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The challenge of e-government toward smart society: based on the advance of society and technology

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Abstract

This paper tries to explain the role in paradigm shift of society toward smart society and its impact on government and politic environment. So this paper designs the analysis framework of e-government advancement with society maturity. This paper assumed e-government can develop by both social and technical advancement and this e-government development also evokes the revisiting impact to technical development and social mutuality. This pattern can be explained by a Korean case study from 1974 to 2016, smart society. As the tasks for the smart society to mature, this paper provides five strategies – transforming into a 'platform-type government' for open government operation, utilization of social networks based on creativity and collective intelligence of the private sector, disclosure and sharing of public information, facilitation of smart work, and preparation of measures against the adverse impact of informatization regarding information security and personal information protection.

Keywords: e-government, smart society, new e-government development model

1. Introduction

Rarely a day goes by without the performance of government and public services providing a topic of discussion and debate within the media. For a long time, bureaucrat bashing was a common sport among politicians and journalists evenly in public administration field. Within this context, the reform of government has received significant attention. Over the past 40 years it has been argued that government reform has been a necessary action, against the failings of big government, and the market mechanisms were intended corrections to inefficient government. To reinvent the government to make more efficient and transparent government, the Korean government has built up the e-government widely and speedy since 1974. Now citizen's conveniences and benefits increased with reinvented government service delivery system. It is possible by the rapid development of information and communication technologies (ICT). Influenced by the global ripple effect from the release of smart-phone and with creative information technologies spreading through in form of social networks, Korea also has witnessed a rapid development of the new smart society[1], which led to great influence and change to our social spheres such as politics, administration, economy and culture, and

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1) The word 'smart' is an adjective having the meaning of intelligent, bright, clever, efficient in speech, and thorough in transactions, etc. However, in real life, it is combined with other words such as in smart phone, smart-learning, and smart office and is used as a practical term delivering convenience and benefits.

also to our daily lives.

The future society will be faced with more accelerated complexity and uncertainty due to technological progress and convergence and increased interactions between countries, so a future response to short- and long-term changes is necessary, and the government's administration system and policy must be in line to deal with such changes. The existing IT industrial ecosystem will derive overall social ecosystem changes, and in the future, countries with competitiveness must prepare policies that accelerate such changes in all areas of society, as well as plan future-oriented policies. For a smart society, an innovative policy design is necessary to overcome human limitations by resolving problems based on smart technology and realize warm humanism (Kim, 2011).[2] Especially, the government is improving to a partnership-based framework upon which individuals and the government are working together beyond bilateral participation. Demands are also increasing for e-government services to comply with the new changes in interactive services on social networks.

However, academic research on such smart technologies and social changes is a few, if not very weak in that only part of technological or social changes is taken to show and discuss fragmentary effect or influence. From the comprehensive viewpoint embracing both technological and social paradigms while overcoming fragmentary thinking and difference in views, this study aims to propose a new e-government development model based on the paradigm shift in the smart society and to explain the changes in e-government level and services and diagnose the current status by applying Korea's e-government practices in a time-series based on the new development model. (I.C.B.M.S: IoT, Cloud, Big-data, Software/Security)

This paper discusses the social paradigm shift, changing government roles and literature review and introduces an analytic framework and methodologies. And this paper introduces application and verification of the development model in Korea's practices, and provides the conclusion and policy implications.

2. Theoretical and literature reviews

### 2.1 Social paradigm shift to smart society

The history of human society has been marked by paradigm shifts caused by technological advances, changes in social values, and other core driving factors (Keeley, 2007).[3] So the Fourth Industrial Revolution means evolving into a smart society and it can be defined as a creative, human-centered society based on cutting-edge ICT. The paradigm change to a smart society is a fundamental change to lead development in all areas, meaning changes in the principal agent and in values. This means a change in the ways to create value and a change in the economic system from the existing large enterprise-centered system to creating a variety of values through cooperation among creative people, SMEs or venture companies. And, in terms of methods, labor, land, and capital, which are the core of an economic society, are also the three core elements of capitalism.

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2) Technologies, best understood as a means of better communication, improved processing and exchange of information, now impact every aspect of our lives, constantly revolutionizing the way we communicate with each other, comprehend our environments, and interact with government. ICTs have played an important role in fostering improved connectivity as well as socio-economic development throughout the world (UN ESCAP, 2011; Jin and Cho, 2015).

3) In the agricultural society, a variety of methods were developed using the basic human labor to overcome natural disasters, thereby placing physical industriousness first among all other required qualities. The industrial revolution shifted the human history from the agricultural society to the industrial society. In the industrial society, technicians or skilled factory workers emerged as indispensable and under the uniform bureaucracy, these workers were forced to bear an enormous amount of labor hours. Such society, again, evolved to the information society, where the emergence of computers and communications technology led to increased significance on knowledge and information. A wide variety of knowledge and information became the core resources in the information society, while opening and sharing such resources became important social values (Drucker, 2002).

In addition, Alvin Toffler with Post-Fordism and the low volume manufacturing of multiple products discussed the third wave of the Industrial Revolution[4]. However, the fourth wave of a smart society paradigm means a creative, human-oriented humanistic society based on smart technology. Specifically, it means that "smart technology will be applied to people, infrastructure, and processes to smartly resolve society's difficult issues, and for all members of society to live a happy life." Also, it means a new era where all areas such as citizens' lives, economy, industry, national administrative system, etc. are innovated.

Figure 1. The concept of smart society
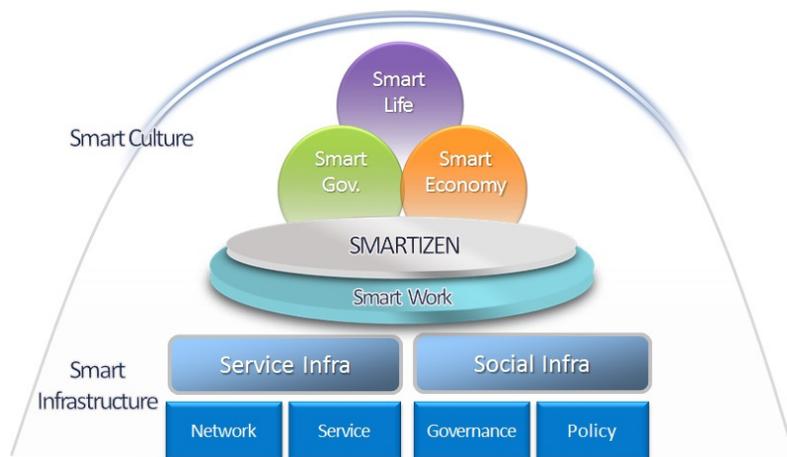
Sources: Kim (2017), Cho and Jin(2016)

The need and strategy for preparing for the advanced information society have been recently discussed. Tapscott (2011) explained that the emergence of the N-generation grown up in the digital environment brought macro-wikinomics, which is the age of innovation based on collaboration and openness, or the age of networked collective intelligence. Knowledge and information are becoming more intelligent; we have come to pursue convergences between ICT and the traditional industry technologies; social values in the information society where sharing and openness were considered as core values now came to demand high creativity based on such values. Compared to the past information society, the smart society can be characterized by more efficient, productive and economical social systems and processes, which are enabled by smart technologies. In addition to such increased efficiency and productivity, this society highly respects human dignity and creates values through combining technologies and other various sectors (Cho and Jin, 2016).

In the smart society, a new order will take root not only in industrial and employment structures, but also in life and culture, ushering in the "New Normal" era. The key to smart society is smart infrastructure, which includes service and social infrastructure, as well as creative people power. In this era, creative people power and individual creativeness will become important (Kim, 2017). Due to continuous changes in every aspect of

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4) Viewpoints toward the information society vary depending on scholars from P. Drucker's (1968) knowledge society, Daniel Bell's (1973) post-industrial society, and Brezenki's (1970) technotronic society. Summing up these viewpoints leads to the fact that the mainstream here is the technology-driven viewpoints, which emphasize the development of information and communications or new technologies that are combinations of information processing and communication technologies, and which aim to utilize information and communication technologies. The information society and the smart society as described so far, therefore, can be considered the outcomes of the changing environment and shifting social paradigms such as the IT evolution.

society, uncertainties and unemployment have emerged as big issues, and low growth, uncertainty, corruption, and conflicts cannot be resolved anymore with the existing approach. In order to solve these issues, new technology and creativity must be employed to realize new human-centered values.

Hence, people's awareness of IT needs to be changed accordingly. We often find that most IT developers only focus on IT development, but we need to consider how we can use such new technologies for creation of values, cooperation, and creativity in a humanistic approach. In other words, the fourth wave of a smart society paradigm means innovative changes throughout the whole society, and not only changes in industries.

In time, with further progress in informatization and democratic development, government websites came to be used as convenient channels of communication between the government and citizens. Citizens were not only informed of government policy undertakings and news, but they also provided feedback[5]. They submitted their ideas and proposals while voicing complaints and addressing issues through the various government websites. By facilitating citizens' participation in public issues and government affairs, electronic media made considerable contributions toward the advancement of democracy in Korea.

2.2 Literature review

We can easily find papers on research on the effect of e-government with a variety of effects: anti-corruption (Andersen, 2009; Cuillier and Piotrowski, 2009), and with service delivery effectiveness (Moon, 2002). More specifically, the e-government system has been recognized for its potential administrative efficiency and effectiveness (Heeks, 2001), interactivity (DiCaterino and Pardo, 1996), interconnectivity (McClure, 2000), and its capacity to reduce administrative burdens (Eurpoean Commission, 2014). In response to the changing environment and government roles caused by citizen demand and participation, e-government policies are also constantly changing and evolving together like an organism. This means that e-government interacts with environmental elements to evolve. Based on this concept, this study reviews the e-government evolution by developmental stages and proposes a comprehensive analysis framework for analyzing Korea's e-government evolution based on the developmental stages. Methodologies for categorizing e-government by developmental stages can vary – there can be three, four, five or more than six stages and they can differ based on scholars such as Kauver or Moon, on business consulting institutions such as Deloitte or Gartner, on international organizations such as UN or OECD and on technologies or participation.

Here, we use three categorization methods – development based on the Web or Internet, development based on citizen participation, and development based on government innovation or services. First of all, there is the set of developmental stages categorized based on the Web or the Internet - This method can be represented by the UN study, in which UN came up with five stages of e-government evolution (emerging, enhanced, interactive, transactional, and connected) while assessing the e-government readiness, based on how efficiently government websites express and deliver government services and information. In the 'connected' stage, the most sophisticated level, government services are requested, processed and delivered in a seamless manner, through entirely networked and integrated government organizations using web technologies. Studies by Moon (2001) and Cho et al. (2002) also fit in here using this method.

The second method is categorization based on government innovation and services, as represented by the OECD (2003) study. Using the model of the Australian National Audit Office, OECD categorized the e-government into four stages according to service type or quality – they are stages of simple information provision, information provision through interaction between the government and citizens, transaction, and

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5) Further, they require opening and sharing unveiled information and data of government for making business or enhancing their life convenience.

information sharing. It is reported that in the stage of information sharing, the most sophisticated level, simplified public administration innovates the process and at the same time increases efficiency, further leading to decrease of citizens' application procedures for government services. Besides the OECD study, this method includes studies by Kauver (1998), Bang (1998), Jeong (2002), Yoon (2003), Oh (2003), etc.

The third method is based on citizen participation and this is used in studies by Gartner (2000) and IBM (2003). Ramsey of IBM (2004) classified digital government into four stages or 'waves'[6] according to the ultimate goal that the government plans to achieve. The customized government achieved from government transformation offers the most integrated stage of digital government in both horizontal and vertical terms, encompassing integration of the entire value chain from internal businesses to external customer affairs toward procurement suppliers, private-sector partners and the general public.

3. Analysis framework

Many studies on e-government development stages in the past have limitations in that they often deal with only part of e-government development, rather focus on evaluation of some representative websites that are officially exposed, or recognize the development model as a fixed framework that is unchangeable.

In this regard, a new e-government development model is suggested to comprehensively understand the technologies, services and citizen participation. The new model classifies e-government into 'bureaucratic', 'information management, 'participatory' and 'governance-type' by identifying the development stages based on the social paradigm shift such as the industrial, information, and smart societies on one hand, and identifying the changes in government roles based on the level of social pluralism and civic society maturity, both of which make up the e-government democracy, on the other hand. As for the relationship between e-government development and e-democracy, attention should be given to their application to political and administrative process and their main players – how they are related to or different from each other (Hong, 1999). From the perspective of this study, e-democracy refers to the use of information technology and networks for the expression of political opinions across the entire political process from political association to the exercise of influence by interest groups, lobbying and participation in elections through an electronic vote (Freedom House, 2016).

E-government, on the other hand, is the integration of information technology to shorten the process of decision-making in the government, share information between its various sections or disclose public information to citizens for free access, and increase the efficiency of government-to-citizen services. Given that efficiency and democracy are the two main goals of both e-democracy and e-government, and that the latter promotes democracy by widening citizens' direct participation in the political process, this binary view serves no real purpose. But, e-government, in its broad meaning, refers to both dimensions of the policy process, which are, in fact, practically and conceptually, inseparable from one another and must be regarded as two parts of the same process. It may be useful to picture the shift in the social paradigm based on the relationship between e-democracy and e-government. The new model classifies e-government by identifying the changes in government roles based on the level of social pluralism and civic society maturity on one hand, both of which are related to e-democracy, and identifying the development stages based on the social paradigm shift on the other hand. In terms of social paradigm shift, Korea has undergone more compact growth time-wise compared to the United States and other EU countries (UNDP, 2016)[7].

6) First, putting existing services online: second, developing portals from the basic to the sophisticated: third, simplifying regulations and services through information integration: fourth, government transformation.

In Figure 2, the horizontal axis shows social paradigm shift related with IT development. Along the vertical axis are the varying levels of social pluralism and civic maturity from low to high and these levels can be classified in relation to features of e-democracy as follows.

Figure 2. Analysis framework
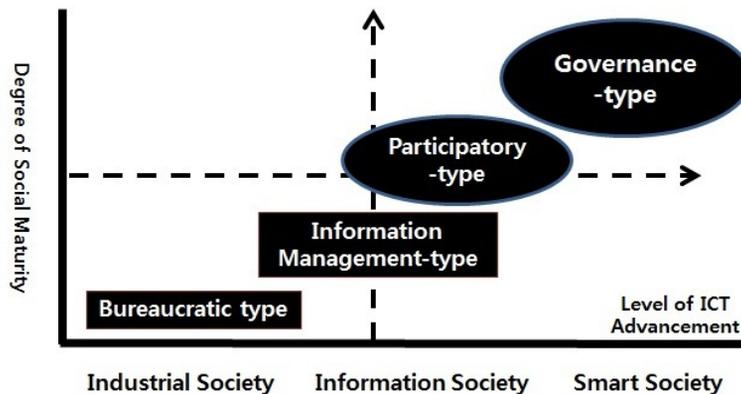
The types of e-government suggested here are based on the conceptual model of e-government, which can be classified according to shifting social paradigm as follows. The bureaucratic e-government is a stage where e-democracy is within the bureaucratic system under a very low level of social pluralism and passive civic society. In this stage, attempts are made to apply e-democracy only to the process of decision-making within government organizations. The information management of e-government can be found under a low level of social pluralism and still rather passive civic society. This stage emphasizes information disclosure to government organizations and the civic society, though in a passive way, and citizens' right to know. The participatory e-government can be found in an active civic society with a significant level of social pluralism. This stage focuses on facilitation of information disclosure from within government organizations to citizens and active participation of citizens in government decision-making. Bilateral communication between the government and citizens is also facilitated in this stage. The governance-type is a stage with a high level of social pluralism and can be found in an active civic society. Not only government organizations but also various members of the society exchange information with each other through electronic communication means and influence transparent and democratic decision-making, all of which further facilitate communication network throughout the entire society. The governance-type e-government is widespread in the smart society.

This paper measured the degree of social pluralism and maturity of civic society by Political Rights, Civil Liberties Ratings and freedom status from Freedom House[8]. Political Rights and Civil Liberties Ratings are based on its total scores for the political rights and civil liberties questions. Each rating of 1 through 7, with 1 representing the greatest degree of freedom and 7 the smallest degree of freedom corresponds to a specific range

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7) Whereas the United States and EU countries have taken as long as 2 centuries to come through modernization, industrialization and informatization, Korea, since its independence in 1945, experienced the industrial society during the 1970~1980s and has entered the information society, which is an amazing growth in such a short time of 40~50 years.

8) They published the ratings on the guarantee of political rights and civil rights in all countries worldwide. Data available from 1972 onward and yearly updated.

of total scores. Another axis of this model, degree of information technology was measured by internet user rate which is a meaningful indicator saying how well organized interment environment is (ITU, 2011), and it is inclined to increase according to ICT advancing.

In this study, attempts are made to analyze major projects and services for each stage by applying them to Korea's cases based on the e-government development model. The time scope of this study is from the early 1990s when the term e-government was first used in Korea and the scope covers projects for bureaucratic, information management, participatory, and governance-type e-government.

## 4. Analysis of Korea's cases: e-government toward smart society

4.1 Establishment of the initial infrastructure for computerizing government affairs

From the 1980s, Korea began to computerize major administrative data such as resident, vehicle, and real-estate information that served as the base for government control and taxation. This allowed turning of the manually-written paper-based business process of government workers to application of integrated forms through online database, further enabling more efficient management of the administrative affairs. In terms of infrastructures, Korea constructed the national backbone networks regarding five areas that make up the national operation framework including government administration, finance and national defense as part of its preparations for the information society, which led to the foundation of a safe network operation framework. By the end of 2000, Korea constructed the nationwide broadband network with fiber-optic cables and came to be fully prepared for the Internet age.

The first time the term e-government (is called internal information management system) was used in Korea was around 1985 for public service (water) charging system in Seoul Metropolitan City (Jin, 2017). The transparency and efficiency in process of public service charging system can be enhanced from this invention of information management system in local public administration. Bill issuing by computerizing system made more trustable government for citizen than by human. As in Figure 3, political right and civil liberties ratings and freedom status were increased since1989 when the Korean government started to internally adapt and use the information management system by PC in public administration affairs. This trend, increasing the efficiency of public administration affairs and enhancing the trust and freedom in society by information management system in government, also positively impacted on Korean economic growth. Despite this benefits, it is not for citizen but for government. Actually government intended to increase the control power of information and the efficiency of government service provider, government itself not services for consumers, citizens. So the leader of establishment of the initial infrastructure for computerizing government affairs was the general affairs department work domain of which is internal management of government[9].

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9) They established the panning for computerization in public affairs (1st: 1978~1982, 2nd: 1983~1986) and developed it as the master plan for public administration information system (1st: 1987~1991, 2nd: 1992~1996) which it was included the concept of the informatization for public services management system.

Figure 3. The social trend in bureaucratic e-government
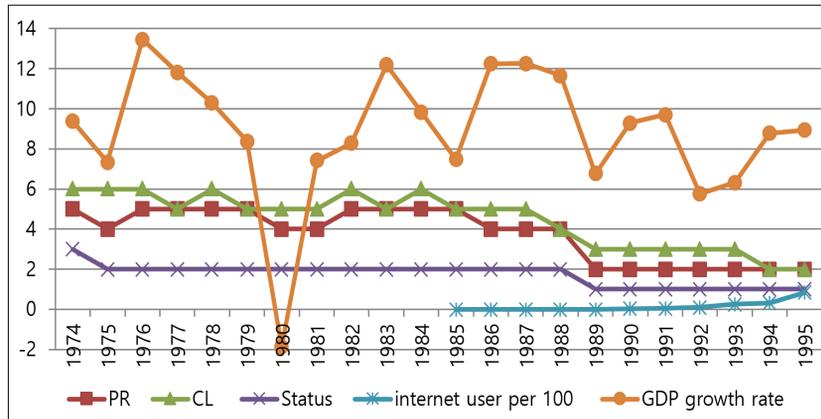
Sources: Freedom house (2016), TI (2016), ITU (2016), The World Bank (2016),
Ministry of the Interior and Safety of Korea (2016)
Note: PR: political right; CL: civil liberties ratings; Status: freedom status

By the late 1990s, many Koreans owned a computer (40.1% in 2000) and had access to the Internet (44.7% in 2000)[10]. With the emergence of the World Wide Web (1995 in Korea), Korean government agencies were able to make public announcements through homepages. These websites, however, were initially used as mere means to publish announcements, government news, phone numbers or directions to government offices but upon further use and development, detailed information about formalities and documents required to apply for government services, as well as downloadable forms were made available. Technological progress and the maturing of Korea's democratic institutions eventually transformed government websites from simple online information portals to service portals. Citizens could now handle online businesses for which they previously needed to visit a government office, such as paying taxes, consulting real estate-related records and obtaining resident registration transcripts and other government documents. In short, the era of online government-to-citizens services began in earnest. But this time can be seen as the starting point toward the bureaucratic informatization or the age of e-government where the government leads the social and economic growth.

4.2 Establishment of the early e-government for enhancing administrative productivity

A more accurate view would be that the e-government practices in Korea had not started until the late 1990s and in 2000 when the President Kim Dae-Jung administration came up with 11 e-government initiatives. The goal of carrying out the 11 initiatives as e-government projects was to continue bringing offline documents to online and ensure efficiency in government administration. In order to build a government-wide integrated computing environment, e-seal and e-signature systems were developed; to provide convenience to government workers, four systems were developed as part of the project[11] and to bring offline government businesses to online, local government informatization schemes were developed.

The national finance information system (G2G) is a budget management system that allows real-time

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10) Web was introduced in Korea at 1995 and e-government along with the widespread use of the term, full-scale e-government projects also started around this time. In the first place, a framework system took full control in information and communications affairs.

11) National finance information system, educational administrative information system, standard personnel management system, and e-approval and e-document exchange system.

monitoring of all spending of all public institutions that use the government budget or funds. The educational administrative information system is an online distribution system for academic and educational administrative data, connecting schools, educational offices, and Ministry of Education and Human Resources Management. The standard personnel management system attempted to establish paperless and efficient personnel administration by computerizing HR affairs, while the e-approval and e-document exchange system aimed to improve productivity in administration through making it compulsory to prepare, approve, distribute and store all official documents electronically. The president was a leader and big supporter to e-government project and the national assembly drew up bill, act for e-government, because they thought that e-government can be a strong strategy and a method to innovate the bureaucratic government in Korea which suffered from economic crisis. Consequentially Korea overcame the economic crisis (its GDP growth rate bounced to +4~10% from –5.71% in1998) and made enhancement of national transparency, CPI (corruption perception index) point was consistently increased from 3.9 in 1997 to 5.1 in 2005.

Figure 4. Social trend in information management e-government
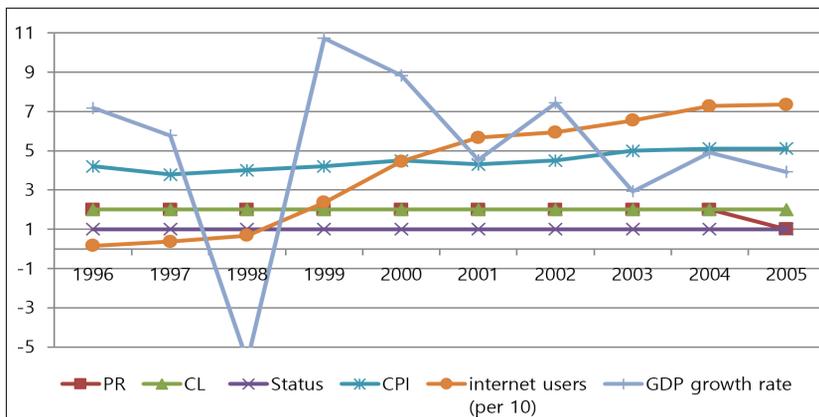
Sources: Freedom House (2016), TI (2016), ITU (2016), The World Bank (2016), Ministry of the Interior and Safety of Korea (2016)

Note: PR: political right; CL: civil liberties ratings; Status: freedom status, CPI: corruption perception index

During President Roh's administration that took off in 2002, efforts to streamline and foster information management were undertaken through 31 e-government roadmap projects involving digitalization of the entire document processing, informatization of national/local finance information, establishment of local e-government, e-audit framework, e-national assembly, integrated criminal justice framework, comprehensive informatization of HR management administration, informatization of foreign affairs and trade, real-time management of national affairs, extended sharing of administrative information, etc. This period, being the transformation stage from the bureaucracy-based e-government to administrative management based e-government, holds significance in that attempts were made to innovate the way government worked. Electronic business processes were stabilized by transforming paper documents to electronic documents, and department-based businesses to service flow-based businesses; administrative information sharing was expanded; and business processes were re-engineered for government services. Backed up with the president's enthusiastic support, legislative advocates from the National Assembly, and financial help with citizens' interests, e-government projects made a huge contribution to turn Korea into a more transparent and economically

energetic nation with a steady increase of its internet users (73.5% by 2005). President Roh's strong supports, legislation supports from the national assembly, sufficient finance support and citizen's interest in e-government projects for government services reengineering made Korea be more transparent, economically energetic and liberty with increasing the internet users(73.5% in 2005).

Despite such efforts, limitations can still be found in this stage: the government still provides one-way services centered around large portals where it publicizes itself unilaterally; it provides supplier-oriented services using certain methods of its own choice; there are limitations on time and place; hand-written documents and online documents are used at the same time; and the government provides back-office based services that are far different from front-office based services.

4.3 Maturation with citizen participation

E-government practices for citizen participation can be mainly found under President Roh's (2005~ 2007) and Lee's (2008~2012) administrations. Also titled the 'participatory government', the Roh's administration stressed citizen participation, and saw extensive increase in the size of council organizations of private-sector members and experts throughout the entire areas of the society including the government and administration. The mainstream e-government projects were also the ones involving citizen participation.

Under the Roh administration, 31 e-government roadmap projects were carried out and more than 12 e-government projects were mainly implemented for increasing online participation of citizens; improving Internet civil services; providing comprehensive services on national safety management, national welfare information, food and drug information, job information, and national logistics information; integrating and improving construction/land/registration information; and providing Internet-based service for administrative appeals, single-window G4B service, e-trade service and support service for foreigners. Citizen participation based services no longer required personal visits or face-to-face interviews but rather facilitated online services through a single window under restrictive participation. 'Civil service innovation' has emerged as a new agenda for improving services for citizens and businesses and increasing electronic participation of citizens.

Anti-corruption and Civil Rights Commission classifies requested services and distributes them to the institutions or departments in charge. More functions that 'e-People'[12] provides are management of public suggestions and system improvement, corruption reporting, e-hearings, policy forum agenda requests and discussions, surveys, etc. After this system was established, the average time required in processing a simple civil application was reduced by 6.7 days, from 12 in 2005 to 5.3 in 2011, whereas for processing a complex civil application, the time was reduced by 26.8 days from 36.1 to 9.3. Moreover, for better service quality, applicants can ask for additional feedback if they are not satisfied with the first one, and rate the satisfaction level again with the additional feedback (Jin et al., 2015).

So practical use of e-government (Min-won 24 services) increased year by year, and most citizens were issued with various public certifications through the min-won 24 system which is the best well known e-government system and has served 1,209 kinds government services since 2002. Citizen could watch the activities of government and participant in process of policy through the interment and e-government (Andersen, 2009; Jin and Cho, 2015). The incensement of internet user and e-government practical user also could be a big pressure for government to open their information, to enhance their capability, and to strongly

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12) One of the examples can be the project called 'e-People' service expansion, which aims to facilitate citizen engagement in policy-making process by allowing them to file complaints, give opinions and discuss policies on a single channel. The entire central and local government bodies and 14 public institutions are connected onto the 'e-People', where complaints and suggestions are filed and processed and the results provided for review. Citizens can also raise their voices regarding unfair administrative measures, infringement of rights or interests, suggestions for improvement, and other opinions on various policies through the integrated online channel.

control their internal corruption in Korea. E-government made the check and balance relation between government and citizen and it enhanced the national transparency and political freedom in Korea. Indeed as in Figure 5, CPI point increased from 3.8 in 1997 to 5.6 in 2015 and civil liberties also enhanced from 7.94 in 2006 to 8.53 in 2016.

Figure 5. Social trend in participatory e-government
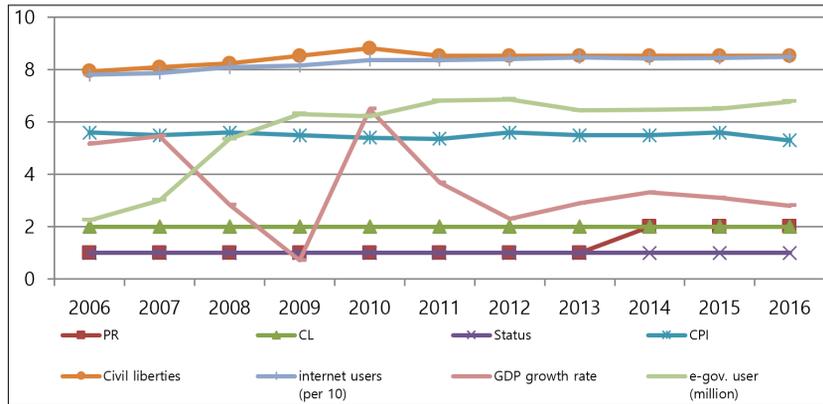
Sources: Freedom house (2016), TI (2016), ITU (2016), The World Bank (2016),
              Ministry of the Interior and Safety of Korea (2016)

Note: PR: political right; CL: civil liberties ratings; Status: freedom status, CPI: corruption perception index

Public attention and interests on the e-government and the participation in the policy process have become another key role for Korea to understand the impact of the e-government under strong leadership of the president and timely legislation in the era. E-government has now become a tool for the citizens to monitor the overall process of the work of government pursuing to public services. E-government becoming not for government but for citizen can check and watch for government to make and provide good public services to citizen.

From 2002, when e-government service(Min-won24) was put in its operation in Korea, to 2016, according to previously suggested scheme, e-government Development Model Based on Social Paradigm Shift, political right, corruption perception index and internet users rate were statistically analyzed to find out how such factors affect to the maturity of e-government. Using Pearson's correlation coefficient analysis method, the following results in the chart below were found. As in Korea, since the beginning of the operation of e-government service in 2002, as usages of internet and e-government increased, participation in political matters increased (P.R. values from 7 to 1, low value means high rate of political participation). Also, from the result, the increase in citizens' participation in the usage of e-government was found to have high correlation with the usage of internet. Thus, as in Korea, maturity of e-government and society could be explained through using the analysis framework of this paper.

Table 1. Correlation analysis

		Political right	Corruption Perception Index	Internet users rate	GDP growth	e-government users
Political right	coefficient	1	-.574*	-.566*	.191	-.573*
Corruption Perception Index	coefficient	-.574*	1	.942**	-.447	.947**
Internet user rate	coefficient	-.566*	.942**	1	-.424	.984**
GDP growth	coefficient	.191	-.447	-.424	1	-.499
e-government users	coefficient	-.573*	.947**	.984**	-.499	1
*. P< 0.05 , **. P< 0.01						

The next analysis is aimed to find out whether the relationship between the usage of e-government and social maturity (political participation and national transparency) and the effect of IT technology could be explained based on e-government Development Model Based on Social Paradigm Shift scheme. To avoid excessive amounts of variables when calculating the number of e-government users, logarithm variables were used and then changed them into dependent variables to make regression analysis. Dependent variable, the number of e-government users, may be the most useful factor to illustrate development of e-government on this research. When the factors (technology, content, and convenience) relating to e-government are all well-appointed, satisfaction from e-government users will increase. Therefore, the maturity or development of e-government depends on utilization by the citizens. For such reason, this research statistically measured the development of e-government as a dependent variable by the utilization of e-government.

4.4 Challenges to the smart society with governance-based e-government

E-government in Korea has mainly shown features of one distinct model at a time among the bureaucratic, information management-centered, citizen participatory and governance-type models. However, in some stages of development, features of both bureaucratic and information management-centered models, or information management-centered and citizen participatory models were concurrently displayed. In this case, rather than the more advanced stage coming beforehand or being apparent, the former stage developed to the next level after going through the process of maturation.

So the e-government in the smart society should develop new roles as an open stage for collecting a variety of knowledge and wisdom for solving social issues and creating new values. It is important that the government establish an open collaborative framework, in which it deploys better policies and seeks for alternatives, together with the citizens. In other words, the 'service-type government' should transform into a 'platform-type government' for open government operation that is based on creative ideas of the citizens. The platform, as used here, means the core foundation of the smart society that creates new values through open innovation of service infrastructures such as networks and systems, along with social infrastructures such as future prediction and governance. Platform strategies provide opportunities for diverse groups of people to challenge and create and integrate a broad range of ideas and knowledge. They are a set of value-oriented ecosystem strategies that produce new services, where technologies, systems, and cultures are included. As the collective power accumulates on the platform, the platform itself will use the influence.

And the government, instead of providing the entire services alone, should collaborate with the private sector

and influence the current national issues and economic productivity through social networks that are based on creativity and collective intelligence of the private sector. Big data analysis from disclosed public information and its utilization will enable customized life services. For instance, big data analysis will provide life-long disease prediction and healthcare programs, and enable anticipatory risk prediction and safety-related services for citizens. In addition, it helps develop future strategy by exploring emerging issues and provide customized life services in an easier manner. Proactive services, in which the government reaches citizens before citizens visit government offices, or the user-oriented customized services need to be established. Smart government will facilitate early establishment of a healthy, safe, creative and happy society.

Also, more public information should be disclosed and an open government built on openness, sharing and collaboration should be pursued based on information sharing between the public and private sectors. The government should contribute to making the future society a reliable space and make efforts for co-existence and integration with each and every player of the society. This smart civic awareness is not only what the society expects from its members, but also an essential part of life skills they need in order to become accustomed and acclimatized to the new social landscape. IT-based social capital, open communication and the restoration of trust are also among the important priorities. A rational and cooperative civic culture begins with the civic spirit and ethical behavior of individual citizens.

5. Conclusion

For social development, technology, markets, and systems must keep pace. However, legal systems are not properly reflecting these social changes, not only in Korea, but also around the world. In order to pioneer a convergence economy, the industrial environment, laws, and systems that can hinder the current convergence industry must be checked and supplemented, and further, the creation of a new convergence market from the convergence of traditional industries and smart technology is very important, and accordingly, it is also important to foster appropriate talents for the new market.

Within this context, this study defines that the social paradigm shift caused by the new IT brought the current smart society following the industrial and information societies, and proposes a new e-government development model that incorporates the level of social pluralism based on e-democracy and the maturity level of civic society. The new model classifies e-government development into four stages: bureaucratic model, information management model, participatory model, and governance model. The study also attempted to apply this model to e-government practices in Korea on the flow of time.

Korea is expected to experience more intensified and mature governance-type e-government services from development of the smart society. In the smart society, people can access to the Internet and enjoy government services using smart phones or wired devices regardless of time and place; foundations are made for them to demand new and a diverse range of services from the government; and information exchange on SNS is becoming part of their everyday lives. In this regard, the ultimate goal of achieving the smart society is to establish a society where challenging issues are solved 'in a smart way' and all members are happier through application of smart technologies to almost everything – humans, systems, process, etc. In other words, through the means of smart information technologies and the digital revolution, the current society is expected to evolve into a value-oriented society where humans are put first as the purposeful being. In order to prepare for the full-scale convergence age in Korea, we must approach it from a three-system legal perspective such as economic policy, promoting innovation, and user protection.

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