

Simple Infrastructure in Measuring Countries e-Government

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Abstract—As alternative to existing e-government measuring models, here proposed a new customer centric, service oriented, simple approach for measuring countries e-Governments. If successfully implemented, built infrastructure will provide a single e-government index number for countries. Main schema is as follows. Country CIO or equal position government official, at the beginning of each year will provide to United Nations dedicated web site 4 numbers on behalf of own country: 1) Ratio of available online public services, to total number of public services, 2) Ratio of interagency inter ministry online public services to total number of available online public services, 3) Ratio of total number of citizen and business entities served *online* annually to total number of citizen and business entities served annually *online* and *physically* on those services, 4) Simple index for geographical spread of online served citizen and business entities. 4 numbers then combined into one index number by mathematical Average function.

In addition to 4 numbers 5th number can be introduced as service quality indicator of online public services. If in ordering of countries index number is equal, 5th criteria will be used.

Notice: This approach is for country's current e-government achievement assessment, not for e-government readiness assessment.

Keywords—Countries e-government index, e-government, infrastructure for measuring e-government, measuring e-government.

I. INTRODUCTION

WORLD is changing fast, with pressure of ICT developments world is changing even faster. Mobile phones putting new color to it, so yesterday's infrastructure burden to provide internet access evenly to all population, tomorrow will be solved easily and effectively with 3G and LTE technology. When internet is widely available, and internet generation is entering adult life, importance of some e-government measuring criteria's decreasing. With decrease of importance of essential criteria's in the past, new criteria and approaches need to be introduced in measuring e-Government. So as alternative to existing e-government measuring models like United Nations (UN) e-Government Development Index (EGDI) [1], here proposed a new customer centric, service oriented, simple approach for measuring countries e-Governments.

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II. CURRENT APPROACHES

Several individual countries collect information on e-government, mostly based on statistical surveys of government organizations. The content and standards (especially regarding statistical units) are diverse [5]. Countries that have conducted e-government surveys include Australia, Brazil, Czech Republic, Denmark, Egypt, India, New Zealand, Norway, Oman, Russia and Sri Lanka, among others.

Below briefly described most major initiatives that has global acceptance.

A. United Nations e-Government Development Index

To measure the development of national e-government capacities, the United Nations has generated the United Nations e-government development index (EGDI) [1]. The EGDI is a composite indicator that consists of three indices (online service index, telecommunication index and human capital index) that are equally weighted. In view of the steady growth in technological capabilities and the fact that the UN aims to reflect these developments in their indices.

The three indices that make up the EGDI cover a broad range of topics that are relevant for e-government:

- The online service index measures a government's capability and willingness to provide services and communicate with its citizens electronically.
- The telecommunication infrastructure index measures the existing infrastructure that is required for citizens to participate in e-government.
- The human capital index is used to measure citizen's ability to use e-government services.

B. UNPAN METERV3.0

METER [4] is an online, interactive tool to assist governments and decision makers at any level throughout the world in developing, monitoring, refining and improving the context within which information and communication technologies are used to transform government; in a sense in creating the context for e-Government. <http://www.unmeter.org/>

C. The 2012 Benchmark Framework

Member States and the European Commission started the benchmark framework in 2001 [2] to assess e-government progress of European countries. Three main sources of data are used for the benchmark:

- Online service analysis across some 10,000 portals and websites;

- Surveys carried out with nominated representatives from the administrations in the Member States;
- Impartial evaluations carried out by experts from the e-Government domain.

Core Measurement indicators:

- Online sophistication
- Full online availability
- User experience
- Portal sophistication
- E-Procurement visibility
- E-Procurement availability for the pre-award phase
- E-Procurement availability for the post-award phase
- Sub-national analysis
- The maturity of “life events”
- The availability and use of key enablers

For online services analysis major 20 services was measured. The analysis of the 20 basic government services looks at the following elements:

Online sophistication: The extent to which government services allow for interaction and/or transaction between the administration and citizens or businesses. This measure covers 20 basic public services such as online tax filing, obtaining permits, enrolling in schools and many others.

Full online availability: The extent to which there is fully automated and proactive delivery of the 20 key public services. A comparison over time illustrates the speed and extent of convergence in performance in Europe.

User experience of services: The user-centricity and usability of e-Government services.

Portal sophistication: Identifying the most mature, user-centric and personalized portals that provide direct access to a wide range e-Government services.

Sub-national analysis: for the first time, the 20 service metrics have been applied at NUTS (Nomenclature of Territorial Units for Statistics) levels, providing an unprecedented granularity of e-Government performance across regional and local administrations.

D. Framework for a Set of e-Government Core Indicators

This Framework proposes a set of globally comparative e-government core indicators, reflecting the emphasis on e-government by the World Summit on the Information Society (WSIS) and the suggestion by the UN Statistical Commission that the Partnership on Measuring ICT for Development extend its core list of ICT indicators to include indicators on ICT use in government. A background description of the e-government activities of The Task Group on E-government (TGEG) in the context of WSIS is available in the 2010 World Telecommunication/ICT Development Report (ITU, 2010) [3].

E-government core indicators of framework:

- EG1: Proportion of persons employed in central government organizations routinely using computers
- EG2: Proportion of persons employed in central government organizations routinely using the Internet

- EG3: Proportion of central government organizations with a Local Area Network (LAN)
- EG4: Proportion of central government organizations with an intranet
- EG5: Proportion of central government organizations with Internet access, by type of access
- EG6: Proportion of central government organizations with a web presence
- EG7: Selected Internet-based services available to citizens, by level of sophistication of service

When you look at above methodologies and the indicators most of them are quite complex to collect and measure and requires an extensive labor and cost. In contrast, we propose very simple approach which we tried to keep as simple as possible.

III. THE PROPOSED APPROACH

UN will have a simple portal, where countries can log on and submit their 4 numbers, more precisely 8 statistical numbers, from which will be calculated 4 ratios, and from 4 ratio numbers one e-government index number for that country. This numbers are reflecting e-government ultimately from customer side. The final result of huge government efforts to serve country is how citizens and entities are served. Main schema is as follows. Country CIO or equal position government official, at the beginning of each year will provide to United Nations 4 ratio numbers on behalf of own country: 1) Ratio of available (transaction level) online public services, to total number of public services, 2) Ratio of interagency inter ministry online public services to total number of available online public services, 3) Ratio of total number of citizen and business entities served *online* annually to total number of citizen and business entities served annually *online* and *physically* on those public services, 4) Simple index for geographical spread of online served citizen and business entities.

In addition to 4 numbers 5th optional number will be introduced as service quality indicator of online public services. If in ordering of countries index number is equal, 5th criteria will be used for ordering.

A. Explanation of Ratios

1st number will represent availability of country to deliver public services online, infrastructure development, transparency, and commitment of country in willingness of delivering services online. This number is total number of all Government to citizen (G2C), Government to business (G2B). Note: If countries will face difficulties in defining all government services, choosing 20 most basic services as above mentioned European benchmark may be one of modifications.

2nd number will represent how good is interoperability of government bodies, inter agency and inter ministry single window public service becomes possible only as result of good enterprise architecture (EA) based connected government, e-governance with good internal process flows.

3rd number will represent readiness of population to use online services, their online literacy and availability of internet and online services.

4th number will show how government geographically equal delivering online services.

Four numbers then combined into one index number by mathematical Average function. Then countries will be indexed in decreasing order

In addition to 4 numbers 5th number introduced as service quality indicator of available online public services. This number represents ratio of satisfactory services to total number of services, which can be assessed by public forums for each service or by team of experts. If in ordering of countries index number is equal this 5th criteria will be used for ranking of country. Main philosophy here is, once service is available quality will become better and better gradually, so this criteria is not included in main indexing. Also including quality into index number will harm simplicity of this approach, so we keep 5th number separately as additional optional number.

To have clear picture of country on UN's portal, not only index number, in beginning of each year country CIO will submit 8 numbers, to UN portal, from which portal will automatically calculate 4 ratio numbers and then country index. Together with 8 numbers CIOs also will submit commitment numbers for coming year. Commitment number and last year's actual numbers will be used next year for progress monitoring of that country by comparing 2 consequent year's numbers and the commitment numbers. Commitment numbers also can be used for country government officials to monitor CIO's performance. Putting here CIO or CIO like role responsible for this data submission is also UN encourages for having such position in a country.

Further 4 numbers are explained by example.

B. Explanation in Example

■ **Criteria #1:** Ratio of online public services, to total number of public services.

Please note, that numbers in examples are not actual numbers. Example: Mongolian government has total 240 public services by end of year 2013, 50 services of 240 public services served online (on transaction level). So country CIO will provide following numbers to UN: Total number of public service 240, number of transaction level online services offered to citizen and business entities 50, commitment for year 2014 is 100. By beginning of 2015 when new entries will be done, commitment numbers and last year's numbers can be checked against actual numbers to see performance of country on e-government development, and progress. In this case Mongolia will have $50/240=0.21$ for first criteria for year 2013.

■ **Criteria #2:** Ratio of interagency inters ministry online public services to total number of online public services.

Example: Because Mongolia is only on beginning stage of building Enterprise Architecture, only 3 ministries are interconnected and have online data exchange between them.

So from 50 online public services only 5 single window online services is provided as result of multiple government agencies online interaction. Country CIO will provide following numbers to UN: Total number of online public services 50, number of interagency inters ministry online services 5; commitment for year 2014 is 20. Calculations will be $5/50=0.1$

■ **Criteria #3:** Ratio of total number of citizen and business entities served *online* annually to total number of citizen and business entities served annually *online* and *physically* on those services.

Numbers here will be counted as one for each service occurrence, which mean if 1 citizen received 3 services, this will be counted as 3, also total number of online and physically served services is counted only for online available services. Example: Total number of online served citizen and business entities is 500 000, where total number of online and physically served is 2085 000 on those 50 public services (we take here total number of served citizen only for 50 services, which was available for online service). Country CIO will provide following numbers to UN: Total number of served citizen 2085 000, total number of online served citizen 500 000, commitment for year 2014 is 1500 000.

Calculations will be $500\ 000/2085\ 000 = 0.24$

■ **Criteria #4:** Simple index number of geographical spread of online served citizen & business entities.

Example and calculation method: Let's say 500 000 online service was made in 5 cities for 2085 000 citizen as shown in Table I. Here we took cities, in real life each administrative unit of country can be in calculation, and it is up to country to decide to which depth of administrative unit to go.

TABLE I
CITIES POPULATION AND ONLINE SERVICE PERCENTAGE

	Population of City	Online Served	Online Served %
City 1	835,000	250,000	30%
City 2	220,000	100,000	45%
City 3	350,000	80,000	23%
City 4	580,000	50,000	8.60%
City 5	100,000	20,000	20%
Total	2,085,000	500,000	126.60%

This table is represented in Fig. 1 and the proposed calculation method is as follows: First calculate total online service % of all cities, which is $30\% + 45\% + 23\% + 8.6\% + 20\% = 126.6\%$.

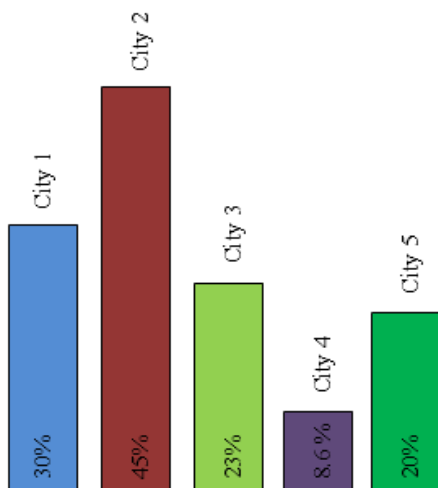


Fig. 1 Online service % of 5 cities

Then find the smallest % among cities, which is 8.6%. Find the difference % between smallest % and other cities. $30\% - 8.6\% = 21.4\%$, $45\% - 8.6\% = 36.4\%$..., see in Fig. 2

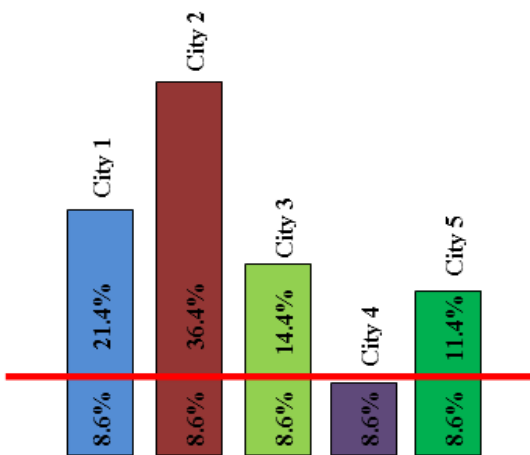


Fig. 2 Finding % difference

Calculate total difference %, which is $21.4\% + 36.4\% + 14.4\% + 0 + 11.4\% = 83.6\%$

Total percentage of cities online service is 126.6, total difference of percentages of cities above minimum 8.6% is 83.6. Portal will find index for geographical spread, as follows:

$1 - 83.6\% / 126.6\% = 0.34$ (this calculation can be simplified mathematically, but shown in detailed form to let reader follow philosophy of calculation). Here the smaller difference is the geographical spread index value is bigger. Country CIO will provide 0.34 to UN.

Final Index

After calculations for 4 criteria's index for Mongolia will be:

$$(0.21 + 0.1 + 0.24 + 0.34) / 4 = 0.2225$$

If one of countries index will be same 0.2225, 5th service quality index will be taken into consideration to find Mongolia's e-government achievement order.

C. Usability of Method

This model can be used to monitor countries e-government achievement globally, or this model can be used also inside country for self monitoring. This model can be used as well as inside ministries and private enterprises, where online services presence needed to be measured.

When it used inside ministries and enterprises, on criteria 2 inter department and inter administrative units transactions will be taken in account.

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