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CHANGES AND DIRECTIONS OF ICT SERVICES IN KOREA GOVERNMENT

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Abstract. *This research tries to show the changes and directions of IT based public services in Korea. To show them, we introduced the background of high-level electronic services in Korea government. Moreover, we described many outstanding results of Korea's e-Government project, which caused being ranked No. 1 in 2010, 2012 and 2014 (No. 3 in 2016 & 2018) in e-Government capability. In addition, we reported key success divers in Korea's e-Government and presented ongoing efforts for intelligent e-Government services. On second part, we introduced mobile government trends based on the accomplishment of e-Government. We presented key drivers of mobile-Government and described mobile government services development guidelines. Finally, we performed a research on the current status of m-Government in Korea and derived prioritized improvement directions.*
Keywords: e-Government, m-Government, Future direction for m-Government

1. **Introduction.** In this paper, we introduce the computerization trends in Korea government sectors. Since the Korean War (1950-1953), Korea has been developed to be one of the world leading countries. In particular, Korea has become a world-leading e-Government country. According to the 2018 United Nations e-Government survey, Korea is one of the leading e-Government development countries in terms of the EGDI (e-Government Development Index). As we can see in Table 1, Korea has been ranked No. 3 in 2016 and 2018. In 2010, 2012 and 2014, the rank was the first.

As the background of high-level electronic services in Korea government, there has been a steady investment and focus on the national computerization. In 1970's, government computing center with IBM1401 system was founded. In 1987-1996, the government established national computer network including ISDN, B-ISDN and TCP/IP networking. In addition, government high-speed network was constructed, and the Ministry of Information and Communications was founded. In 2010-2012, many important projects and actions for national e-Government have been done. They enacted world-first 'e-Government act' and constructed K-Net, GNS (Government Network Service) and G-ISMS (Government-Information Security Management System). After 2013, Korea won the world-best e-Government rank and began to export the 'Korea e-Government

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TABLE 1. Leading countries in e-Government development [1]

Country	OSI	HCI	TII	EDGI	2016 Rank	2018 Rank
Denmark	1.0000	0.9472	0.7978	0.9150	9	1
Australia	0.9722	1.0000	0.7436	0.9053	2	2
Korea	0.9792	0.8743	0.8496	0.9010	3	3
England	0.9792	0.9200	0.8004	0.8999	1	4
Sweden	0.9444	0.9366	0.7835	0.8882	6	5
Finland	0.9653	0.9509	0.7284	0.8815	5	6
Singapore	0.9851	0.8557	0.8019	0.8812	4	7
New Zealand	0.9514	0.9450	0.7455	0.8806	8	8
France	0.9792	0.8598	0.7979	0.8790	10	9
Japan	0.9514	0.8428	0.8406	0.8783	11	10
U.S.A.	0.9861	0.8883	0.7564	0.8769	12	11
Germany	0.9306	0.9036	0.7952	0.8765	15	12
Netherland	0.9306	0.9206	0.7758	0.8757	7	13

(OSI: Online Service Index, HCI: Human Capital Index, TII: Telecommunications Infrastructure Index, EDGI: e-Government Development Index)

System'. Also, the government has launched citizen-oriented 'e-Government 3.0', mobile government platform and G-cloud service.

2. **e-Government in Korea.** e-Government means utilizing ICT technologies for the government business works, and its goal includes innovating government's work process, innovating public services and promoting citizens' participation. Pursuing the goal, the history of e-Government is depicted in Figure 1. Korea's e-Government project has achieved many outstanding results in many different aspects. Firstly, Korea's e-Government has been enhancing citizen's quality of life via online civil affair services. Also, it has enhanced productivity and transparency of administrative works and has played an important role in supporting and fostering competitiveness of private enterprises by giving them chances to utilize public data. Being caused by the steady efforts, Korea's e-Government has been ranked No. 1 in 2010, 2012 and 2014 (No. 3 in 2016 & 2018) [2,3].

Key success divers in Korea's e-Government can be summarized as follows:

- Culture for accommodation of new technologies and services
- World best wire & wireless Internet infrastructure
- Aggressive and continuous investment
- Strong government leadership and systematic support & implementation systems
- Advancement in ICT industries and applications
- Highly perceptive mid-term and long-term planning

Now, Korea government are pursuing intelligent e-Government services through smart collecting, storing, analyzing, making and providing stages (Figure 2). With the help of intelligent processing technologies, the Government tries to build global e-Government, all digital zero stop, integrated and customized services, 3 any(time, place, device) mobile on-site works, on-time intelligent decision making, self-security infrastructure, sharing economy based public services and creation of new industries & jobs [4].

3. **m-Government in Korea.** Traditionally e-Government can be defined as the employment of the Internet and the world-wide-web for delivering government information and services to the citizens (United Nations, 2006). Whereas, mobile e-Government can be defined as a strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits

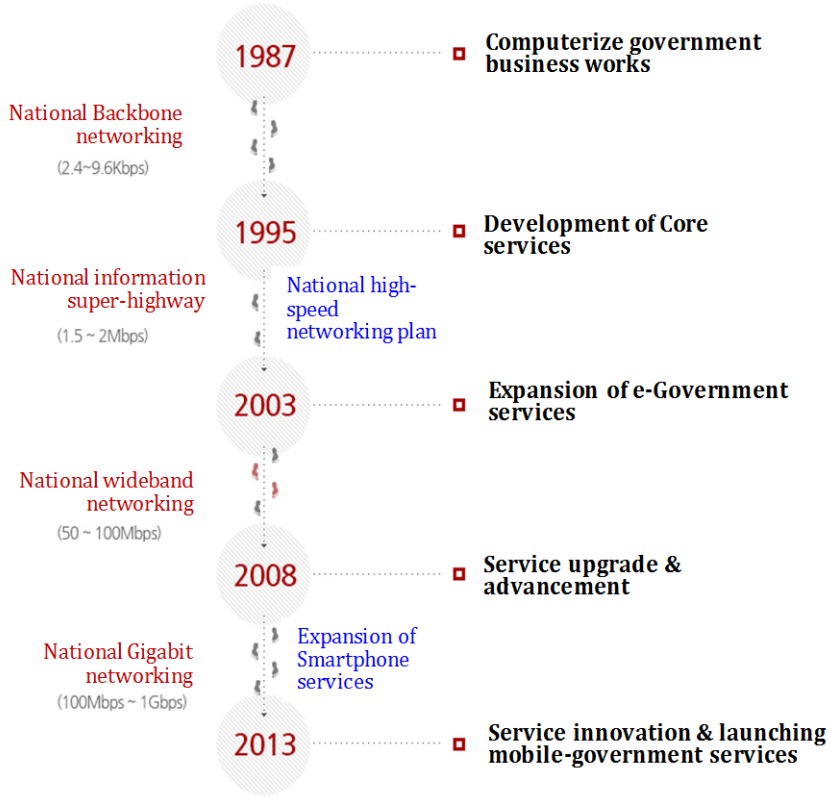

FIGURE 1. The history of e-Government in Korea

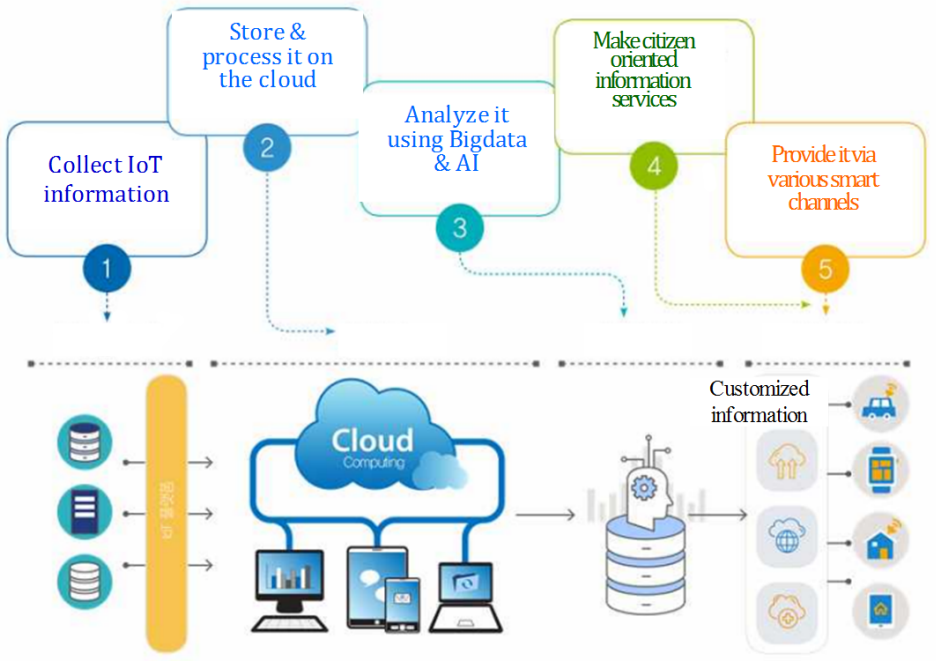

FIGURE 2. Intelligent e-Government services flow

to the parties involved in e-government including citizens, businesses and all government units. Conventional government, e-Government and mobile-Government can be compared as Table 2.

The key driver of mobile-Government is mobile devices and smartphone penetration. In 2017, Korea's smartphone penetration rate is No. 6 (Figure 3). Also, it needs the expansion of mobile Internet and mobile applications and services.

TABLE 2. Characteristics of each government type

Category	Government	e-Government	Mobile-Government
Principles	Administrative procedures (Telephone, Fax)	ICT based process reengineering (PC, Internet)	Connection and integration with wireless devices (Smartphone, Smart Pad)
Service time	8 hours/day, 5 days/week	24 hours/day, 7 days/week	24 hours/day, all year services
Service spaces	Direct visit, via Fax and/or Telephone	Via Internet from customers' home or office	Any customers' location
Service types	Direct visit to the government office	Access to the web portal via clicks	Direct access to the service

FIGURE 3. Smartphone utilization ratio

Public smartphone application development can be evolved through several phases. Phase 1 is simple service, phase 2 is convenient and complex services, phase 3 is simple interactive service, phase 4 is complex interactive service, phase 5 is business management and phase 6 is integration (Figure 4).

Also, to establish effective and efficient m-Government, there have been consecutive regulation efforts in Korea [5].

- Mobile-Government master plan toward leading administrative government services (2010)
- M-government services mid-term plan (2011)
  - 917 services (citizen: 192, inner: 83, on-site: 642)
  - Developed based on the "mobile device management system"
- Mobile administrative services (16 types, 2012-2013)
- Mobile e-Saram Service (2013)
- Barotalk Messenger Service for civil servants (2014)

In addition, it legislated mobile government services development guidelines [7].

- Mobile-Government services: mobile based services for government organization, public institutions, private enterprises and citizen
- Public government services: various public and administrative services for citizen

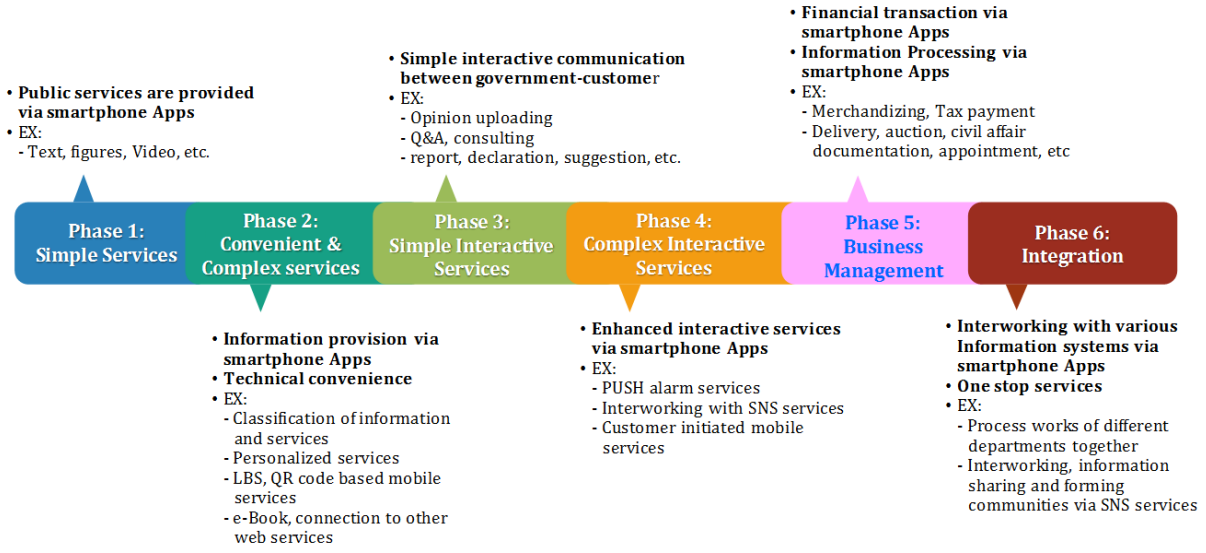

FIGURE 4. Public smartphone application development phases [6]

- Inner and on-site mobile administrative services: mobile services for government administrative services including inner and on-site administrative services for civil servants

For the concrete and continuous support of mobile government, Korea designed and implemented mobile device management systems. Details are omitted due to the page limit.

4. **Requirements for Next m-Government.** To give strategic suggestions for next m-Government, we conducted several analyses of current m-Government services. Firstly, to derive some significant implications, we studied representative abroad IT service implementation cases of Government and policy directions including mobile government. Table 3 shows the summary of the cases.

TABLE 3. Representative IT services and policies of foreign governments [8,9]

Country	IT services and policies
United States of America	• Development of mobile web pages of federal e-government portals • New York City NYC 311 app for city life information and government services • Arkansas Personal Assistant app helping the use of local Government services
England	• Supporting on-site work and public participation via mobile devices • Online and mobile to provide services to the public • Open cloud store, an open market for public sector ICT products and services
France	• Traditional policy focused on arts, culture, and humanities rather than technology • Digital strategy and legislation by embracing changing conditions (2015) • Codifying the active use of public data in an open ecosystem
Estonia	• Block chain based digital administrative system called X-Road • Use of electronic resident id with built-in electronic chip • World's first electronic election (2005)

Secondly, we analyzed mobile common platform, which is built for joint use by national agencies and to provide a secure environment and prevents overlapping budget investments. Main problems and requirements for the platform are as the following: high portion of security devices and low proportion of network devices/consultation between relevant departments is required/reliability issues due to server aging/moving to and enlargement of the cloud/building a common foundation for IoT certification/development of common modules for onsite administration.

Thirdly, we analyzed several main m-Government services. Those include onNara, e-Saram, firefighting, car and barotalk, which are determined through meeting with public officers and conducted through expert consulting and previous reports. As the analysis results, we can find several service improvement directions. Those include enhanced ease of use of features/manuals, guidelines to respond to errors, and enhanced real-time counseling/discovering mobile specific services that can take advantage of mobile characteristics/Barotalk speed improvement spurred by system redesign and extensive renewal.

In addition, we conducted several interviews with public officers. Due to the time limit, not many meetings are performed. They indicated several causes of low utilization. Those include no opportunity to use it for internal work/not much work that requires an urgent need to do business using a mobile device rather than using a smart work center/inconvenience to create business reporting and approval documentation in a mobile device environment. Also, they indicated several causes of high utilization, which include very usefulness of mobile devices for field works. In addition, they pointed out the inconveniences when using mobile applications. Those include low execution speed in comparison with kakaotalk and other messenger service/the complexity of security procedures/difficulty to cope with in the event of an error. Also they need several additional features, which include a little more convenient UI/UX/Services suitable for field work/basic manual, Q&A related professional bulletin board.

We derived overall requirements and suggestions based on several analyses in three categories, i.e., service, technology and policy. To give priority score for each improvement suggestions, we calculated the points using importance and feasibility score by expert group. Work process improvement, security level differentiation, enhancement of real-time Q&A and establishment of service response strategy got high priorities. Whereas, cooperation plan with private enterprises, establishment of integrated control organization, installation of monitoring and control center are lowly ranked. Detailed full list and scores can be found in Table 4.

5. **Discussions.** This research tries to show the changes and directions of IT based public services in Korea. To show them, we introduced the background of high-level electronic services in Korea government. There has been a steady investment and focus on the national computerization since 1970's initial government computing center with IBM1401 system. And, we described many outstanding results of Korea's e-Government project, which caused being ranked No. 1 in 2010, 2012 and 2014 (No. 3 in 2016 & 2018) in e-Government capability. Also, we reported key success divers in Korea's e-Government and presented ongoing efforts for intelligent e-Government services through smart collecting, storing, analyzing, making and providing stages.

On second part, we introduced mobile government trends based on the accomplishment of e-Government. We reported key drivers of mobile-Government and described mobile government services development guidelines. Finally, we analyzed the status of current m-Government in Korea and presented several improvement suggestions. Based on the suggestions, next m-Government services need to focus on the diversification of development strategies by service characteristics. Its goal is to increase efficiency and effectiveness through specialized focus strategy based on the service characteristics.

Table 4. Priorities for improvement suggestion for m-Government [8]

Priority	Proposed improvement	Score
1	Work process improvement	17.32
2	Security level differentiation	15.89
3	Enhancement of real-time Q&A	14.68
4	Establishment of service response strategy	13.47
5	Establishment of strategic levels for mobile device management system	13.32
	Reinforcement of service operation guideline	
6	Security level adjustment	12.22
	Mobile device management service introduction system	
7	Data connection strategy among organizations	12.00
	Enhancement of mobile device management system	
	Legislation and revision of mobile-government laws and acts	
	Enhancement of operation and maintenance	
8	Establishment of supporting policies for new services	11.01
9	Application of new authentication technologies	8.89
10	Cooperation plan with private enterprises	8.55
11	Establishment of integrated control organization	8.00
12	Installation of monitoring and control center	7.23

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