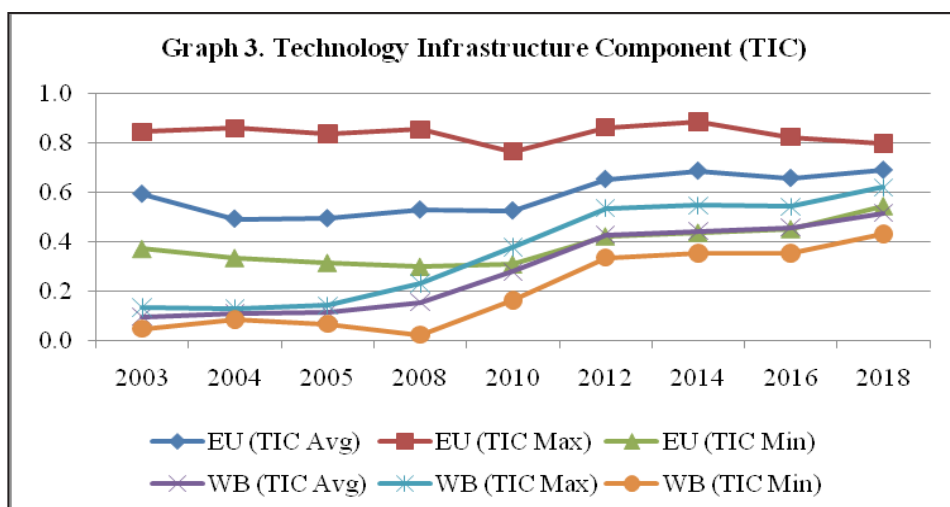
Source: Author's calculations based on data from EGDI Reports

The trend analysis of average EU-TIC and WB-TIC shows that both regions have positive trends and both trends improve slowly, for EU with 0.012
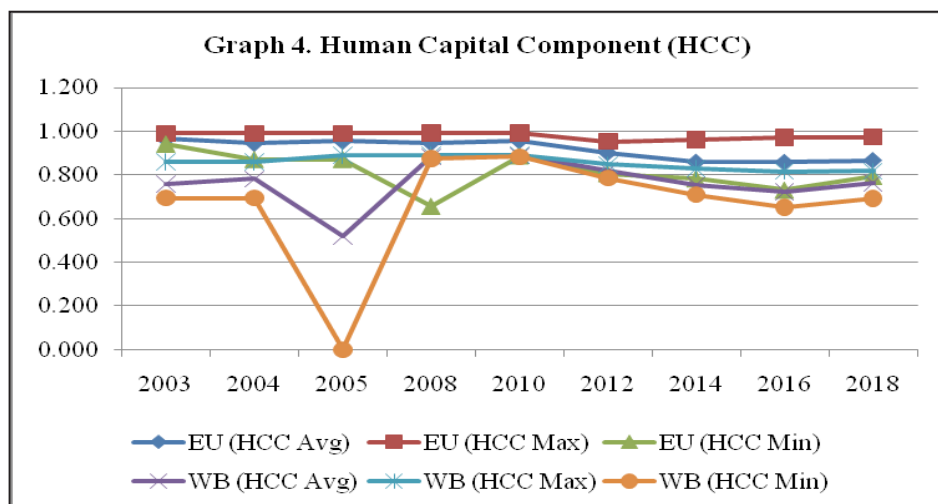
and for WB countries with 0.031. Comparing the trends of average scores, maximum and minimum values of EU-TIC and WB-TIC for the whole period shows that the differences are reducing. In Table 4, results are presented about the average, maximum and minimum scores for HCC (Human Capital Component) of EGDI for the EU and WB regions. Comparing the average scores of EU-HCC and WB-HCC in the period 2003-2018, it can be concluded that the average values of EU-HCC are higher than the values of WB-HCC for the whole period from 2003 to 2018. The difference between the average scores between the two regions is reducing for the period of analysis. The difference of HCC average scores for the EU and WB regions for year 2003 was 0.207 and for year 2018, it is 0.105. Unlike the previous two components (OSC and TIC), all EU member states in the last 2018 report were scoring very high with an HCC value 0.75-1.

Table 4. Human Capital Component (HCC)

Year	EU-HCC (Avg)	EU -HCC (Max)	EU-HCC (Min)	WB-HCC (Avg)	WB-HCC (Max)	WB-HCC Min)
2003	0.964	0.990	0.940	0.757	0.860	0.694
2004	0.945	0.990	0.870	0.782	0.860	0.694
2005	0.955	0.990	0.870	0.520	0.890	0.000
2008	0.947	0.993	0.658	0.883	0.891	0.874
2010	0.957	0.993	0.887	0.888	0.891	0.883
2012	0.902	0.953	0.806	0.819	0.848	0.786
2014	0.859	0.962	0.783	0.753	0.828	0.710
2016	0.858	0.971	0.731	0.723	0.816	0.652
2018	0.867	0.974	0.794	0.762	0.817	0.692
slope	- 0.008			0.0031		

Source: Author's calculations based on data from EGDI Reports

The comparison of the maximum and minimum values for HCC for the two regions shows that all maximum values for the EU region are higher than the HCC values for the WB region, for the whole period. The minimum values for the EU region are also higher than the minimum values for the WB region for the whole period, as well. But it is important to stress that the difference in minimum values for the HCC is not so significant and even the values converge for year 2010. In this year, Malta scored very low with an HCC value of 0.887 and in the same year, in the WB region, Macedonia had the lowest score with 0.883, very close or almost the same score with the lowest score in the EU.

Source: Author's calculations based on data from EGDI Reports

The differences between the maximum and between the minimum HCC values for both regions are reducing significantly (for maximum values from 0.13 in 2003 to 0.157 in 2018, and for minimum values from 0.246 in 2003 to 0.102 in 2018). The trend analysis of average EU-HCC and WB-HCC shows that the trend of EU-HCC is negative and slightly deteriorating for EU with − 0.008, while the trend for WB-HCC is positive and slightly improving with 0.0031. Comparing the trends of average scores, maximum and minimum values of EU-HCC and WB-HCC for the period 2003-2018, it can be noticed that the differences for this component are the lowest, taking into account the other two components such as OSC and TIC.

Conclusion

The goal of this research study was to cover the geographical research gap by making comparison of e-government development index (EGDI) between the two regions, EU and WB. The study makes a comparison of average, maximum and minimum scores of EGDI and its components and trend analysis. Findings from the study suggest that both regions have a positive EGDI trend for the whole period (2003-2018) and that the difference is slightly reducing. The results from comparing the EGDI components showed that the highest difference between the two regions is in the online service component (OSC), followed by the technology infrastructure component (TIC), while the lowest difference is in the human capital component (HCC). The results from the last report showed that the EGDI for all WB countries was ranked high in an interval from 0.5 to 0.75. Only one country from the WB region, Bosnia and Herzegovina, with EGDI of 0.53 in 2018, is close to

the upper bound for medium EGDI development. This study offers a better view of the reality in e-government development in the two regions, which is very important because all WB countries have the intention to become EU members in the future. Therefore, the potential for convergence between the both regions in e-government development is important for the future process of joining the EU. Also, the results from this study can serve policy makers in EU and especially in WB countries to more easily identify the potential areas for investment and improvement (in this case OSC and TIC).

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