

**International e-Government,
Waseda University and
International Academy of CIO**

**The 12th Waseda - IAC International
e-Government Rankings Survey 2016
Report**

July 2016, Tokyo, Japan

Preface

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This report of the 12th edition is published by Institute of e-Government, Waseda University with the history of more than one decade on its activities of e-Government Ranking survey. It is great honor and much pleasure that I have edited and contributed to the contents of this report. During one decade since 2005 which started this annual ranking survey, there have been a wide range of challenges on changing technologies such as IoT, Big Data, Cloud and 4G mobile under new Internet / Digital economy in addition to rapid growth of ICT innovation and applications.

As the editor of this report, I would express particular attention to encouraging policy reforms to support the usability by citizens as users with demand side centric comprehensive approach and enabling new mechanisms for sharing the common solution oriented approach. Also, I suggest effective partnership among government, business, and academia to create innovative governance model for public and private partnership (PPP) in global context. To set up the national priority, the lessons learnt from the best practices in the report will contribute to the parties concerned.

I am deeply indebted to my colleagues and staff of the Institute as well as International Academy of CIO which I have been serving as president. In addition, I have learnt from partners such as ITU, OECD, EU, WB and APEC as well as many academia institutions and research centers. My deep appreciation is extended to the distinguished international Experts Group from 11 world prominent universities.

Finally, I think there are some issues left for further discussion such as e-Government vs. digital government, also, Chief Information Officer vs. Chief Innovation Officer, in addition, new international ranking survey for mega cities and e-local governments in the future. I trust the readers will learn a lot on e-Government issues from this report.

July 2016. Tokyo

Executive Summary

The Institute of e-Government, Waseda University (Director Prof. Dr. Toshio Obi), has released the results of the 2016 Waseda-IAC International e-Government ranking survey for the 12th consecutive year. The 2016 ranking survey marks Singapore staying at first place, followed by USA in 2nd, Denmark in 3rd, Korea in 4th and Japan in 5th place. Estonia is in 6th, Canada in 7th, Australia in 8th, New Zealand in 9th and both the United Kingdom and Taiwan ranked 10th.

For the 2016 survey, the research has been conducted in part through workshops and forums, and also the team has arranged professional meetings and discussions with a variety of international and national organizations to improve oversight and objectivity. These organizations include the Organization for Economic Co-operation and Development (OECD), Asia Pacific Economic Cooperation (APEC), the International Telecommunications Union (ITU), the World Bank (WB), and many other government agencies, Think tanks and NGO/NPOs in charge of e-Government activities in their respective countries.

The 2016 ranking marks a new decade of e-government development, an era of Internet/Digital economy where some countries have reached the ultimate goal of their e-government strategic plans. The ranking should adjust to accommodate any initiatives of those countries to shift their e-government into a new iteration. It also marks the significant positive changes in the application of the new trends of ICT in administration. Therefore, in order to effectively evaluate the application of new trends in each country, the research team conducted a survey by sending a questionnaire to relevant government officers as well as experts globally. The 9 main indicators have remained from previous years. In 2016, the Waseda-IAC e-Government ranking added “The use of Emerging ICT” as the 10th indicator in evaluating e-Government in 63 countries and 2 new countries: Ireland and Lithuania. This makes a total of sixty-five countries (economies) compared to sixty-three last year.

There is a diversity of the trends including digital innovation and regulatory environment. Major findings as the key characteristics this time are as follows:

- (1) Strong movement on citizen /user centric approach to e-Government online services is recognized as the step toward e-Participation,
- (2) Finding out the best practice and application is needed for the future perspective of mobile government via usage of smartphone as a part of e-Government framework

- (3) There is a lack of effective and productive cooperation between central and local e-Governments. And the urgent coordination among major stakeholders is necessary for reducing the duplication of activities and services and strengthening the partnership.
- (4) It is a high time to make re-evaluation on e-Government activities and create the new model of comprehensive digital government in order to attain the UN Sustainable Development Goals in this sector.

In order to obtain the latest and most accurate information, and to assess the relevant data, the research team at the Institute of e-Government at Waseda University headed by Professor Toshio Obi has conducted the ranking in cooperation with experts, researchers from partner universities around the world under IAC (International Academy of CIO), including George Mason University (USA), Bocconi University (Italy), University of Turku (Finland), Peking University (China), Thammasat University (Thailand), De La Salle University (Philippines), Bandung Institute of Technology (Indonesia), National University of Singapore (Singapore), Federal Academy School of IT Management (Russia), Czech Technical University (Czech Republic), and the main contributor, Waseda University (Japan).

This report contains Chapter 3 [Sector Analysis] with 10 indicators, Chapter 4, 5, and 6 as rankings by organizations, size of population and GDP and Regions, and Chapter 7 [Highlights], Chapter 8 for Methodology. Chapter 10 introduces [65 country assessment reports attached as appendix].

An analysis of the twelve years of the Waseda – IAC e-Government Rankings Survey indicates the following seven highlights:

- (1) Ageing Societies and e-Government (Societies are now becoming ageing at an alarming level in both developed and developing countries around the world)
- (2) E-Government service quality to be evaluated by marketing model
- (3) The impact of national policy to the development of e-Government at local level
- (4) E-Government for combating corruption through new mechanism
- (5) The usage of emerging technologies in e-Government such as IoT and Big data
- (6) E-Government development for the issues of less developed countries
- (7) Mobile Government in transition

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The list of country Assessment reports (65 countries/economies)

Singapore, USA, Denmark, Korea, Japan, Estonia, Canada, Australia, New Zealand, UK, Taiwan, Norway, Austria, Sweden, Finland, Iceland, France, Netherlands, Germany, Ireland, Thailand, Belgium, Portugal, Hong Kong, Switzerland, Israel, Italy, Spain, Czech, Russia, Malaysia, Macau, Indonesia, Chile, India, Romania, Poland, Philippines, Bahrain, UAE, Oman, Turkey, Mexico, Kazakhstan, Vietnam, Brunei, Brazil, China, Saudi Arabia, Argentina, Lithuania, Peru, South Africa, Tunisia, Columbia, Venezuela, Georgia, Uruguay, Costa Rica, Morocco, Kenya, Pakistan, Fiji, Egypt, Nigeria

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I. 2016 Overall Ranking

In 2016, there were some changes in evaluating e-Government development in the Waseda-IAC international e-Government ranking. Firstly, the research survey changed the total of the indicator from nine to ten main indicators. Secondly, the number of sub-indicators remained the same as previous years, but the evaluation questions in sub-indicators were re-planned in order to optimize and match the changing trends of ICT. Thirdly, evaluation methodology is adjusted in order to fit with the 10 main indicators and 35 sub-indicators. Furthermore, the number of countries (economies) increased from 63 to 65. Table 1 below shows the final overall 2016 Waseda-IAC International e-Government ranking.

No	Country(Economy)	Score	No	Country(Economy)	Score
1	Singapore	91.0	32	Indonesia	58.3
2	USA	90.2	34	Chile	58.2
3	Denmark	88.8	35	India	57.8
4	Korea	85.7	36	Romania	57.2
5	Japan	83.2	37	Poland	56.8
6	Estonia	81.8	38	Philippines	56.7
7	Canada	79.9	39	Bahrain	55.5
8	Australia	76.4	40	UAE	54.8
9	New Zealand	74.1	41	Oman	53.4
10	UK	72.7	42	Turkey	52.3
10	Taiwan	72.7	43	Mexico	51.5
12	Norway	70.0	44	Kazakhstan	51.4
13	Austria	69.6	45	Vietnam	51.2
14	Sweden	68.0	46	Brunei	50.9
15	Finland	67.6	47	Brazil	50.5
16	Iceland	67.3	48	China	50.3
16	France	67.3	49	Saudi Arabia	49.4
18	Netherlands	65.7	50	Argentina	46.2
19	Germany	65.1	51	Lithuania	45.3
20	Ireland	64.8	52	Peru	44.5
21	Thailand	64.5	53	South Africa	44.1
22	Belgium	64.0	54	Tunisia	44.0
23	Portugal	63.8	55	Columbia	42.0
24	Hong Kong	63.1	56	Venezuela	41.9
25	Switzerland	63.0	57	Georgia	41.5
26	Israel	61.9	58	Uruguay	41.1
27	Italy	61.5	59	Costa Rica	40.9
28	Spain	60.6	60	Morocco	40.7
29	Czech	59.7	61	Kenya	40.4
30	Russia	58.7	62	Pakistan	39.7
31	Malaysia	58.4	63	Fiji	38.3
32	Macau	58.3	64	Egypt	36.8
			65	Nigeria	35.0

Table 1: Waseda – IAC e-Government Total Ranking 2016

Table 2: List of Scores by Indicators of Top Ten countries (economy)

Indicators	Singapore	USA	Denmark	Korea	Japan	Estonia
Network Prep.	7.6	7.2	7.9	7.5	7.3	7.0
Online Service	11.1	11.3	11.2	11.2	9.9	10.9
Open Government.	9.5	9.6	9.4	9.2	9.2	7.8
Cyber Security	9.8	9.0	9.0	9.3	9.1	9.3
Mgt Optimizati	11.7	11.4	11.8	11.6	11.5	11.3
e-Participation	8.2	9.8	8.5	8.0	7.5	9.7
CIO	9.4	9.1	8.4	7.9	9.1	8.5
e-Promotion	9.7	8.2	8.3	7.7	9.3	7.1
Emerging Tech	6.7	7.2	7.0	7.9	5.6	3.0
Portal	7.3	7.4	7.3	5.4	4.7	7.2
Total	91.0	90.2	88.8	85.7	83.2	81.8

	Canada	Australia	New Zealand	UK	Taiwan
Network Prep.	6.6	7.0	6.9	7.0	5.3
Online Service	11.2	10.8	9.9	6.9	8.8
Open government	9.3	8.2	9.3	9.0	9.0
Cyber Security	7.2	8.4	9.4	8.5	7.6
Mgt Optimizati	11.2	11.4	11.2	9.6	8.8
e-Participation	9.6	6.0	6.0	9.2	7.5
CIO	7.9	6.2	7.9	7.8	7.7
e-Promotion	6.4	8.3	3.5	4.5	7.4
Emerging Tech	3.4	3.0	3.3	3.0	5.0
Portal	7.1	7.1	6.7	7.2	5.6
Total	79.9	76.4	74.1	72.7	72.7

The 2016 ranking marks a wide score variance in the top 10 of the rankings. In the overall ranking, Singapore remains the 1st place as the country with the highest score for e-Government development in the Waseda-IAC e-Government ranking. Thanks to the adoption of digital solutions and new technology, USA is 2nd, followed by Denmark in 3rd place. This is the highest position that Denmark ranked during the twelve years of the ranking. In the top ten, South Korea increases its position this year as 4th and Japan stands at 5th place. Both Estonia and Canada also jumped two slots ahead and is 6th and 7th this year while Australia slipped slightly from 7th last year to 8th place. Like Estonia, New Zealand made a big jump from 13th last year to 9th this year. This is the first time New Zealand made the top ten list. A big change in the top ten group of the ranking is the United Kingdom, which slipped from 4th last year to 10th this year. Taiwan made a big effort to join the top ten group this year as even rank with UK.

In the middle tier of the ranking, there are many variations in scores and positions of evaluated countries. Some developed countries such as Sweden, Finland, and Germany are on a downward trend in the ranking due to not having major

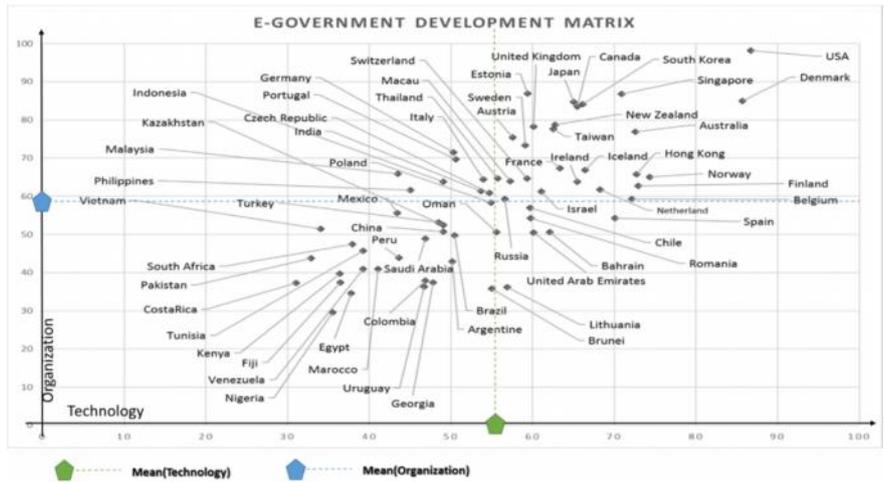
e-Government activities this year. Their positions are 14th, 15th and 19th respectively. Taiwan (Chinese Taipei), and Macau made obvious advances in e-Government development. Compared to last year, their positions have improved significantly.

Ireland and Lithuania are two new countries. They are EU members but their positions are different. Even though it was the first time in the Waseda-IAC e-Government ranking, Ireland has a very good position in the middle of the total ranking at 20th while Lithuania ranked at 51th even while the Lithuanian government continues to place e-Government development as a high priority.

A big change in the middle tier of the ranking is the positions of Indonesia, UAE, Brunei, and Vietnam. Indonesia slipped 4 slots and is 33th while UAE and Brunei slipped 10 and 3 slots behind compared to last year, respectively. In Vietnam, online service delivery is still limited, despite a high rate of internet penetration. Lack of consistent direction in e-Government implementation, especially in local governments, resulted in highly fragmented e-Government initiatives and impeded collaboration and data sharing among agencies.

The bottom tier of this ranking consists of familiar names from last year, such as Pakistan, Fiji, Egypt, Costa Rica, and Nigeria. In this group, Nigeria is the country that had big change. It fell from 58th to 65th this year. Nigeria still needs to improve her ICT services and telecommunication systems. This year, Nigeria replaced Kenya ranking at the bottom of the overall ranking.

Table 3: E-Government Development Matrix



The e-Government Development Matrix attempt to cluster the countries into four quadrants; Quadrant I (the upper left), Quadrant II (the lower left), Quadrant III (the lower right), and Quadrant IV (the upper right). Countries in Quadrant I are the country whose governance readiness is above average. Quadrant II clusters the countries whose both governance and technology readiness are still below average. Quadrant III is the

opposite of Quadrant I in which the technology readiness is above average. Quadrant IV is the segment for the country whose both aspects are above average.

Table 4: 4 Quadrants of E-Gov. Development Matrix

Quadrant I	Quadrant II		Quadrant III	Quadrant IV	
Italy	Mexico	Peru	Chile	USA	Australia
Germany	Poland	Argentina	Romania	Denmark	New Zealand
Portugal	Turkey	Morocco	Spain	Japan	Austria
Czech Republic	Kazakhstan	Venezuela	Oman	South Korea	Belgium
India	Vietnam	Kenya	UAE	Singapore	Russia
Malaysia	Saudi Arabia	Colombia	Bahrain	Estonia	Thailand
Indonesia	China	Uruguay	Lithuania	Norway	Hong Kong
Philippines	Brazil	Georgia		Finland	Macau
	South Arica	Brunei		Iceland	Taiwan
	Tunisia	Fiji		Ireland	Netherland
	Pakistan	Egypt		Sweden	France
	Costa Rica	Nigeria		United Kingdoms	Switzerland
				Canada	Israel

The evaluation of the development of e-Government in countries through the e-Government rating charts that Waseda University publishes is a useful method to see the overall picture of ICT applications and e-Government development in many countries around the world (65 countries as of 2016). By carefully analyzing 10 main indicators, covering most of the concepts related to ICT trends and e-Government, the e-Government ranking from Waseda University has contributed to an overall plan to assess the development of e-Government.

This model fully evaluates the development of e-Government from the user’s perspective and based on the organization's impact. To clarify the impact of the organization on e-Government services, Waseda rankings analyze the indicator of “Management Optimization”, which includes the evaluation of e-Government development through development strategy. This is a very important factor and tends to lead to policy creation for the development of e-Government, rather than measures to improve service quality. Besides the indicator “Management Optimization”, the Waseda rankings have put Government CIO into the assessment model and consider it to be one of the key factors for the success of e-Government in each country.

Another important factor also mentioned in the Waseda e-Government ranking is “e-Government Promotion”. These are criteria that indicate and evaluate the activities of the government in promoting the development of e-Government. In the Waseda e-Government ranking, e-Government promotion is refer to legal frameworks and mechanisms (laws, legislations, plans, policies and strategies).

It is clear to see that this indicator only refers to the promotion of policies and development strategies, but does not mention the promotion of services through marketing policies. However, the sub-indicators of organization have not been fully addressed, and the lack of planning from leadership, an important factor in implementing e-Government.

The impact of e-Government is expressed at different levels from country to country. In developed countries, it focuses on promoting new online services and introducing online services at the highest level to customers, while also seeking out new trends in service development, applying new technical tools to build smarter e-Government, using ICT for better management, aiming to maximize the government's activities, and enhancing communication with customers over the Internet. In developing countries, it is promoting service plans in these countries mainly focuses on the implementation plans and e-Government roadmap for each year or for a certain period, or on upgrading the network system by raising the proportion of Internet users and broadband connections. In under-developed countries, it have focused on building telecommunication infrastructure in order to increase the ability to connect to the global Internet network, as well as the ability to internally connect between departments, such as building networks for e-Government applications in the future.

Highlights for top 3 of overall ranking

Singapore:

As leading nation of e-government in Asia, Singapore continues to maintain the momentum of evolvement. The performance on indicators of Management Optimization, e-government promotion and cyber security are showing its strong points and advancement this year. Especially on the efforts for cyber security, Singapore equips the law and regulation framework to assure every safety measure and security upgrade can be enforced with legal basis. In respect to policy, National Cyber Security Masterplan 2018, as the latest strategy, guides government to enhance nation’s security environment and create a robust and trusted society for public, private and individuals. Continuous masterplans in each crucial segment are one of the keys to keep Singapore proactive and possessing execution capacity on e-government development.

To future direction, Singapore still has potential on the growth of the use of emerging technologies. This new indicator has been introduced to Waseda e-government ranking this year. Due to the fact that many countries are still at the

start-up phase, direction for expanding the new technologies into public service sector needs more endeavor to be clarified. Singapore could seize the opportunity to formulate policies and standards, not only guide domestic innovation, but also delight international co-development.

United State of America:

Notable highlights include the U.S. Citizenship and Immigration Services (USCIS) portal, which allows applicants to check their immigration status instantly along with typical wait times, and the Open Government Initiative. The USCIS portal is consistently rated among the most accessed websites in the U.S. government, according to the official Open Analytics counter.

On the local government front, sharing best practices can particularly improve the provision of benefits for low-income individuals by state governments. Millions of federal dollars are spent annually on state or local IT that supports these services and the Advance Planning Document (APD) process allows states to obtain approval for the portion of the costs of acquiring new online systems that the federal government contributes. The current system contains important mechanisms to hold states accountable for making smart choices about what systems are developed, but it may also encourage siloed systems, which might add greater costs for later integration as well as biasing states against migrating to solutions that could be more cost-effective in the long term. To address this gap, The Office of Management and Budget (OMB) should work with relevant agencies to modernize the APD process to encourage governments to develop enterprise-wide solutions.

Denmark:

Denmark has shown marked developments in e-government projects but there are few available resources on e-Government related promotions particularly at the local level. In 2005, the Danish authorities launched a large-scale communication campaign to raise citizens' awareness of e-government services. The OIO Committee for Architecture and Standards (OIO Committee) has a mandate to support the strategy to facilitate the work of e-government in the state, regions and municipalities, with particular emphasis on ensuring interoperability between IT systems across organizational boundaries. The government has released its e-government strategy 2011- 2015 on June 20, 2011 at the eGov Global Exchange in Singapore, even before reaching the Danish public, according to Lars Frelle-Petersen, Deputy Director General and Head of the Digital Task Force Agency for Governmental Management, Danish Finance Ministry. The government is thus looking at online services that are simpler and more effective. This will be achieved through four goals: 1) Phase out paper applications and regular mail 2) Help companies achieve higher growth rates 3) Bring 'welfare technologies' into public schools, hospitals, nursing homes, providing better

welfare with more value for the money 4) Cooperate closely to digitize the public sector. Furthermore, to promote Internet use in Denmark, The Danish Public Welfare Technology Fund will allocate DKK 15 million to establish Internet hotspots in public places. Institutions for education, knowledge or culture can apply for funds to provide their users with free internet access. The funds will be used to prioritize Internet connectivity and use. The government will also invest 500 million. DKK and municipalities will up to 1 billion. DKK tailoring teaching in public schools for future needs.

II. E-Government Ranking by Indicators

The Waseda – IAC International e-Government Ranking uses comprehensive benchmarking indicators to accurately assess the latest developments of e-Government in the major countries in ICT. In the process of evaluation, researchers found that Information Technology is increasingly widely used in the activities of governments and the applications of ICT have been applied to many fields in various sectors. Many governments around the world are aware of the role of ICT in their administration and management; they have applied ICT to deliver services to citizens, businesses and the government itself, aiming to move traditional government towards an e-Government model. The new trends of ICT play an increasingly important role in the shift from traditional government to smart governments. Therefore, based on these trends, the 2016 ranking adopted one new indicator: “The use of emerging ICT” with three sub-indicators (the use of Cloud Computing, IoT, and Big Data) for evaluation. In total, the 2016 ranking has ten main indicators with 35 sub-indicators.

Indicators	Sub-indicators
1. Network Preparedness/Infrastructure	1-1 Internet Users 1-2 Broadband Subscribers 1-3 Mobile Cellular Subscribers
2. Management Optimization/ Efficiency	2-1 Optimization Awareness 2-2 Integrated Enterprise Architecture 2-3 Administrative and Budgetary Systems
3. Online Services / Functioning Applications	3-1 E-Procurement 3-2 E-Tax Systems 3-3 E-Custom Systems 3-4 E-Health System 3-5 One-stop service
4. National Portal/Homepage	4-1 Navigation 4-2 Interactivity 4-3 Interface 4-4 Technical Aspects
5. Government CIO	5-1 GCIO Presence 5-2 GCIO Mandate 5-3 CIO Organizations 5-4 CIO Development Programs

6. e-Government Promotion	6-1 Legal Mechanism 6-2 Enabling Mechanism 6-3 Support Mechanism 6-4 Assessment Mechanism
7. E-Participation/Digital Inclusion	7-1 E-Information Mechanisms 7-2 Consultation 7-3 Decision-Making
8. Open Government	8-1 Legal Framework 8-2 Society 8-3 Organization
9. Cyber Security	9-1 Legal Framework 9-2 Cyber Crime Countermeasure 9-3 Internet Security Organization
10. The use of Emerging ICT	10-1 The use of Cloud Computing 10-2 The use of Internet of Things 10-3 The use of Big Data

Table 5: The Main Indicators and Sub-Indicators

This research not only evaluates the development of websites and ICT deployment in governments, but also looks into real operations, such as management optimization, internal processes, online services, and new trends in e-Government development and the relationship between governments and their stakeholders. The top ten e-Government rankings by indicators are listed in table 6 below:

	Network Prep.(10)	Score		Online Service(12)	Score
1	Denmark	7.9	1	USA	11.3
2	Singapore	7.6	2	Denmark	11.2
3	Korea	7.5	3	Singapore	11.1
3	Sweden	7.5	4	Estonia	10.9
5	Belgium	7.4	5	Australia	10.8
5	Finland	7.4	6	Norway	10.5
7	Japan	7.3	7	Finland	10.3
8	USA	7.2	7	Netherlands	10.3
9	Norway	7.1	9	Japan	9.9
10	UK	7.0	9	New Zealand	9.9

	Open Gov.(10)	Score		Cyber Security(10)	Score
1	USA	9.6	1	Singapore	9.8
2	Singapore	9.5	2	New Zealand	9.4
3	Denmark	9.4	3	Korea	9.3
4	Canada	9.3	3	Estonia	9.3
4	New Zealand	9.3	5	USA	9.0
6	Korea	9.2	5	Denmark	9.0
6	Japan	9.2	7	Switzerland	8.8
8	Taiwan	9.0	8	UK	8.5

8	UK	9.0	9	Israel	8.4
8	Finland	9.0	9	Australia	8.4

	Mgt Optim(12)	Score		e-Participation(10)	Score
1	Denmark	11.8	1	USA	9.8
2	Singapore	11.7	2	Estonia	9.7
3	Korea	11.6	3	Canada	9.6
4	Japan	11.5	4	France	9.5
5	USA	11.4	5	UK	9.2
5	Australia	11.4	6	Italy	9.0
7	Estonia	11.3	7	Norway	8.5
8	New Zealand	11.2	7	Denmark	8.5
8	Canada	11.2	9	Singapore	8.2
10	Sweden	11.1	10	Iceland	8.0

	CIO(10)	Score		e-Promotion(10)	Score
1	Singapore	9.4	1	Singapore	9.7
2	USA	9.1	2	Japan	9.3
2	Japan	9.1	3	Sweden	9.0
4	Estonia	8.5	4	Australia	8.3
5	Denmark	8.4	4	Denmark	8.3
6	New Zealand	7.9	6	USA	8.2
6	Korea	7.9	7	Korea	7.7
6	Canada	7.9	8	Taiwan	7.4
9	Germany	7.8	9	Estonia	7.1
9	UK	7.8	10	Italy	6.8

	Emerging Tech(8)	Score		Portal(8)	Score
1	Korea	7.9	1	USA	7.4
2	USA	7.2	2	Singapore	7.3
3	Denmark	7.0	2	Denmark	7.3
4	Finland	6.8	4	UK	7.2
5	Singapore	6.7	4	Estonia	7.2
6	Norway	6.5	6	UAE	7.1
6	Ireland	6.2	6	Australia	7.1
8	Sweden	6.2	6	Canada	7.1
9	Japan	5.6	9	Iceland	7.0
10	Taiwan	5.0	10	New Zealand	6.7

Table 6: List of Cores by indicators of Top Ten Countries

III. Sectors Analysis

1. Network Preparedness/Digital Infrastructure

Network Infrastructure is an essential requirement for conducting data communication from one access point to other points—from government's premises to the citizens. Network preparedness becomes a necessity for effective e-Government implementation. Different stages of infrastructure have long been available in many countries and have become an important tool to connect citizens and enterprises with government. In developing countries, the numbers of internet users, broadband subscribers, and especially mobile cellular subscribers continue to rise.

Infrastructure for e-Government development is no longer confined to Internet users, mobile subscribers or the number of broadband connections. Together with the development of ICT and the integration trends between local and center government, we recognize that the foundation for the development of e-Government in a country depends on a backbone system. It is capable of connecting all bureau and departments together via the core Government Backbone Network. There are three sub-indicators under NIP: (1) Internet Users; (2) Broadband Users; and (3) Wired Broadband Users.

In 2016, the first place ranking for network preparedness was achieved by Denmark. Denmark has come a long way since it made the decision to establish a modern, robust digital infrastructure for the public sector. The current Danish e-Government strategy, published in August 2011, is entitled “The Digital Path to Future Welfare: e-Government Strategy 2011-2015.” The strategy proposes that the central government, regions and municipalities cooperate in order to accelerate the adoption of digital solutions in the public sector. The report emphasizes that the government must capitalize on its leading position and continues to be a digital government leader well into the future.

2. Management Optimization

This indicator reflects the utilization of ICT for improving government business processes. The optimization should show the effort to integrate the silo of business processes using ICT. Clear direction from the top is required to implement such improvement and integration effectively and successfully. The roadmap of the improvement process must be well-defined and acknowledged by all stakeholders. The following sub-indicators constitute this indicator: (1) Optimization Awareness, (2) Government Enterprise Architecture, and (3) Integrated Administrative and Budgetary System.

Topping the management optimization ranking are Denmark, Singapore, Korea, Japan, USA, Australia, and Estonia. Estonia has launched the Digital Agenda 2020. The ultimate goal of this agenda is not merely ICT use in daily life and business. The current

plan emphasizes the improving economic competitiveness, the well-being of people and the efficiency of public administration. Some priorities have been set on the agenda such as completing a next-generation broadband network, generating greater control over personal data, and utilizing data analytics in the public sector. In all, Estonia has fully achieved the maximum score in the Management Optimization domain. Contributions from the operationalization of X-Road are very significant in this area.

3. Online Services/ Applications

E-service is the integration of business processes, policies, procedures, tools, technologies, and human efforts to facilitate both assisted and unassisted customer services using the Internet and other networks. Government provides services at different levels: for various governments (government-to-government), for private enterprises (government-to-business) and for citizenry (government-to-citizen). Government-to-citizen service involves all the communication or transactions between government, at various levels, and citizens. Now governments are developing the next stage of e-government by establishing e-service infrastructure and organizational capacity for constituents to transact official business online. There are five applications under this indicator that are considered as flagships in e-government development. These applications are as follow: (1) e-procurement; (2) e-Customs; (3) e-Tax; (4) One stop services, and (5) e-Health.

The U.S. is in first place for Online Services. ICT in the U.S. continues to provide new and innovative ways for U.S. citizen to interact, get involved and become empowered. Public participation enhances the government's effectiveness by improving the quality of its decisions through collaboration. Innovative tools can be used to create unprecedented openness in the Federal Government through increased citizen participation and make this type of collaboration a reality.

In Singapore, most services have reached the transactional stage, allowing citizens having two-way transactions with public agencies. However, the third party application result (Google PageSpeed) has been introduced to Waseda-IAC international e-Government ranking in 2016 to measure the portals' speed in consideration of convenience. There are still some improvements that could be achieved with the online portals in Singapore.

4. National Portal/Homepage

National portal is the foundation of e-Government and a basic interface for stakeholders to access government in an electronic way. In the public sector, this means that the government makes all services available via one portal. In e-Government one-stop service means integrating all services and making them accessible via one gateway. National portals offer many benefits to users for public services—from

citizens and businesses to the public administrators themselves—including faster, cheaper and superior services. Throughout eleven years of ranking, we noted that the national portal helps to reduce costs, improves perceptions of government efficiency on the part of citizens and also delivers benefits for both customers and government.

The National Portal of the US government is a gateway to improve the communication experience between the government and the public. Moreover, it provides information that helps the public to better understand government structure. The well-organized portal serves as a platform that assists the public to find desired information. To improve users' browsing experience, the portal also allows users to create government accounts that allow each individual user to customize the portal as they desire. The website contains accessibility features, a live chat platform, and the chat feature is available every weekday except holidays. This provides a one-stop-shop for all government information and services. It comprehensively lists all public services, forms, tools and transactions that the government provides in a user-friendly manner.

The national portal of the UAE Government is part of the federal e-Government program and a major milestone in the process of e-Transformation in the UAE. It is a one-stop shops that brings all e-Services provided by the UAE federal and local government bodies under one umbrella. The national portal contains all necessary information for individuals, businesses, visitors, and government. It is a single entry-point for users to access the different federal and local government e-Services. The portal also serves to boost communication between customers and government representatives and e-Participation through forums, blogs, surveys, polls and social media.

5. Government Chief Information Officer (GCIO)

The Government CIO is the expert who has the mandate to align management strategy with ICT investment in order to achieve a balance between the business strategy, organizational reform, and management reform; hence, the Government CIO is one of the key factors in the success of e-Government implementation. The presence of Chief information officers (CIOs) in government plays an important role in the success of e-government. The exact title of the GCIO might differ among countries. The same position with the same capacity can be named differently. However, the title CIO is becoming very important since there is an increased need for international collaboration to support CIO human resource development. There are four sub-indicators under GCIO: (1) The presence of GCIO; (2) The mandate of GCIO; (3) The organization of GCIO; and (4) The development program for GCIO.

In Japan, each central ministry has a CIO who is appointed among senior staff within the ministry (mainly Director General of administration) and an assistant CIO who is an expert recruited externally. The Federal CIO Council composed of Ministry

CIOs has the authority to decide many rules on in-house ICT installation and online services. The percentage of CIO appointments at the prefectural level is 90% and 85% at the city level in 2015. The government established a Government CIO as a core of all Ministry CIOs in November 2012.

In Germany, there is a growing impetus in the federal government in the area of CIO in government. This is in conjunction with the government drive to optimize public administration. In December 2007, the German cabinet agreed on a Federal IT strategy aiming at improving IT management within the government. It recommends that each government department have a CIO with wide ranging powers. It also results in the creation of an IT Council composed of CIO officials that will tackle Germany's IT strategy issues. This development resulted in high marks for Germany in this area of the survey. Cornelia Rogall-Grothe has been the German GCIO from 2010 to 2015.

In Singapore, the Infocomm Development Authority of Singapore (IDA) plays the role of a Government Chief Information Officer (GCIO) together with the "e-government owner" – the MOF. IDA is responsible for "master planning, project-managing and implementing various infocomm systems and capabilities for the Government". To accomplish this mission, this organization supervises and manages IT standards, policies, strategies and procedures for the Government as well as administers the security and infrastructure of ICT. With the presence of IDA, Singapore government is aiming to promote the role of CIOs in the public sector and to increase the success rate of Government IT projects. On January 2014, IDA has appointed Mr. Chan Cheow Hoe as the GCIO and Assistant Chief Executive of the Government Chief Information Office / Government Digital Services. GCIO drives and oversees ICT initiatives to maintain Singapore Government's leadership position as an innovative user of infocomm technologies to delight customers and connect citizens. GCIO comprises the following groups and functions: (1) Whole-of-Government (WOG) ICT Governance; (2) Whole-of-Government (WOG) ICT Infrastructure; (3) Government Digital Services; (4) Clusters, that work in partnership with public sector agencies to manage their ICT function; (5) Strategy & Innovation; and (6) GCIO Corporate Development.

6. E-Government Promotion

The e-Government promotion indicator is evaluated by using a comprehensive list of parameters which judge the degree of development in each sector as well as the current status of e-Government promotion. This ranking includes activities supporting the implementation of e-Government such as legal frameworks and mechanisms (law, legislation, plans, policies and strategies). In other words, these activities are carried out by the government in order to support the development of e-services and in-house operations. The sub-indicators under this indicator are as follow: (1) Legal Aspects; (2) Enabler; (3) Supporting Aspects; and (4) Assessment model.

In Singapore, high-tech and informational society is one of the vital national goals. Therefore government continues to pursue the evolution of e-government, not only through continuous plans but also the relevant legal framework has been implemented in recent years. Academic support including seminars and research centers on e-Government and ICT utilization are active in Singapore. It ranked second in this indicator among evaluated countries.

The digital interactions between the U.S. government, citizens, businesses, employees and other governments have improved from couple of years ago. This clearly springs from the efforts to develop and promote electronic Government services and processes by the establishment of an Administrator Office of Electronic Government within the Office of Management and Budget. The promotion of the use of the Internet and other information technologies to increase opportunities for citizen to participate with the U.S. Government and promoting interagency collaboration providing electronic Government services, where these collaborations would improve the services provided to citizens by integrating related functions and the use of internal digital Government processes. This e-Government promotion has reduced the costs and burdens for businesses and other government entities, not forgetting that people are better informed regarding decisions made by policy makers

7. E-Participation/ Digital Inclusion

E-Participation is a term referring to ICT-supported participation in government and governance processes. Processes may concern administration, service delivery, decision-making, and policy-making. Triggered by the advent of web 2.0 technologies, it has come to the era of Government 2.0 powered by more convergence of e-Government applications to public. This phenomenon shows the trend of internet application to be more citizen-centric, including e-Government that introduce the e-Participation. An e-Participation indicator is used to take into account the "demand" side of e-Government as well as to see to what degree people are using e-government platforms especially in the light of Gov 2.0 mashups. The sub-indicators are as follow: (1) e-Information; (2) e-Consultation; (3) e-Decision making.

E-Government, in general, is not meant to be a direct support for democratic practices. E-government is just one method to achieve better governance. While democracy is only one of the final outcomes expected, it is not always necessarily the case. Therefore, judging the success level of e-Government practices by using the measurement of democracy can be misleading. Furthermore, e-participation cannot be viewed as representative of the whole e-government system. In fact, it is just a part of e-government, using the electronic version of ordinary participation practice that is mainly supported by the Internet. E-participation is not the substitute of offline or any other participation channels, such as face-to-face meetings. E-participation can be

illustrated as a vehicle. It offers speed and convenience. But it's up to the government how to drive it.

Culture and society in Estonia have been recreated as a high-tech society. These factors have driven Estonia to the next horizon of e-Government. Citizens and the government can benefit from ICT in their daily life. For instance, parliament members have websites and provide citizens with an alternative channel to communicate. The presence of an e-participation portal (osale.ee) contributes to the high achievement of Estonia in this indicator.

In Canada, e-services, online services, online information and online citizen engagement are organized by category and not on a department-by-department basis, which makes them user-friendly and responsive to citizen demands. In order to gauge the efficacy of their services, the government uses a unique Canadian outcomes analysis approach called 'Citizens First' in the case of individuals and families, and "Taking Care of Business" in the case of companies, it enables everyone to use electronic services very easily. The Government of Canada offers a variety of applications, accounts, tools and services to allow citizens to complete tasks online.

8. Open Government Data

Open data is data that can be freely used, reused and redistributed by anyone—subject only, at most, to the requirement to attribute and share sources. Open data does not mean that a government or other entity releases all of its data to the public. It would be unreasonable for the government to give out all of your private, personal data to anyone who asks for it. Rather, open data means that whatever data is released is done so in a specific way to allow the public to access it without having to pay fees or be unfairly restricted in its use. Three sub-indicators are used to evaluate: (1) legal framework; (2) society; and (3) organization.

Open Government Data evaluates the openness and transparency of governments. The top ranking countries on this indicator have provided the citizens with an application programming interface (API) that could help developers and researchers to create innovative citizen-centric applications. There are a number of small scale utilization cases and applications for smartphones and tablets.

According to Waseda e-Government ranking, providing Open Government Data is fast becoming a major political objective and commitment in many countries. Especially in Japan, the motivation of supporting economic growth and improving public services, as well as to promoting government transparency and accountability make it an attractive policy objective. While many governments are rushing to launch political initiatives and online portals, the majority have yet to demonstrate the full benefits of Open Government Data and to make the necessary preparations to realize those benefits.

Open Government Data is increasingly becoming an important concept in the applications of ICT, in administration and management of government, and can be considered a core element in bringing government closer to citizens, and also helps government be more transparent in all activities as well as minimize corruption. In order to improve internal efficiency, the delivery of public services, or processes of democratic governance. The usage of ICT can deliver the services and information to citizens, effective interactions with business and industry, improving day by day in internal processes as well as citizen empowerment through access to information. Open Government Data is a way for public administration to become more open and transparent, and to reinforce democratic participation.

New Zealand launched the Official Information Act to participate in the Freedom of Information Act movement around the world some time ago. To strengthen the implementation of these acts, New Zealand has established Open Data Portal (<https://data.govt.nz>) to provide public with government information. To keep the information update, New Zealand government uses Data one.govt (Open Network Environment) as a platform for data submission.

In the U.S. as a priority Open Government Initiative for President Obama's administration, Data.gov increases the ability of the public to easily find, download, and use datasets that are generated and held by the Federal Government. Data.gov provides descriptions of the Federal datasets (metadata), information about how to access the datasets, and tools that leverage government datasets. The data catalogs will continue to grow as datasets are added. Federal, Executive Branch data were included in the first version of Data.gov. The site has undergone continuous improvements since then.

9. Cyber Security

Cyber Security is the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, trainings, best practices, assurances and technologies that can be used to protect the cyber environment and organization and user's assets. Organization's and user's assets include connected computing devices, personnel, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment. Cyber security strives to ensure the attainment and maintenance of the security properties of the organization and user's assets against relevant security risks in the cyber environment. Legal framework, Cyber security countermeasures, and Internet security organization are three sub-indicators to evaluate e-Government development.

In South Korea, the National Cyber Security Master Plan was released in 2011. Since then, it has been viewed as the foundation to guide the nation's cyber defense strategy. Korea also has a solid legislation framework on cyber security such as: The Information and Communication Infrastructure Protection Act 2001 (critical

infrastructure protection); Act on Protection of Personal Information Maintained by Public Agencies (1994); Electronic Transaction Basic Act (February 1999, into force on 1 July 1999); and so on.

Both KrCERT/CC and KN-CERT are considered as computer emergency response teams in Korea Government. The Korea Internet and Security Agency is responsible for network and information security. In addition, the National Cyber Security Center (NCSC) is the central point of government for identifying, preventing and responding to cyber-attacks and threats in Korea. The NCSC, in collaboration with the private sector and the military sector, will improve warning systems and response time to security incidents and protect critical national infrastructures in Korea. For raising awareness on cyber security, the Korea Information Security Agency is responsible for online training and broadcasting about the responsible use of the internet among users.

10. The Use of Emerging ICT

This indicator is the new indicator on the ranking. This indicator is aimed at accommodating many countries, especially developed countries that have implemented or examined the emerging technologies for improving e-Government quality. However, developing countries are expected to obtain an important score by implementing state-of-the-art ICT for their e-Government. There are three emerging technologies on government sectors that will be investigated. These technologies are as follows: (i) the use of Cloud Computing, (ii) the use of Internet of Things, and (iii) the use of Big Data.

The United States government believes the security of computer systems is important to the world for two reasons. The increased role of Information Technology (IT) and the growth of the e-commerce sector have made cyber-security essential to the economy. Also, cyber-security is vital to the operation of safety critical systems, such as emergency response, and to the protection of infrastructure systems, such as the national power grid. Based on then-DHS Secretary Janet Napolitano's testimony to the Senate , in a year alone, the DHS U.S. Computer Emergency Readiness Team (US-CERT) received more than 100,000 incident reports, and released more than 5,000 actionable cyber-security alerts and information products. Twitter, the Wall Street Journal, the New York Times, and the Department of Energy and many other prominent companies have reported that their systems had been breached. Furthermore, classified government data has been leaked to the press and the public in several high-profile cases. Current efforts are being made to secure sensitive data to prevent future breaches.

In Finland, the Internet of Things was mentioned in the new Government Program as a key project to coordinate the ministries' activities. This will be a joint effort by businesses and the public sector in order to “create a favorable operating environment for digital services and new business models”. An implementation plan for leveraging

big data and for piloting My Data will be drawn up (based on the Big Data Strategy of the Ministry of Transport and Communications, 8/2014).

Norwegian government has started to implement Cloud Computing for running One Government Private Cloud (OGPC). OGPC offers Infrastructure-as-a-Service (IaaS) for government agencies. E-Government National Center maintains this Cloud Computing Services. Other emerging technologies are still immature and no evidence to prove that Brunei implemented Big Data and IoT.

IV. E-Government Ranking by Organizations

1. Ranking of APEC Economies

	No	APEC Economies	Score
1	1	Singapore	91.0
2	2	USA	90.2
3	4	Korea	85.7
4	5	Japan	83.2
5	7	Canada	79.9
6	8	Australia	76.4
7	9	New Zealand	74.1
8	10	Chinese Taipei	72.7
9	21	Thailand	64.5
10	24	HK SAR	63.1
11	30	Russia	58.7
12	31	Malaysia	58.4
13	33	Indonesia	58.3
14	34	Chile	58.2
15	38	Philippines	56.7
16	43	Mexico	51.5
17	45	Vietnam	51.2
18	46	Brunei	50.9
19	48	China	50.3
20	52	Peru	44.5

Table 7: e-Government Ranking in APEC Economies

In this group, the survey research covers 20 economies as in the previous years. This group is divided between developed countries and developing countries. Leading in the developed countries is Singapore in the first place, followed by USA in 2nd. South Korea and Japan positions are 3rd and 4th respectively. Canada and Australia are 5th and 6th while New Zealand kept its same place compared with last year at 7th. Topping the developing countries in this group is Thailand, followed by Hong Kong in 10th.

As in the overall ranking, in this group Vietnam had the big regression and fell five slots from 13th last year to 17th in the 2016 ranking. Peru ranked at the bottom of this group ranking. Chile jumped from 15th place in last year's ranking to 14th place. In the

2016 e-Government ranking, Chile is one of the top countries in Latin America in terms of Internet access.

2. Ranking of OECD Countries

	No	OECD Countries	Score
1	2	USA	90.2
2	3	Denmark	89.7
3	4	Korea	85.7
4	5	Japan	83.2
5	6	Estonia	81.8
6	7	Canada	79.9
7	8	Australia	76.4
8	9	New Zealand	74.1
9	10	UK	72.7
10	12	Norway	70.0
11	13	Austria	69.6
12	14	Sweden	68.0
13	15	Finland	67.6
14	16	Iceland	67.3
15	17	France	67.3
16	18	Netherlands	65.7
17	19	Germany	65.1
18	20	Ireland	64.8
19	22	Belgium	64.0
20	23	Portugal	63.8
21	25	Switzerland	63.0
22	26	Israel	61.9
23	27	Italy	61.5
24	28	Spain	60.6
25	29	Czech	59.7
26	34	Chile	58.2
27	37	Poland	56.8
28	42	Turkey	52.3
29	43	Mexico	51.5

Table 8: e-Government Ranking in OECD Countries

The 2016 ranking added Ireland as a new country. As Ireland is a member of OECD, the addition increases the number of OECD countries to 29 in the Waseda-IAC ranking. Most of the countries in the top ten of this group are also amongst the top ranked countries in the overall world ranking. The leaders of group are the USA, Denmark, Estonia, Japan and South Korea. They tied for 1st, 2nd, 3rd, 4th, and 5th place respectively, followed by Canada at 6th, Australia at 7th and New Zealand at 8th. Two last countries in the top ten are the United Kingdom and Norway.

In this group, the UK had a big regression, it dropped from 3rd in last year's ranking to number nine in the 2016 ranking. Despite a lower position than last year, most of

indicators are at high score which reflects a well-developed e-government situation as one of the countries with a high level of e-government development

V. E-Government Ranking by the Size of Population and GDP

1. Ranking in Big Population Countries (bigger than 100 million)

	No	Country(Economy)	Score
1	2	USA	90.2
2	5	Japan	83.2
3	30	Russia	58.7
4	33	Indonesia	58.3
5	35	India	57.8
6	38	Philippines	56.7
7	43	Mexico	51.5
8	47	Brazil	50.5
9	48	China	50.3
10	62	Pakistan	39.7
11	65	Nigeria	35.0

Table 9: e-Government Ranking in Big Population Countries

There is little change in this group compared the ranking last year. The leaders of this group are USA, Japan, and Russia. They are ranked 1st, 2nd and 3rd place respectively. The USA is very mature in e-Government and the U.S. government is committed to delivering public services. USA's objectives are to fulfill the needs of users and achieve maximum value for the money of the taxpayers. Currently, the focus is shifted to the productivity and effectiveness improvement by using ICT.

In the bottom of this group ranking is China, Pakistan, and Nigeria. They came at 9th, 10th, and 11th place respectively. Compared with other countries, China has a comparatively slow process on e-Government development. The absence of GCIO not only pares down the scores for evaluation, but more importantly, has influenced the execution of ICT plans in each government level. According to China's strategy, e-government has been regarded as a tool for administrative reform and government process re-engineering rather than developing e-Government itself. Plenty of online services remain below the phase of transaction, not to mention the lack of open government data and e-decision making. However, some megacities in China have promoted advanced e-service and data share process to citizens (For example Shanghai), which continues to pull ahead the gap with underdeveloped areas. The gap of wealth has affected every aspect of the societies in China, and the implementation of better e-government is no exception.

2. Ranking in Small Population Countries (Less than 10 million)

	No	Country(Economy)	Score
1	1	Singapore	91.0
2	3	Denmark	89.7
3	6	Estonia	81.8
4	9	New Zealand	74.1
5	12	Norway	70.0
6	13	Austria	69.6
7	14	Sweden	68.0
8	15	Finland	67.6
9	16	Iceland	67.3
10	20	Ireland	64.8
11	24	Hong Kong	63.1
12	25	Switzerland	63.0
13	26	Israel	61.9
14	32	Macau	58.3
15	39	Bahrain	55.5
16	40	UAE	54.8
17	41	Oman	53.4
18	46	Brunei	50.9
19	51	Lithuania	45.3
20	58	Uruguay	41.1
21	59	Costa Rica	40.9
22	63	Fiji	38.3

Table 10: e-Government Ranking in Small Population Countries

Ireland and Lithuania are two new countries for evaluating the e-Government ranking in 2016. These two countries belong to the group of small population countries but they have a good ICT infrastructure for developing e-Government. It is the first year for Ireland to enter the Waseda e-Government ranking, landing in the 20th position among 65 countries. Scores on each indicator are balanced, and Ireland showed strength in the indicators of “Online Service” and “Management Optimization”, which also are the common strong points for top-20 countries. The one-stop service of Ireland (<http://www.gov.ie/>) tries to minimize the website to provide most of the information and links to government agencies on simple options. It is also available for users to search information by 4 ordinary needs as “apply/find/complain/pay” on the first-level page. However, more general information could be added to the national portal for non-Irish people to get known about the nation, in addition to the tourism website for Ireland. With a good foundation of e-government plans and GCIO structures, Ireland may make more progress on the e-government development.

Denmark has shown marked development in its e-government projects but there are few available resources on e-Government related promotions particularly at the local level. The government is thus looking at online services that are simpler and more effective. This will be achieved through four goals: 1) Phase out paper applications and regular mail 2) Help companies achieve higher growth rates 3) Bring ‘welfare

technologies' into public schools, hospitals, nursing homes, providing better welfare with more value for the money 4) Cooperate more closely to digitize the public sector.

3. E-Government Ranking in Top 10 Countries with biggest GDP in World

	No	Country	Score
1	2	USA	90.2
2	5	Japan	83.2
3	7	Canada	78.3
4	10	UK	72.7
5	17	France	67.3
6	19	Germany	65.1
7	27	Italy	61.5
8	30	Russia	58.7
9	47	Brazil	50.5
10	48	China	50.3

Table 11: e-Government ranking with biggest GDP Group

China is the second biggest economy in the world, but in terms of e-Government, it remained in 10th place, the same as last year. The USA is at the top of this group, followed by Japan in 2nd and Canada is 3rd. France and Germany exchanged positions compared to the ranking last year; they were 5th and 6th respectively. In the bottom of this group ranking consists of familiar names from last year, such as Russia, Brazil, and China.

As one of the most advanced e-government nations, Japan stayed in the top 5 of the overall ranking and in 2nd place in this group. As mentioned above, the Japanese government has built a sophisticated promotion system for e-government initiatives and precise GCIO regimes into every rank of government (Central and local government; different government agencies) to assure the effective implementation and evaluation of e-government initiatives.

In this group, Brazil is one of the biggest, in both population and area. Therefore, to provide e-services to all citizens is required to set up a good infrastructure, now low awareness of e-government services is a barrier preventing its effective use. It can be established that this is also an obstacle to the assessment of citizen demand. One of the challenges is that citizens with higher levels of education get more easily acquainted with new ICT tools and access e-Government services. Besides, education constitutes a fundamental requirement to enable citizenship and as a consequence for the advancement of e-Government.

VI. E-Government Ranking by Regions

1. Ranking in Asian Countries

No	Country(Economy)	Score
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1	1	Singapore	91.0
2	4	Korea	85.7
3	5	Japan	83.2
4	8	Australia	76.4
5	9	New Zealand	74.1
6	10	Taiwan(Chinese Taipei)	72.7
7	21	Thailand	64.5
8	24	Hong Kong	63.1
9	31	Malaysia	58.4
10	32	Macau	58.3
11	32	Indonesia	58.3
12	35	India	57.8
13	38	Philippines	56.7
14	45	Vietnam	51.2
15	46	Brunei	50.9
16	48	China	50.3
17	62	Pakistan	39.7
18	63	Fiji	38.3

Table 12: e-Government Ranking in Asian Countries

In 2016, the Waseda e-Government ranking kept the number of country in the Asia at 18 countries, the same as last year. Not much changed in the top of the group compared with last year. Singapore, Japan and Korea remain the leading countries in this group in terms of e-Government development. During this year of assessment, we could not find major significant activities related to e-Government issues.

The Macau SAR government has strived to simplify the administrative procedures and optimize public services through continuous e-government plans in different phases. Administrative effectiveness and efficient governance reform have always been critical tasks for e-government in Macau.

2. Ranking in Americas Countries

	No	Country	Score
1	2	USA	90.2
2	7	Canada	79.9
3	34	Chile	58.2
4	43	Mexico	51.5
5	47	Brazil	50.5
6	50	Argentina	46.2
7	52	Peru	44.5
8	55	Columbia	42.0
9	56	Venezuela	41.9
10	58	Uruguay	41.1
11	59	Costa Rica	40.9

Table 13: e-Government Ranking in Americas Countries

In 2016, this group had only a small change in the e-Government ranking between Peru and Colombia. They exchanged their positions compared to the ranking last year.

In American countries, the gap in scores (digital divide) between the leader country and the bottom country in the group ranking is very wide. This shows that the gap of the digital divide is increasingly widening among countries in the region.

Colombia has participated in several international efforts to improve e-Government in the Americas. For example, it has offered many candidates for excelGOV awards, and generally participated in regional and international working groups at a rate higher than its neighboring nations. Though it still has much room for improvement in terms of rankings, Colombia is poised to continue on its upward trajectory and make some important advances in the coming years.

Chile has achieved its e-Government success due to three main factors: a continuous long-term strategy, efficient policy-making and its modern socioeconomic qualities. Unlike other countries in the region, Chile began designing its long-term e-government policy plans by the early 2000s, when its first webpage for official procedures, “Easy Errand,” was created. By 2004, Chile had designed its first Digital Agenda to start with a continuous process that would lead up to today’s 2013-2020.

3. Ranking in European Countries

	No	Country	Score
1	3	Denmark	89.7
2	6	Estonia	81.8
3	10	UK	72.7
4	12	Norway	70.0
5	13	Austria	69.6
6	14	Sweden	68.0
7	15	Finland	67.6
8	16	Iceland	67.3
9	17	France	67.3
10	18	Netherlands	65.7
11	19	Germany	65.1
12	20	Ireland	64.8
13	22	Belgium	64.0
14	23	Portugal	63.8
15	25	Switzerland	63.0
16	27	Italy	61.5
17	28	Spain	60.6
18	29	Czech	59.7
19	36	Romania	57.2
20	37	Poland	56.8
21	51	Lithuania	45.3

Table 14: e-Government Ranking in European Countries

In this group for the 2016 ranking, the survey research added two new European countries and now the number of countries in this group is 21. Europe is largely made up of developed countries with high per-capita incomes and a wealth of human resources. With regards to e-Government development, EU countries are encouraged to

deploy advanced technologies, institute better governance and e-services while simultaneously pursuing greater transparency, efficiency and inclusion.

It is the first time for Ireland to be evaluated in the Waseda e-Government ranking with a good position at 12 in this group and 21 in the overall ranking. Compared with other European countries, Ireland had better performance on the indicator of Management Optimization, E-Government Promotion, E-Participation and Emerging Technologies. The Government of Ireland has regarded the merging ICT as methods to reform public service, the key element of public service's ICT strategy. A Cloud Computing Strategy has been made to support the reform, to engage with Cloud Computing and to undertake a comprehensive program of Data Centre Consolidation. Considering Ireland's efforts to promote open data, there should be more related legal framework and Data management integrated into the government's official departments.

The Lithuanian government continues to consider e-Government development a high priority. Despite the country's relatively small size in GDP and population, it has established a useful and user-friendly online presence for itself, which shows signs of improving in the days ahead.

4. Ranking in Africa, Middle East and CIS Countries

	No	Country(Economy)	Score
1	26	Israel	61.9
2	30	Russia	58.7
3	39	Bahrain	55.5
4	40	UAE	54.8
5	41	Oman	53.4
6	42	Turkey	52.3
7	44	Kazakhstan	51.4
8	49	Saudi Arabia	49.4
9	53	South Africa	44.1
10	54	Tunisia	44.0
11	57	Georgia	41.5
12	60	Morocco	40.7
13	61	Kenya	40.4
14	64	Egypt	36.8
15	65	Nigeria	35.0

Table 15: e-Government Ranking in Africa, Middle East and CIS Countries

This group includes 6 countries from Africa, 5 countries from the Middle East and 4 countries from CIS. The 2016 ranking did not add any new countries from these regions. Leading this group is Israel, followed by Russia in 2nd, Bahrain in 3rd, the UAE in 4th, and Oman in 5th. Compared to the ranking last year, their scores in 2016 are lower even the number of main indicator increases to 10. 3 Africa countries at the bottom of the ranking in this group are also 3 countries ranked at the bottom of overall ranking: Kenya, Egypt, and Nigeria. They were 13th, 14th, and 15th respectively.

Among the ten indicators in the current ranking, the National Portal and Management Optimization are the best among other indicators in e-Government Bahrain. This achievement signifies the importance of the new e-Government Strategy 2017 for improving the quality of government business process. Bahrain implements several best practices for developing e-Government systems. Enterprise Architecture is adopted to develop Bahrain National Enterprise Architecture Framework. COBIT 5 is applied for designing IT Governance Framework.

Compared to 2015, Kenya escaped from the bottom of the ranking and jumped to 13th in the ranking of this group and 60th in the 2016 overall e-Government ranking. Kenya has the impressive point on Management Optimization, Online Service, and E-Participation. The Kenya Vision 2030 is the national long-term development policy that aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. But the field of GCIO, the use of emerging technology and e-Government Promotion are the weak point of Kenya.

VII. Highlights

1. Ageing Societies and e-Government

As both developed and developing countries around the world are now discovering, societies are now ageing at an alarming level. Some, like Japan, are facing an unprecedented increase in the proportion of seniors to the working age population. Others, like the United States, face situations that do not appear so alarming when looked at proportionally (thanks to immigration and higher birth-rates), but will still have to deal with a record-shattering number of aging seniors in real number terms. (Bloom et al., n.d.) No matter what the proportions look like, the increasing number of aging citizens poses a significant and substantial problem to countries around the world.

Despite the seriousness of this problem, there is some optimism that these challenges can be met through the strategic use of ICT applications. As more and more everyday tools, tasks, and operations are digitized, governments gain a whole new set of options to use to improve the lives of their aging citizens. Below is a few of the emerging technologies and ICT applications that will make a difference in seniors' lives in the coming years.

Governments are still hard at work, making plans as to how to deal with the Ageing problem. At the 2015 White House Conference on Aging in July, several public and private initiatives were announced. The federal government launched Aging.gov, a portal administered by U.S. Health and Human Services that collects the most relevant information and services for seniors in one web portal. Initiatives like this are occurring around the world, as policymakers are realizing the extent of the challenges and

opportunities that these new demographic realities offer. Naturally, many of them are turning to new technological innovations as one of the most promising tools available.

2. E-Government service quality as new Evaluation model

Many governments around the world are aware of the role of ICT in their administration and management; they have applied ICT to deliver services to citizens, businesses and the government itself, aiming to move traditional government towards an e-Government model. E-Government represents a paradigm shift from traditional government and its evolution happens in stages: it begins with the establishment of a web presence, matures to interaction through email or other electronic media, and is followed by the development of business logic infused with front-end applications. Finally, the process ends with the integration of governmental activities beyond the web interface.

The aims and nature of the transition from government to e-Government and the applications of ICT in administration and management, e-Government refer to improving the quality of services for citizens, businesses and organizations, as well as delivering services to citizens in an easier and more convenient way.

Like other traditional services, the quality of electronic service is the most important requirement of users. Some researchers suggest that price is a pivotal quality indicator in situations where other information is not available, but for most people, the quality of service is the top priority when using a service. In recent decades, this issue has become a major area of academic investigation. Regarding this issue, there has been a great deal of research evaluating the dimensions of e-Service contexts. Service quality has been considered from many different perspectives and is based on many aspects, such as service performance, customer perspective, and the perception of service or customer expectations.

There is no overall model that covers the general concepts in the evaluation, especially for specific types of services, such as e-Government (e-Government model). E-Government has developed in most countries, but the level of development differs from country to country. Developed countries tend to focus on promoting new online services and introducing online services at the highest level to customers, while also seeking out new trends in service development, applying new technical tools to build smarter e-Government, using ICT for better management, aiming to maximize the government's activities, and enhancing communication with customers over the Internet.

2016 Waseda e-Government ranking shows that: United States and Denmark are two countries in the top of overall ranking. There are some reasons which made these countries in the top of ranking, but one of them is that they have very good e-services to community.

3. The impact of national policy to the development of e-Government at local level

R. Heeks categorizes e-Government into five levels: International, National, Regional, State/Provincial and Local government. Local governments are the main point of contact for delivery of services where 50% to 80% of citizens' interactions with public bodies occur. However, despite its importance, the implementation of local e-Government has remained problematic not only in developing countries but also in advanced economies. Reviewing relevant research reveals that most research and designed models have focused on national and state-level e-Government practices, with few studies focusing on local e-Government. For many years, Australia and United Kingdom are two countries that have achieved high positions on the Waseda- IAC e-Government ranking.

Australia is governed through a three-tier system, represented by federal, state and city governments that works within a parliamentary system of democracy. There are total 562 local governments, with broad variety in geographic sizes and population.

Australians e-Government adoption efforts have been clarified under the 2012-2015 e-government strategy. It shows that Australians continue to embrace the Internet as a way of interacting with government. The National Digital Economy Strategy was published on 31 May 2011 emphasized on the mission to position Australia as a leading digital economy by 2020. Drawing upon this vision, a collection of policies, strategies and guidelines were published by Ministry of Finance and Deregulation and Australian Government Information Management Office (AGIMO), pursuing to make Australia government becoming an effective government; seeking to reduce costs, increase customer satisfaction and promote innovation.

Being the largest local government area in the world with a large diversity in geographic, demographic, and population, Australian local authorities are struggling to develop and implement e-government practices for increasing citizens' engagement due to insufficiently skilled human resources or lack of funding. For example in Western Australia State, there are cities such as Shire of East Pilbara which spans more than 370,000 square kilometers and is home to just over 8,000 habitants. In this instance, local governments are unlikely to have sufficient resources to ensure citizen access to the Internet and to develop e-government practices.

In addition, local governments in Australia have limited authority, with their responsibilities mainly constrained to day-to-day services. In order to develop e-government services relating to such as health or education, local governments are highly depended on the state government's funding resources. Meanwhile, e-government in Australian local levels is currently proceeding independently from federal guidance, with ICT initiatives frequently implemented without guiding policy

documentation from national government level. This leads to a huge diversity in e-government service practices amongst Australian local governments.

UK local government is structured in two ways. In Scotland, Wales and Northern Ireland there is a single-tier council which is responsible for all local authority functions. The remaining of England has a two-tiered level of local government comprising district and county councils. In total, there are 464 councils in England and Wales with some 10,000 parish and town councils across the UK.

The United Kingdom stressed in its “Government Digital Strategy” that all services should be “digital by default”, which means all transactions with citizens and businesses will be delivered through digital channel. Building upon over a decade of experience of implementing online services the strategy points out how government services are expected to become ‘digital-by-default’. It estimates that moving services from off-line to digital channels will save between £1.7 and £1.8 billion a year.

The UK has its own advantages in pursuing e-Government practices at the local government level. The UK government launched a modernization program to transform local authorities’ performance across the UK. This new agenda has led to the execution of electronic government at the local level across the UK. National policies such as the National Strategy for Local E-Government offer a holistic framework with broad contexts and requirements for development government at local level. The UK has been developing a national strategy together with supporting mechanisms in standards, organizations, and infrastructure for local e-Government, making it a country with a high level of local e-Government implementation. Based on a survey of the impact of national policy, 83 percent of UK local authorities stated that the national strategy directly influenced improvements on service delivery, and 64 percent stressed that the policy impacted public engagement in local decisions.

It can be seen from above scenarios that an advanced national e-government level does not always guarantee the success at the local level. From the case studies of Australia and UK, it is believed that the cooperation of different levels is essential for e-government development at local levels. Meanwhile, the inaccessibility of citizens to ICT infrastructure such as broadband network is the main cause that hinders the e-government development process.

4. E-Government for combating corruption

Many scholars have long acknowledged e-Government as a tool for combatting corruption. E-Government, according to the World Bank definition, is the use of Information and Communication Technology (ICT) in government institutions to transform interactions with citizens, business enterprises, and other public bodies. The transformation is aimed to improve the quality of public service delivery. These

transformations are referred to using three notations: G2C for Government to Citizens, G2B for Government to Business and G2G for Government to Government.

Many government institutions use Information and Communication Technology (ICT) to improve the quality of government business processes in terms of time, accuracy, and information distribution. The accuracy, which covers relevance, recentness, and reliability, is one of the elements of accountability. Furthermore, using ICT, governments are able to disseminate information broader and faster than without ICT. As a result, more people will get more information from government and the-Government will become more transparent to the public. Enhancement in transparency and accountability will reduce corruption as formulated in the following equation.

$$\text{Corruption} = \text{Monopoly} + \text{Discretion} - \text{Transparency/Accountability}$$

In words, the equation explains that the corruption occurred in a situation where there is a monopoly on goods and services allocation power and there is a discretion power on the authority of allocating the goods and services. Assuming that the monopoly and the discretion are admissible by law and *ceteris paribus*, a control and monitoring mechanism are become necessity to moderate the practice of monopoly and the use of discretion. An effort to increase a control and monitoring capacity requires an extent of transparency. Transparency enables citizens to collect information from government in order to monitor government performance.

There is no doubt that e-Government has the potential to reduce corruption. E-Government enables government to increase the level of efficiency and effectiveness through streamlining the process, reducing the red tape, and diminishing improper negotiations. Through e-Government, governments are more transparent to the public by disclosing government-related information publicly. Furthermore, e-Government allows citizens and business enterprises to gain more control on processes related to public service delivery, thus minimizing an asymmetric information gap between government officers and stakeholders. Obviously, e-Government depends on the availability of Internet access to pursue a high level of transparency. A country with high Internet penetration will have greater e-Government implementation. As a consequence, such countries are most likely countries with low corruption.

As part of our investigation on e-Government development around the world, we found some interesting facts on the use of e-Government for reducing corruption. This article will briefly describe e-Government systems in some countries that without doubt eliminate corruption cases in the country both developed and developing countries.

Transparency as well as Accountability is the soul of e-Government for combating corruption. Transparency is not only for citizens but also for business enterprises and

other government agencies. The formulation among those transparencies will significantly increase the performance of e-Government for combating corruption.

5. The usage of emerging technologies in e-Government

Waseda e-government ranking has added a new indicator as the tenth benchmark this year, evaluating the use of emerging technologies in e-government development. Three technologies: Cloud computing, Internet of things and big data are chosen to be observed, including the strategy, regulation and implementation of them into the public sectors. The conceptions of these technologies have arisen for years, arousing heated discussion in business area. Complying with the trend, government agencies attempt to collaborate with enterprises and industries to rough out the future vision utilizing new technologies. Smart nations or smart cities in the municipal level, are the examples of multiple technique applications. E-government also has to expand the range accordingly with change of era, adopting burgeoning technologies to the continuous transformation of government.

Throughout governments' progress, developed countries have seized the moment to improve the quality of public services by introducing emerging technologies. One of the evident cases is the practice of utilizing big data in open government initiatives. Citizens may have heard about the terms of big data, open data or open government a million times, but still remaining confused about the goods from what they could bring to their normal lives. Big data includes massive information from different sources, but not all of them useful for the public; meanwhile, government sectors have controversial issues about choosing the appropriate and reasonable data to release to the public. Though there are organizations over the world trying to reach a common standard for open government data, political and security concerns are bristled with in specific nations. The technology of big data may continue to mature, but the patterned operations in the public sector could need more time to fumble, especially in the countries with slow legislations. In consideration of the sensitive matters about data disclosure system (the abuse of private and personal data, security problem, etc.), participating actors press for permission from regulations and policies to initiate new business. With government' guidance, society could make flexible use of abundant data to develop vital career; otherwise the opportunities could slip away in a twinkling. On the other hand, a timely regulation could normalize the usage of big data or open data, which eliminating scandal and public's doubt about new technologies and secure concerns. After all, civilian usage is the key point for public data utility.

Releasing large government datasets to the public has been considered to stimulate innovation and social development. For the governments, it is also hard to resist the temptation in which there are inestimable economic potentials. Delivering preferable public service to citizens may be the main reason for adopting emerging technologies in

e-government plan; the following economic achievement after employment has been expected as well. During the observation of each economy, not a few governments have founded their open data site, by which the information of each sections of society are shared with citizens and industries. From the basic demographic information to specific datasets of tax, health and other social contents. There are several kinds of ways to systemize the database; people can search for the data by catalogues, needs, objectives or their identities. However, only a few portals provide the particular manual for users to acquaint with the system. The guideline should not only introduce the platform and the methods, but also explain how the datasets benefit their work and life. Certainly, comparing with general citizens, industries and academies have proficiency in usage. For citizens, public open data site may satisfy their curiosities and enable them to understand the nation and government. But more importantly, citizens can obtain knowledge or innovational chances by analyzing the data; they can supervise public agencies, which according with the slogan “openness and transparency” of government; taking full advantage of big data could produce democratic value as well. Governments’ duty is to do more than just free the information, but also help citizens to make the best use of affluent resources. Therefore, in addition to legislative preparedness, government should draw up to provide citizens a comprehensive guidance about emerging technologies adopted for public services.

To citizens, the terms of “Internet of things” sounds fashionable and easy to understand. Nevertheless, it is comparatively not easy to realize its application in government services. People may enjoy the convenience that IoT has brought to their lives, accepting the employment of the technology readily. For government, the difficulty is to establish the standards---for infrastructure, devices and network, etc. Also, policy framework would facilitate the development of IoT into interoperable services.

There could raise more emerging technologies in our information society, so should our e-government update and reform along with the changes. Waseda e-government ranking has kept improving the benchmark to catch up innovative dynamic in government area with the latest ICT achievements. One of the essentials of e-government is receiving new technologies relentlessly and never stopping evolving. For government agencies, regulation preparedness and comprehensive explanations are necessary for delivering to public. Besides, collaborating with progressive enterprises with technical advantages is a conclusive way to foster the scope. But to e-government, PPP is an excellent method. Serving the citizens and delivering best public services are the fundamental purpose, by which e-government should always abide.

6. E-Government development trend and issues of Least Developed Countries

In Least Developed Countries (LDCs), ICT is known to be one of the important tools, which can be used to eradicate poverty. However, there are many cases where ICT

falls short of being used effectively to solve socio-economic issues in those countries, where investment on the infrastructure often takes place before a sufficient study of ICT policies and strategies is conducted. In most cases, the construction of the infrastructure is financially and technically supported by international organizations and foreign countries. Although many ICT projects failed to be utilized effectively, while the ICT infrastructure has yet to cover throughout the country, many still surge for better changes by using ICT. However, the expansion of the network in an unprofitable region, such as a rural area, is the issue. Moreover, there are also difficulties on building human resources for the ICT sector as well. There are many cases where the image of the required personnel is unclear. In the course of building the human resources, the specific need of the industrial sectors has to be taken into consideration; this as well is to stimulate/encourage the commitment from private sectors. Meanwhile, because ICT can make big changes to the traditional work style, many people in the developing countries has a strong resistance to accept its introduction to their work. Therefore, it is very important to give a clear understanding regarding the goals and merits of shifting to ICT. And at the same time, training for the usage of ICT is also essential.

E-Government is an important theme for informatization in LDCs. The promotion to implement and realize the e-Government has always been raised as vital contents by the government. This theme is the pivotal core of the informatization in government sectors. The approaches and the goals of e-Government vary for each country's government. However, whether it be the developed countries or the developing countries, e-Government is aimed to provide high quality administrative services to the people by using ICT to "improve the effectiveness of the administrations" to "achieve high-speed administrative procedures" and at the same time "providing the administrative information" while making "direct participation by the citizen regarding political policies" possible, to become the trust-worthy and better political entity. In order to "improve the administrative services" by using ICT, 1) Efficiency improvement of the administrative work; 2) Information publication; 3) Support of democratization; and 4) Preparation of legal systems have to be achieved.

7. Mobile Government in transition

The digital divide between developed and developing countries is a persistent issue, which includes many factors such as infrastructure and human capital building. In addition, the divisive is influenced by the social economic and political environments. The development of e-Government in developing countries is affected by the digital divide, including the performance on running e-Government projects. However, developing countries can use ICT to firmly grasp the chance to pursue their goals especially for the digital divide in the practical conditions of society. M-government can be considered one approach that may possibly spread across the world, especially in developing countries.

Mobile-Government, sometimes referred to as m-Government, is the extension of e-Government to mobile platforms, as well as the strategic use of government services and applications which are only possible using cellular/mobile telephones, laptop computers, personal digital assistants (PDAs) and wireless internet infrastructure.

Mobility is no longer a technological revolution. It is more about how businesses and governments can provide a better social infrastructure through mobile applications and services. Adoption of mobility, therefore, is an indispensable asset for the public sector in meeting the demands of citizens. While e-Government is an important step taken by many governments, the provisions of services through mobile technologies is now becoming compulsory. M-Government emerges as the next big wave in the process of ICT use in the public sector even if supplemented activities to e-Government. Mobile-Government is primarily concerned with the study of these major social and technological changes in the public sector.

Mobile communications are widely used to ensure communications and data capturing for emergency services as well as for utility services in various sectors, such as housing, civil engineering, drainage and postal delivery services. However in these fields, mobile technology has been used for a long time, but the advent of the term “m-Government” is related to public services that are provided to citizens via handheld terminal equipment. M-Government services can be classified in 8 categories: (1) m-Communication; (2) m-Transactions; (3) m-Voting; (4) internal m-Government issues; (5) location based services (LBS); (6) m-Government for transportation; (7) m-Education; and (8) m-Health.

VIII. Methodology

1. Outline

To evaluate e-Government development in a country, this ranking survey is based on group of sub-indicators to evaluate the overall e-Government development in a country, ranging from policy development and e-Services implementation to management optimization and e-Government promotion. To improve the evaluation of e-Government development in a country, from 2010, the ranking added an e-participation indicator. In 2014, Open Government Data and Cyber Security were also added to the ranking. In the 2016 ranking survey, the research team added “the usage of emerging ICT technologies”. It makes a total 10 main indicators for evaluation.

Therefore, methodology is based on 10 main indicators and it divided into these steps:

- Waseda e-Government ranking is based on 10 indicators which includes 35 sub-indicators and 154 questions. Based on these questions, the research team

searches all information relate to the questions (web search) and put score for each question

- Each country is evaluated by conductor and the result (score) is checked by editor. A first draft of score is called score 0
- Score 1 are reviewed by experts through expert group meeting. Normally, expert group meeting has two meeting per year. The result from expert group meeting is called score 1 for each country.
- To improve accuracy and independence of the study. The research team sends questionnaires to government employees (officers) who are responsible and in charge of e-Government services in the country to be evaluated. The questionnaire is discussed in detail in section 2. The detailed score in this section is considered the 2nd score for the country. From the results and data obtained in this step, the research team conducted a comparison between score 1 and scores 2, in order to find the most accurate scores.
- This score is reviewed by expert group meeting again before issuing the final score for each country.

To increase the quality, the assessment used a questionnaire as a tool to obtain some information from respondents who reside in the respected countries. The respondents are government officers who work for a ministry that concerns e-Government and, to some extent, respondents from academia who are knowledgeable in e-government. The questionnaire in the upcoming ranking is mandatory. The score will use the feedback as additional information to mitigate the sample risk, thus, reducing bias during scoring. The following diagram shows the due process of creating the ranking.

Waseda-IAC International e-Government ranking is also based on clustering methods by classifying countries according to the group, which has been demonstrated by organizations (APEC, OECD), by the size of population and GDP, by regions (Asia-Pacific, Americas, European, Africa, Middle East and CIS countries).

2. Sample of Questionnaires to Government Officers and experts

2.1 National e-Government Development Strategy

Please describe briefly the current national e-government development strategy in your country. The description may contain the answer of following questions:

- *Which ministry holds the responsibility to ensure the achievement of the strategy?*
- *What are the vision and the mission of the current strategy?*
- *What is the title of the National e-Government Development Strategy? For example: Digital 2020.*
- *If the strategy document is available on the Internet, **please provide us with the URL for it.***

2.2 Current status of Government Chief Information Officer (GCIO)

Please describe the current situation of GCIO in your country. Whether all government offices have GCIO or not.

- *If government offices in your country have GCIO, what is the role of GCIO? What is the regulation regarding the GCIO mandate?*
- *If there is any information regarding the presence of GCIO, please provide us with the URL for it*

2.3 Evaluation process of E-Government

*Please describe briefly a process of evaluating e-government project.
Some highlight would be as follow*

- *Whether there are some agencies responsible for evaluating a national e-government project or not*
- *Whether the evaluation process is conducted periodically or ad-hoc activity.*

Please provide us with the URL that explains e-Government evaluation process

2.4 Cyber Security Infrastructure

Please describe briefly some regulation and infrastructure in your country regarding Cyber Security, including How to countermeasure the cyber-attack. Infrastructure may contain institutional capacity and secured technology infrastructure.

Please provide us with the URL for relevant information

2.5 Utilization of Cloud Computing, Internet of Things, and Big Data in Government

Please describe briefly about the use of the emerging technology in government sectors; The use of Cloud Computing, Internet of Things (IoT), and Big Data.

A brief explanation on some experiences of government institution in implementing those technologies are highly appreciated

If your country has adopted the use of those technologies, please inform the relevant regulations.

Please provide us with the URL for relevant information

3. SWOT Analysis

The SWOT analysis is great for developing an understanding of an organization or situation and decision-making for all sorts of situations in business, and organizations. The SWOT analysis approach headings provide a good framework for reviewing strategy, position and direction of a company, product, project or person (career). Doing SWOT analysis can be very simple, however its strengths lie in the flexibility and experienced application of SWOT analysis.

One of the methods which Waseda e-Government ranking based on is SWOT analysis. The evaluation and analysis of e-Government development in one country is also expressed through SWOT analysis, especially, for the application of ICT in management and administration in public sector. In Waseda-IAC e-Government ranking, SWOT analysis is expressed and mentioned through country reports.

4. Data Analysis

The basis scoring for web search is aggregation. However, the aggregation does not apply to Network Infrastructure Preparedness (NIP). NIP uses Average method in which the score of NIP is the average of Internet User, Fixed Broadband User, and Wireless Broadband User Score that are produced from ITU Report.

The score for main indicator is the aggregation of respected sub-indicators. The score of sub-indicator is the aggregation of respected items. The score of item is based on the result of web search according to the rule mentioned in section A.IV of this document. This process generated the Original Score (Score 0). At this time, the Score 0 is copied to the Score 1.

Score 1 could be modified through a peer-review process by the second assessor. Doing the same procedure, the second assessor will put the adjusted score to the Score 1. The average of Score 0 and Score 1 will result the Raw Score.

The Raw Score is normalized to the 0-100 scale score using the following formula.

$$N = \frac{R_i \text{ or } M}{M} \times 100$$

Raw Score is the Score generated by averaging the Score 0 and Score 1

MaxScore is the maximum score of the sub-indicators

This will generate the Normalized Score which ranges 0 – 100. Furthermore, the Normalized Score is recalculated by weighted rate. The result is the released score that will be used as the source for arranging the rank.

No	Indicators	2016
1	Network Infrastructure Preparedness (NIP)	NormScore X 10%
2	Management Optimization (MO)	NormScore X 12%
3	Online Services (OS)	NormScore X 12%
4	National Portal (NPR)	NormScore X 8%
5	Government Chief Information Officer (GCIO)	NormScore X 10%
6	E-Government Promotion (EPRO)	NormScore X 10%
7	E-Participation (EPAR)	NormScore X 10%
8	Open Government Data (OGD)	NormScore X 10%
9	Cybersecurity (CYB)	NormScore X 10%

10	The emerging technology in e-government (EMG)	NormScore X 8%
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Table 16: List of main Indicators

5. Experts Group Meetings

During one year of evaluation, there were two meetings to discuss the 2016 e-Government ranking. The first meeting was held in Tokyo from Sept 28-29, 2015 in the 2nd APEC e-Government Forum and IAC 10th Anniversary Event. In this meeting, the research team presented the processes of evaluation, summary the new trends for ICT and e-Government development, the number of countries for evaluation as well as the main indicators in the ranking. The meeting covered the idea of measuring user perception on e-government implementation as an indicator to make the ranking more balanced. Since it is difficult to involve citizens in the countries to measure user perception, the survey will collect the information from GCIO, professional, academia, and documents such as newspapers and journals.

In the first meeting, all experts agreed (1) to add two new countries to the ranking, Ireland and Lithuania. (2) One new indicator was added so that the 2016 ranking would use ten indicators. The new indicator is the use of emerging technology in e-Government; cloud computing, Internet of Things, and Big Data. The focus is to search the evidence that government agency implemented those technologies.

The second meeting was held in the 11th International Academy of CIO (IAC) Annual meeting and Forum at Bocconi University, Milan, Italy from June 27-28, 2016. During the meeting, the research team introduced the draft results of 2016 e-Government ranking survey and country assessment reports with 65 countries (economies).

6. Processes of Evaluation

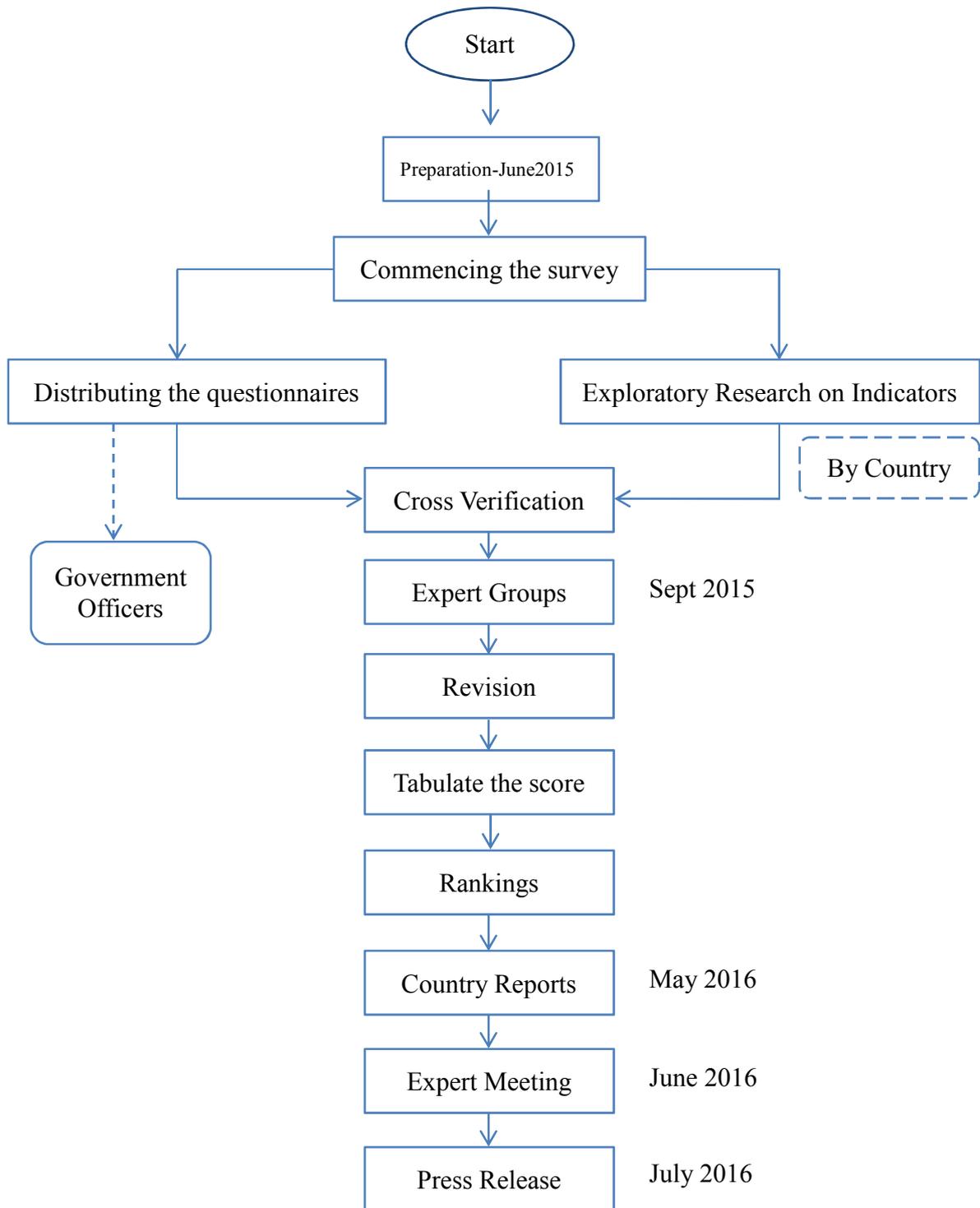


Table 17: Process Diagram

IX. Contributors List (● indicate group leader)

1. List of Global Experts Group

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