

The issue of measuring e-government success in context of the Initiative 202020

Kopackova Hana

Abstract

This article deals with the issue that motivated formation of Initiative 202020. Czech Republic lags behind in the development of e-Government and currently is moving to 50th place in the ranking of E-Government Development Index evaluated by United Nations. The aim of this Initiative is that in 2020 the Czech Republic will be ranked among the top 20 states. The article sets two goals. In the first place, it is analysis of methodology with the objective to say if this measure is consistent enough for setting goals and priorities for next four years. Second goal is to find out possible reasons why our country is evaluated so badly and suggest options what could be done to score better. To achieve these goals, in-depth review of E-Government surveys from years 2003 - 2016 and other available materials, was conducted.

Keywords: e-government; measure; benchmarking; United Nations; EGDI

JEL Classification: H54

1. Introduction

Definition of e-government is very broad and changing through the time (e.g. [2], [3], [4], [5], [6]). Nevertheless, when trying to capture the issue of measuring e-government success it should be clear what construct is meant. For the purpose of this article e-government will be defined as the system of delivery of government information and services online via the Internet or other digital means [7], [8]. Reasons for implementation of e-government are different, though the main ones are:

- faster service delivery,
- greater efficacy,
- increased flexibility of service use,
- reducing transaction costs,
- enhanced transparency,
- and so on.

Whatever are the reasons and expected benefits, after the implementation phase and during the operation of the service, measurement of success should be done in order to ensure that the investment is justified. Metrics used to measure the success can be individual, based on the comparison of expectations and results, or collective that compare countries or regions among themselves. Each of the following approaches has its advantages and disadvantages. The advantage of individual evaluation is the focus on those indicators that are really important to the government. Disadvantage lies in isolation of results. No comparison to others means that we can be satisfied with less than is possible or we can have unrealistic expectations. The advantage of collective assessment is the comparison with other countries or regions and the opportunity to learn from the best practices. The drawback is that metrics are universal and if the country is on track in services other than benchmarking evaluated, then the country gets bad reviews even though the actual value of the services can be high. However, collective assessments can serve as the evaluation criterion for international companies when deciding in which country to invest. Country with the lowest barriers and “friendly” public administration will be favored.

The United Nations (UN) E-Government Survey is benchmarking tool comparing all UN member countries (193). Main measurements in the survey are based on two criteria – state of e-government development and e-participation. E-government development index (EGDI) takes into account specific e-government initiatives, as evidenced by online service index (OSI), telecommunication infrastructure index (TII), and human capital index (HCI). The measure is purely quantitative. E-participation index is qualitative measure that says how relevant and useful are features that allow citizens to voice their views online, give feedback and overall engage in public policy.

Over the last eight years, in the evaluations of the UN in terms of the maturity of e-government, the Czech Republic is getting worse. Although between 2014 and 2016, an increase of three places shows improvement, generally, in those eight years, the Czech Republic dropped by 25 places. Originally leader of Eastern Europe has become average and in some criteria even below average. At least it suggests ranking in E-Government Survey. The goal of this article is to prove if the situation is so critical and if so, why it happened. Analysis of surveys will be done to prove if the measure is consistent and able to be ground for setting strategies for next four years.

2. Material and Methods

The article is based on the qualitative analysis and thorough review of eight benchmarking studies from years 2003 [9], 2004 [10], 2005 [11], 2008 [12], 2010 [13], 2012 [14], 2014 [15], and 2016 [16]. First stage of the review tested availability of data. The aim was to find out if the source is complete and able to give all necessary values in all years. Desired variables were: EGDI value, EGDI ranking, HCI value, HCI ranking, TII value, TII ranking, OSI value, OSI ranking, EPI value, EPI ranking, values for HCI components, values for TII components, and values for OSI components. If some values could not be traced, it was necessary to find another trusted source that would imply.

The second step was to determine the consistency of the E-Government Survey during years. Methodologies of all surveys were reviewed and changes were found. Some problems were discovered, not mentioned in methodology that appeared through the first stage of review, all of them are described in results.

Last step covered the case study of the Czech Republic. All available data were gathered in order to make the comparison with regional, sub-regional and world average. Components of EGDI were studied through all years to find out where are hidden causes of problems.

3. Results

E-government Surveys are comprehensive materials covering from 100 to almost 300 pages. All studied surveys have common signs. All of them describe the methodology used in a given year, interpret the results - broken down by region, samples of best practices, but also examples of missed opportunities. They also contain tabular data in Annexes. Specific is the thematic focus of each survey, e.g. in 2010 it was devoted to the financial crisis or in 2016 to sustainable development. E-government Survey that measures e-government development in all 193 UN Member States through the E-government Development Index (EGDI) consist of three components weighted in equal manner.

- Online Service Index (OSI) measures the online presence of governments and services provided to citizens online. Selected government websites are evaluated according to four stages of development with the weight assigned to each stage (emerging 7%; enhanced 24%; transactional 30%; and connected 39%).
- Telecommunication Infrastructure Index (TII) is an arithmetic average of five indicators (estimated internet users per 100 inhabitants; number of main fixed telephone; lines per 100 inhabitants; number of mobile subscribers per 100 inhabitants; number of wireless broadband subscriptions per 100 inhabitants; and number of fixed broadband

subscriptions per 100 inhabitants), that measure the infrastructure through which citizens can have access to government online services.

- Human Capital Index (HCI) consists of four components (adult literacy rate; the combined primary, secondary and tertiary gross enrolment ratio; expected years of schooling; and average years of schooling) and measures the educational base of citizens allowing them to access government services online.

The first task was to determine whether the E-Government Survey can be used in all years as the sole source of information for the selected variables. Results are shown in table 1. Eight variables were available in all years, one in five years, two in four years and one only in two years. Missing data were sought in the UN E-Government Development Database.

Table 1. Availability of E-Government Survey data (Source: Author)

Variable name	Number of results
EGDI value, HCI value, TII value, OSI value, EPI value, EGDI ranking, EPI ranking, Values for OSI components, Values for TII components	8/8
Values for HCI components	5/8
TII ranking, OSI ranking	4/8
HCI ranking	2/8

Second step in the review was analysis of consistency of methodology. This part will be divided into two sections. In the first instance were studied changes described in methodology but some changes or problems with results were not found in the methodology. These changes will be reported in second part.

Methodological changes:

- Web Measure Index (WMI) was renamed for Online Service Index (OSI) in 2010. Phases of OSI have changed twice – first in 2008 the phase Networked was changed for Connected with different and much broader specification and then in 2010 the number of phases was reduced from five to four excluding interactive phase. Also in this year was given different weight to each stage. Greater weight was given to development of participatory and integrated transactional services than in the past. The questionnaire for OSI is changing for every time period.
- Human Capital Index (HCI) included two measures in 2003, 2004, 2005, 2008, 2010, and 2012 – Adult literacy and Gross enrollment with the proportion 2/3 to 1/3. From 2014 it comprises two more measures with proportion – 1/3 Adult literacy, 2/9 Gross enrollment ratio, 2/9 Expected years of schooling, and 2/9 Mean years of schooling.
- Telecommunication Infrastructure Index (TII) is the most changed index, which is understandable given the speed of change in information technologies. In 2003, 2004, and 2005 the index remained unchanged and covered five components – Internet users, Online population, Personal computer users, Fixed telephone subscriptions, Mobile-cellular subscriptions, and TV sets. In 2008 TV sets component was omitted and Online population was replaced by Fixed broadband subscriptions. Last changes happened in Personal computer users component that was replaced in 2012 by Fixed Internet subscription and then in 2014 by Wireless broadband subscriptions.
- E-participation index remains qualitative in nature with three parts forming the framework. Nevertheless, questionnaire is reviewed each year and adapted to new trends, which means that caution must be taken in comparing e-participation rankings with past measurements.

Changes and problems found in surveys:

- In 2008 and 2010 are scores assigned to stages of Web Measure Index given in points, not in percentage as it is in all other years. This can bring doubts about comparability. Data in UN E-Government Development Database are correct and use percentages.
- In 2003, 2004, and 2005 were not available data for HCI components, these data are not available even in UN E-Government Development Database.

- In 2003 and 2004 were measures of TII components related to 1000 persons and from 2005 those measures are related to 100 persons.
- Ranking of e-participation index made the most confusion. If one would take ranking from surveys and would not seek where the problem is, then the rating of the Czech Republic would be very unfavorable and surprising (23, 25, 31, 60, 86, 22, 122, and 76). The reason for these major changes lies not only in the lack of maturity of the Czech e-government in the area of e-participation, but also in inconsistent application of methods for ranking. Over the years were used two types of ranking methods without mentioning it in the methodology. Dense rating was used in 2003, 2004, 2005, and 2012. Standard competition ranking was used in 2008, 2010, 2014, and 2016. UN E-Government Development Database use Standard competition ranking, so the values are comparable. For the Czech Republic it is (45, 42, 47, 60, 86, 56, 122, and 76).

Last step in the review was case study focused on the position of the Czech Republic in international comparison of E-Government Survey. As a basic source of information were taken e-government surveys from various years, but subsequently there will be described projects in the Czech Republic originated in a given period for comparison with reality.

Figure 1. The Czech Republic in the EGDI ranking (Source: Author)

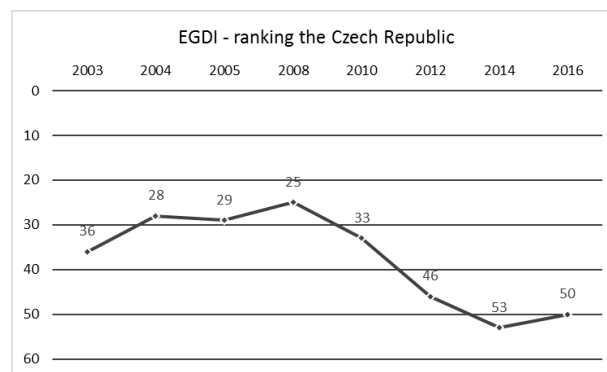
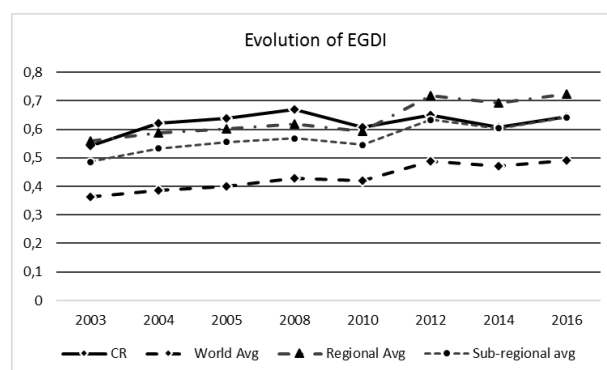


Figure 1 shows the evolution of EGDI ranking during studied period. It is evident that up to 2008 had ratings improving tendency, with the best result at the 25th position. Since then, the Czech Republic worsened by a total of 25 places. Although the order of EGDI has some explanatory value, based on the order we are not able to say whether the situation has worsened, or if we stagnate, and other countries are improving. Likewise, we cannot say whether there are large differences in index values, or the values varies only a little. It is necessary to compare index values to answer these questions. Comparison of EGDI values for the Czech Republic, regional average, sub-regional average, and world average is displayed in the figure 2. Results show that world average is far below Czech values, nevertheless it does not mean that our results are sufficient. To the world average are calculated countries very poor and underdeveloped as well. African countries, small island states and countries torn by wars are also part of the evaluation.

Figure 2. Comparison of EGDI indicator (Source: Author)



Much more interesting is the comparison with European and eastern European countries. Czech results were higher than European average until 2010 even if in this year started decline in EGDI ranking, however the decline affected all countries. The reason for low EGDI value for all countries can be found in the change of methodology for calculating OSI. The introduction of different weights for particular stages discriminated countries with mostly emerging and enhanced web presence and the Czech Republic was no exception. The problem appeared in the following evaluation, when other countries reacted and improved their web presence, concerning on transactions and tools for e-participation.

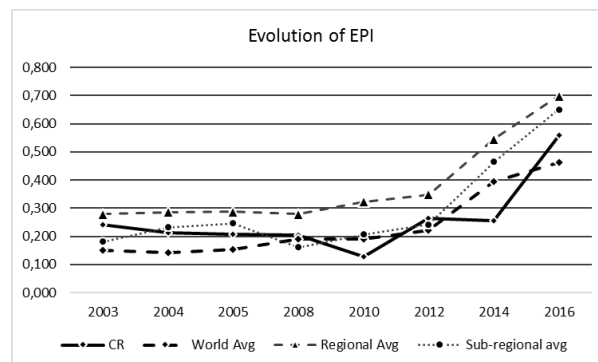
Change in methodology of HCI counting brought another decline in EGDI score for almost all countries. Paradoxically, the Czech Republic benefited by this change and good score covered so deepening downturn in the indicator OSI (see table 2). Survey in 2016 revealed that improvement in HCI indicator is demanding for underdeveloped countries and thus our country can benefit from the high quality education system for some time. However, these countries progress significantly in OSI indicator that raise the whole EGDI indicator in regional, sub-regional and even world average. Even Czech Republic improved the online services but the raise in other countries was much faster and now we are on the Eastern Europe average.

Table 2. The Czech Republic ranking in in OSI and HCI indicators (Source: Author)

	2003	2004	2005	2008	2010	2012	2014	2016
OSI	56	34	37	21	37	55	91	92
HCI	55	42	42	40	38	40	21	25

The seriousness of the situation is mainly based on two indicators – OSI and e-participation. Low level of online services is the problem that cause low rating in EGDI indicator, however there is another problem that was not articulated by Initiative 202020 and seems much serious. It is very poor rating in e-participation index. E-participation index is a qualitative measure that says how good, relevant, and useful are features that allow citizens to voice their views online, give feedback and overall engage in public policy. Questionnaire for EPI is divided into three parts; e-information, e-consultation, and e-decision-making. E-information covers existence and availability of different archived information and datasets. E-consultation allows citizens to communicate with their elected officials and read archived discussion. E-decision-making means possibility for people to be part of decision process. E-participation can be implemented through number of online tools: community networks, blogs, text messages, newsgroups, online forums, e-mail lists, pools, voting tools, and petition tools. In the survey is evaluated diversity, quality, relevance, and usefulness of those online services. Results of the Czech Republic, given in figure 3, indicates that e-participation is the weakest part of Czech e-government. It shows low openness of the Czech government. What, together with the lack of transparency, creates a bad image of our society. Moreover, in the coming years we can expect a greater emphasis on mobile friendly services, which are largely underdeveloped in the Czech Republic, as assessed in EU eGovernment benchmarking report [1].

Figure 3. Comparison of EPI indicator (Source: Author)



In order to be objective as possible and to show that Czech e-government initiatives did not stand still, now I would like to present projects that appeared in the period from 2008 when the decline in EGDI ranking emerged. The first major project, whose origins date back to 2007, is the CzechPOINT, assisted contact point of public administration, where citizens can obtain a statement from one of the public administration information system, or to convert the document into paper form. They are for people who cannot communicate with the public administration electronically. It is important to realize that in every society there is and always will be a group of such citizens. On the other hand there is also CzechPOINT@home, which is the de facto point of contact for "electronically literate" in the comfort of their home.

Since 2009 is operating data boxes information system, which aim is to change the method of delivery of official documents. The information system of data boxes is operated by the Czech Post. It facilitates communication of public authorities because it's faster and cheaper, and it also provides the secure delivery of the messages. Authorities and business enterprises have to communicate with each other only via data boxes, citizens can use their data boxes to apply for permissions, approvals or licenses but it is not obligatory.

The third big national project held in given period is called Basic registers, which represents central information source for information systems of public authorities. In addition basic registers are central hub for interchange of additional information, related to information, stored in basic registers – e. g. IS of vehicles, IS of drivers, IS of foreigners etc. The main thought behind project is „Let documents circulate through the authorities, not people themselves”. There are four basic registers integrated together (ROB – register of inhabitants; ROS – register of legal persons (companies); RUIAN – register of territorial identification, addresses and real estates; and RPP – register of rights and responsibilities of public authorities).

These are not all projects held in the Czech Republic in given period, many are on the regional level, some of them are more technical and some more process oriented. Summary of all projects can be found in the database of projects in online version <http://projekty.osf-mvcr.cz/en/Lists/Projekty/SearchProjects.aspx>.

4. Discussion and recommendation

Results showed that the EGDI methodology is stable in its basic calculation, which is the average of the three indicators $1/3$ HCI + $1/3$ OSI + $1/3$ TII. However, the changes take place within the indicators. For all of them changes in methodology occurred during the reporting period. This is understandable, because with technology development and possibilities of online services ratings must be also modified. If member countries want to keep high in the rankings, it is not enough to build e-government services, but also see how they are evaluated. Based on the study of materials available, I can say that the success of each country is determined by three different factors:

- real state of e-government in given country,
- changes in methodology (mentioned or not),
- changes in the process of evaluation.

First factor need not to be explained. Second factor was mentioned in results. Although all indicators of EGDI were changed, two changes influenced scoring of the Czech Republic. Assignment of the weights to the stages of OSI indicators caused the drawdown in the EGDI range. On the other hand, change in HCI index helped us to score better, respectively covered deepening fell in OSI indicator. Third factor means changes in the actual evaluation process. It is necessary to consider that any evaluation is not objective but express the point of view of the reality. Especially OSI is vulnerable to process changes in two views – findability and language barrier. Evaluators were instructed to take more citizen-centric approach, which means that if features could not be found easily, quickly and intuitively, then a site would score poorly. Interpretation of this instruction can be different for each evaluator and year. Another problem, which may reduce

ratings of the Czech Republic is the Czech language. Methodology of E-Government says “the research team was fully equipped to handle the six official languages of the United Nations, namely Arabic, Chinese, English, French, Russian and Spanish, however... the team went beyond this mandate and made an effort to review each website in the official language of the country, or where that was not possible, in another of the languages available on the site”. This statement does not guarantee that in each period there will be translator able to help with evaluation of pages in Czech, so the process will be changed. Good example of process changes can be seen in table 3. In 2014 only 53% of websites were evaluated as emerging, although in 2012 and 2016 it was about 100%. This change in evaluation cannot be explained by changes in Czech e-government and I haven't found any proof for changes in methodology, so it has to be some process problem.

Table 3. Scores for emerging stage of OSI (Source: Author)

	2003	2004	2005	2008	2010	2012	2014	2016
Emerging	75	75	100	100	74	100	53	95

In the preceding text were explained possible factors of success and now I would like to propose some ways, how to affect the success of the Czech Republic in this assessment.

- **Visualize and promote everything that already exists** – online services that are functional should be presented at the main evaluated sites (national portal, e-participation portal, and websites of ministries of education, labor, social services, health, finance and environment). They have to be visible, easily findable and translated into English language.
- **Monitor changes in methodology** – each E-government survey should be monitored for changes in methodology in order to focus Czech e-government policy and actions on the most important themes.
- **Actually develop new online services** - currently the emphasis is given on these online services:
 - whole-of-government
 - e-participation
 - multichannel service delivery
 - expanding usage
 - digital divide and vulnerable groups
 - open government data.

5. Conclusion

According to the results of this study must be stated that changes in methodology were consistent and affected all – world, regional and sub-regional average. The survey is quite well documented and accompanied with source data. The fundamental methodology of EGDI indicator counting is stable in its basic calculation, changes occur only within the measures, that form parts of EGDI. Based on these facts, we can take the E-Government Survey as a good source of comparative data regarding e-government. On the other hand it must be said that the survey is not complete because it does not include data from the demand side for the use of online services. This problem was already mentioned in 2010 survey yet there is no way how to realize this part of survey.

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Review 1:

- The paper has very ambitious aims and I am not sure that they can be met on 8 pages. Especially the second goal focused on reasons why the Czech e-gov scored badly.
- Results are presented only in general terms which undermine practical use of the paper. Authors does not deal only with results, but discuss problems of the benchmarking methodology which I welcome.
- I do not think that it is necessary to work with all the studies. I would start with 2008 also because of the EU programming period 2007-2014 and because of the intensive technology-orientation of the Czech Smart administration strategy.
- Results should be discussed with regards to existing e-gov strategies and their effects
- I recommend minor revisions. Results should be specified (e.g. in relation to existing e-gov services) and link to more practical recommendations. Results should be discussed with regards to existing e-gov strategies and their effects (discussion of effects of Smart administration and following strategies would be beneficial).

Review 2:

- The paper is not based on empirical research; it is based only on United Nation Surveys. For comparison it would be interesting to include other comments about the methodology used in the United Nations Surveys.
- For references to the United Nation Surveys it would more appropriate to use their e-ISBN.
- The article does not respect given structure, especially of chapter numbering.

Changes in the paper:

1. Factors of the success were identified and clearly defined.
2. Results were specified in order to give some more practical recommendations in Discussion and recommendation chapter.
3. Comparison of Czech e-government initiatives was added.
4. Numbering of chapters was added.
5. No similar review of methodology of E-government survey was found in scientific literature.
6. ISBN of sources was added where possible.
7. The only recommendation of reviewer that was not accepted was the one regarding the number of E-government studies. I believe that it is necessary to inspect evaluation methodology comprehensively and that is why no edition was omitted in modification.