

GOOD SOFTWARE STANDARD PROPOSAL

Civil Complaints System

Smart Parking System

Mobile Voting Solution

Smart City Platform for Mayor

Human Resource Management System

Call Center System





SEOUL METROPOLITAN GOVERNMENT

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Eung-dap-so

Smart Parking Management System

mVoting

SMART CITY PLATFORM FOR MAYOR

HRM System

120 DASAN CALL CENTER



Eung-dap-so

Civil Complaints and Proposal Integrated System



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I INTRODUCTION

1. Background

As an endeavor to advance the development of Smart City & e-Government environment, The Seoul Metropolitan Government (SMG) conducted a Smart City & e-Government Solutions Introduction Project for other cities around the world by examining its current e-Government status and providing technical support to boost its Smart City & e-Government level.

The Seoul Metropolitan Government (SMG) has been a leader and innovator in Smart City and e-Governance and has successfully applied information technologies in public administration to achieve better public service delivery, as well as improve communication channels for citizen engagement and empowerment. Both the United Nations e-Government Survey by the United Nations Department of Economic and Social Affairs (DESA) and the Digital Governance in Municipalities Worldwide by the e-Governance Institute at the School of Public Affairs and Administration (SPAA) at Rutgers University consistently rank the Seoul Metropolitan Government (SMG) as the top municipality in e-Governance.

Since 2003, the City of Seoul Metropolitan Government and the Republic of Korea have continuously ranked in the top spots in The Municipal e-Governance International Survey conducted by Rutgers University, as well as The E-Governance Survey by the United Nations (2003~2016). During the last 13 years, the Seoul Metropolitan Government has become what numerous international governments seek to benchmark as their vision for e-Government. The city has shown strong leadership in envisioning a long-term strategy in the development of e-Government. Based on its Five Year Long-term Strategy, a dedicated team of experts gathered around the municipality's IT division, whose main responsibility is to manage the city's e-Government strategy, policy, infrastructure and regulation. The Office of the Mayor acted as the liaison between various government agencies in the development of the new infrastructures, while outlining the guiding principles for sharing information and collaboration with related agencies.

The ITU (International Telecommunication Union), which is under the auspices of the United Nations, published a special report titled “Smart Cities - Seoul: a case study¹” as part of its technology watch report in February 2013. Referring to the City of Seoul as one of the world’s tech-savviest cities that has retained its top ranking in the UN e-Government Survey since 2003, the report cited the Seoul Metropolitan Government’s e-Government capacities along with diverse and unique digital services for its citizens.

2. Objectives – Purpose of Eung-Dap-So System Introduction

As one of the most important municipal governments in Asia, the Seoul Metropolitan Government has played a key role in leading the Smart City and e-Governance campaign in the region. The SMG continues to outperform its competitors, both local and international, in various international e-Governance measures (e.g., UN’s e-Government Survey, Rutgers’ Digital Governance in Municipalities Worldwide). Seoul consistently ranks first in measures across such areas as e-Government content, service delivery and citizen and social engagement. The SMG continues to utilize its e-governance initiatives to support and encourage other good government efforts, and has succeeded in applying e-Governance as a catalyst to greater government reforms and connecting with its broader strategic objectives, which are to create a more effective, efficient and open government for the citizenry.

Public administrators from around the world have shown interest in such policies, and the SMG has undertaken a concerted effort to collaborate with such local governments to export its exemplary cases. However, information technology policy adoption requires certain infrastructure to be in place and often presents local governments with challenges during their adoption process.

This introduction will provide decision makers with not only the bird’s eye view of the overall background of the e-governance projects, but also with the nuts and bolts of the projects which would allow them to have a clear understanding of what to expect. This study aims to analyze SMG’s major exemplary cases in the e-governance area, and validate the excellence of those cases. It provides analyses that will construct a “pathway” for policy exports, especially to those local governments that are particularly interested in adopting SMG’s system innovations.

3. Project Scope and Methodology

Other cities around the world are endeavoring to ensure citizen engagement with open government and desires to establish a strong communication channel between the government and citizens. For this purpose, the Eung-Dap-So System is recommended and in order to come up with accurate findings and the effective Eung-Dap-So System during the Project, it is important to first understand the current status of beneficiary cities' e-Government environment. Therefore, the Seoul Metropolitan Government (SMG)'s consultant team initially conducted surveys for in-depth investigation of the solution and also assist other cities to utilize the Eung-Dap-So System by producing a scientific analysis on the case study of other cities' e-Government. This Eung-Dap-So System introduction report, therefore, includes not only an analysis on SMG's e-Government environment, but also recommendations of e-Government services to be established for the ICT development in other cities, including the Eung-Dap-So System.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this Civil Complaints and Proposal Integrated System introduction,
- (ii) Analysis on the Eung-Dap-So system of Seoul Metropolitan Government for the effective implementation of the solution
- (iii) Case study of other cities' Civil Complaints and Proposal Integrated System and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

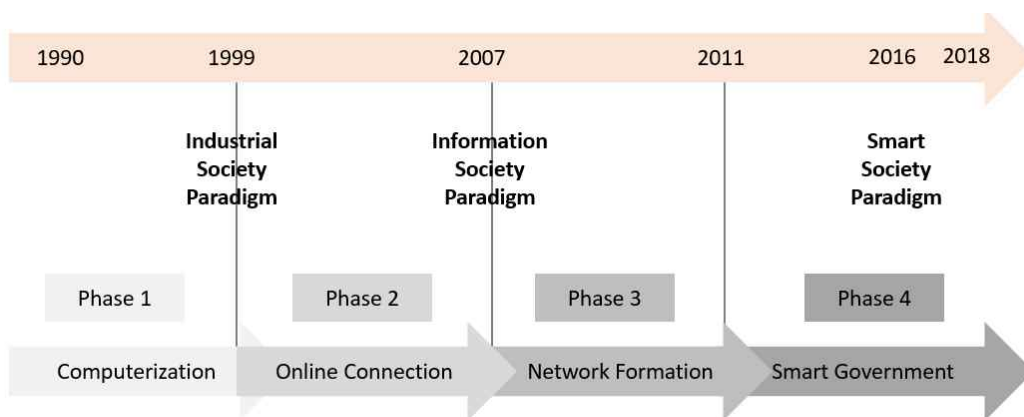
II ENVIRONMENT ANALYSIS

1. Seoul Metropolitan Government's e-Governance Policy

1.1 History Seoul Metropolitan Government's e-Government

The City of Seoul's e-Government has been systematically developed since the 1990s in an effort to automate and computerize the various work processes of city administration. The major spur for its development was due in part to the national effort to make information technology (IT) a sustainable growth strategy for Korea. Within this context, the City of Seoul wrote into ordinance the "Seoul Metropolitan Government Framework Ordinance on Information²" and the "Seoul Metropolitan Government Ordinance on Promotion Of Digital Administration³," both in 2010, capacities to tactically manage the development and the use of IT for its city administration. This allowed for the rapid development of City of Seoul's infrastructure technology from informatization of the administrative process to expansion of services to its citizens, increased civic participation and greater e-Democracy. The City of Seoul's e-Governance went through gradual and distinct phases of development during the past two decades.

Figure 1. SMG's e-Government Development Phases (Adopted from Seoul e-Government 2013)



The First Phase (1990-1999): The Computerization Phase in which the basic infrastructure for the use of information technology was established.

The Second Phase (1999-2007): The Online Connection Phase in which the roadmaps were established and the city's administrative services and electronic information were integrated.

The Third Phase (2007-2011): The Network Formation Phase in which the "u-Seoul" plan was implemented to adjust to a new mobile environment, which emphasized the participation and sharing of information required for the advent of Web2.0.

The Fourth Phase (2011-2015): During the Smart Government Phase, the City of Seoul pushed ahead with the Smart Seoul 2015 plan, which was intended to integrate online and wireless infrastructure and provide customized services to the citizens by utilizing big data and open public data, thereby enabling diverse opportunities and venues for increased civic participation and open government.

The Current Phase (2016-2020): The City of Seoul hopes to secure its leading position in the hyper-connected digital technology era and maintain the well-being of its citizens through the "Global Digital Seoul 2020 Plan.

1.2 e-Government Strategies

The Seoul Metropolitan Government's status as an early adopter of technology and eGovernment has provided the SMG with opportunities to experiment with diverse technological innovations and garner sufficient support from the central government, which was also on its way to implementing its new vision for government operations, called "Government 3.0." It is a more people-oriented approach, which focuses on openness, sharing, communication and collaboration, as opposed to the government led approach.

The holistic Government Portal integrates all major administrative services provided by individual government institutions to facilitate more effective delivery of e-Government services. For the SMG, the two major challenges are utilizing Big Data and rapidly transitioning to mobile-centered provision of public services.

1.2.1 Utilizing Big Data to Offer New Scientific, Innovative Administrative Services

The Seoul Metropolitan Government has considered new strategies to improve data-centric and administrative innovation in public services which citizens can connect with advanced public service. The Seoul Metropolitan Government coordinates a variety of data based on e-Government functions, pursuing the slogan "Big Data

solves even the smallest grievances.”

However, the use of Big Data does not create value on its own; it needs to be aligned with an effective incentive system to help accelerate citizen’s motivation and participation, while encouraging agencies to make better use of accumulated data. The SMG’s Big Data strategy aims to overcome these challenges and strike a balance between data transparency and privacy concerns.

1.2.2 Pursue of Mobile-centered Innovations in City Administration

Citizens’ preferred medium of communication is rapidly changing from computers to mobile devices. The Seoul Metropolitan Government is proactively promoting across-the-board, mobile-oriented administrative services to provide citizens with real-time public services anytime, anywhere on their mobile devices while increasing public service efficiency.

In November of 2013, the Seoul Metropolitan Government set up the “Mobile Master Plan” with the aim of building a mobile platform wherein everyone can share information and collaborate with anyone else to create new values. The strategies to accomplish mobile-based municipal administration in the city are as follows:

Figure 2. Seoul’s strategies for mobile-based municipal administration

1. Mobile infrastructure designed for collaboration and sharing

2. Mobile-based city administration led by citizens

3. Mobile-based customized aggressive welfare

4. Mobile-based economy pursuing balanced growth

5. Mobile culture available in the palm of your hand

6. A safe, smart mobile city

The plan from the Seoul Metropolitan Government is to gradually increase a total of 39 tasks, including the entire array of administrative services such as welfare, health, safety, transportation, and environment.

1.3 Ongoing Effort: Global Digital Seoul 2020

The past 5 years, the SMG's efforts have gradually lead toward its dream of achieving the future urban city, which is the tech-savvy and information seamless smart city. The City of Seoul aims to increase the quality of life and economic opportunities of its citizens through the digitalization of all aspects of SMG's administrative services including economy, culture, transportation, safety, welfare and environment. The Global Digital Seoul 2020 lays out the next five-year initiative which is based on citizen-led digital governance that emphasizes communication with citizens and attempts to resolve future urban problems through digital technologies.

1.3.1 Background and Future Direction of Global Digital Seoul 2020

First, Information, and Communication Technology (ICT) is shifting towards digital technologies and everything is being hyper-connected in a new digital ecosystem. At the initial stage of the information-based society, the paradigm shift into digital technologies allows development of knowledge-creating industries with smart phones and other smart mobile devices, and the SMG is in a very advantageous position to rapidly transition to this new phase.

Second, a shift from user-oriented IT strategy to citizen-led digitalization, requires new ways to deliver services its citizens. Even though the City of Seoul has a high reputation related to its role as an IT powerhouse, it is still required to completely utilize IT infrastructure and to develop a new business model for collaboration between public and private sectors for citizen-led digitalization strategies. The future of informatization in the public sector depends on public-private collaboration.

And third, from a policy perspective, one of the most important strategic goals of the City of Seoul is to become one of the top 5 competitive cities in the world. As the City of Seoul's effort, Global Digital Seoul 2020 is a new IT strategy in order to improve its global competitiveness.

The SMG's Global Digital Seoul 2020 was intended to consolidate its past e-Government development efforts and provide a new vision and directives for implementing the digitalization of administrative services. The Global Digital Seoul

2020 focuses on three elements: digital technology, people and social innovation. The City of Seoul is looking to integrate infrastructure and technology-mediated services, facilitate citizens' social learning through this infrastructure, and envision smart city governance to bring about innovation and social progress. The City of Seoul hopes to enhance citizen engagement with digitalized initiatives beyond simple delivery of services. Ultimately, the SMG's goal is to improve the quality of life for its citizens and create sustainable values for the future.

1.4 Future of e-Government

It is essential that the City of Seoul integrates IT with other important areas of public interests, including job market, welfare system, and green growth. To this end, Global Digital Seoul 2020 aims to systematically link digital technologies to other operating systems of the City of Seoul.

The Seoul Metropolitan Government has continuously employed and tried to keep pace with the Central Government's grand vision for public operations, namely "Government 3.0," which places emphasis on openness, information sharing, communication and collaboration. Under this new vision, the SMG is undergoing a paradigm shift to move away from a government-led approach to a more people-oriented approach.

So far, this study has concluded that Seoul Metropolitan Government's e-Government policies and innovation initiatives have produced much of the intended results and the SMG has managed to create an ideal working framework for e-Governance, which is worthy of further study and of being an exemplary policy for export to other municipalities.

III Case Study

1. Case of Singapore

1.1 History Seoul Metropolitan Government's e-Government

Challenges of e-Government are not limited to technology; they require broad understanding of the multidimensionality of the e-Government development process. Very similar to the vision and strategies of the SMG, the Singapore Capital City Government built an e-Government structure that incorporates new forms of leadership, transformative public and private partnerships, participatory processes and increased accountability.

Figure 3. Singapore Government Web Site: Main Page Retrieved from <https://www.gov.sg/>



E-Government Profile: Singapore (Source: Holzer & Manoharan, 2016. Digital

Governance in Municipalities Worldwide (2015–16): Fifth Global E-Governance Survey: A Longitudinal Assessment of Municipal Websites throughout the World. National Center for Public Performance, Rutgers University-Newark.)

According to the Rutgers University’s Digital Governance, Singapore is in the top 20 cities in terms of e-Government and Digital Governance. More specifically, the Singapore Capital City Government has scored considerably high in the Service Delivery measures and the Citizen & Social Engagement measures of e-Government.

Figure 4. Singapore Government Web Site: An Accessibility to Government

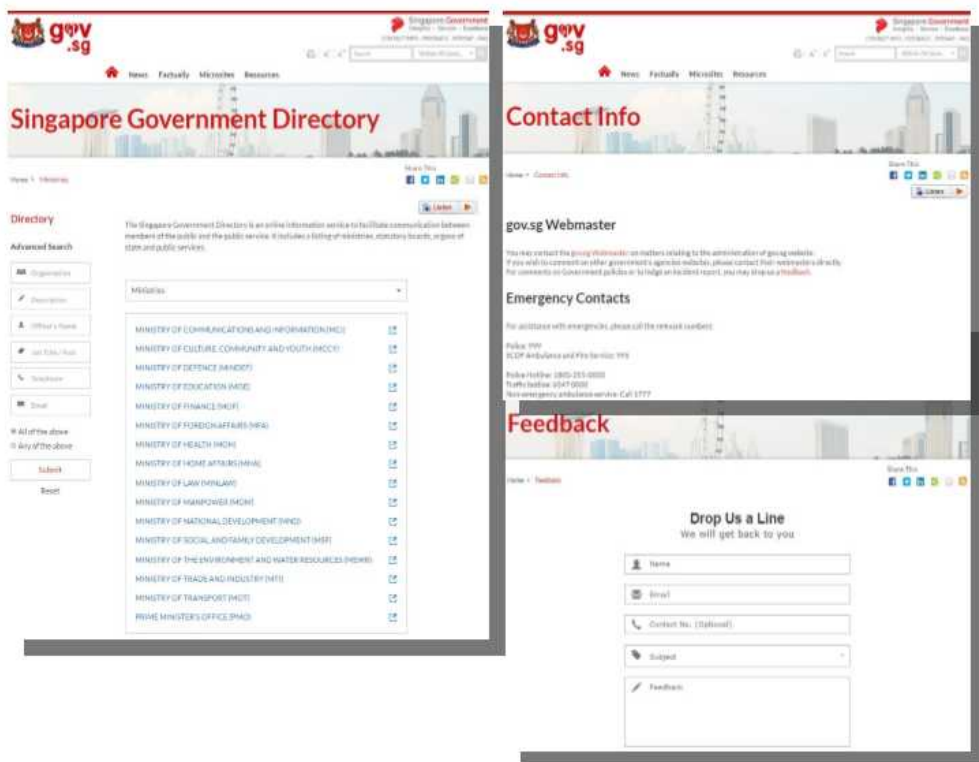


Figure 4. Presents the accessibility to the Government through the Website. The Homepage clearly specifies the structure of department information in government. In this Directory page, Singapore citizens have access to government directly and simultaneously, and citizens can find detailed information about public officers in charge with the advanced search function on the left-side of the page. Contact information and Webmaster’s e-mail address are provided for inquiries and Emergency Contacts. In case citizens want to leave feedback, the site offers a Feedback Page, therefore citizens can make suggestions without having to contact public officers directly.

Figure 5. Singapore Government's Communication through Social Media:
Facebook Retrieved from <https://www.facebook.com/gov.sg>



On Figure 5, Singapore Government officially operates Facebook, Twitter and YouTube as an alternative means of communication to traditional channels. However, all channels offer two-way communication between government and citizens. Nevertheless, the channels are still managed separately though the link is provided from the Website.

IV Seoul Metropolitan’s Eung-Dap-So System

“Eung-dap-so” is the Korean name for the system of “Civil Complaint and Proposal Integrated System (CCPIS)”. The system was first introduced to respond more quickly to citizen’s comments, troubles, and complaints. Specifically, this online system is designed to integrate and manage all-encompassing channels: 31 existing complaint and proposal sites, including the “One Click e-Applications” and various other social media centers.

Since the SMG introduced this system, all complaints and suggestions can now be filed at Eung-Dap-So, which was created to listen to every citizen of the City of Seoul. Specifically, in an effort to process all the complaints and suggestions faster than before, it is customary that simple complaints are immediately processed by the complaint managers. Consequently, citizens of the City of Seoul can submit their opinions and suggestions to the authorities without having to worry what channel to use, who to contact, which department should handle the complaints. Once citizens’ opinions are received, the department in charge is determined through coordinated meetings.

Eung-Dap-So is a communication channel with the public. To be more precise, it is an integrated system that receives and administers civil opinions, not only from the previous traditional channels such as telephone calls and in-person visits, but also from online and social network service (SNS).

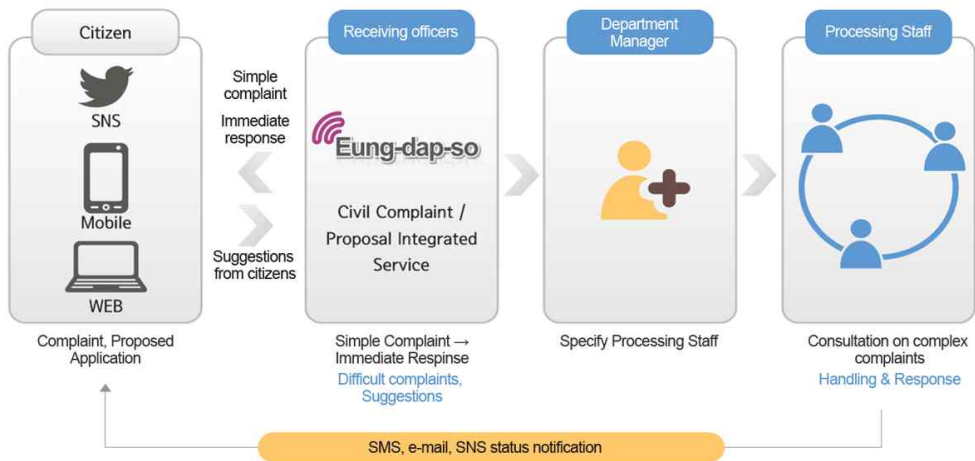
1. Policy Goal, Performance and Outcomes

1.1 Policy Goal

Prior to the current Integrated Complaints handling system, the City of Seoul citizens too often experienced inconvenience in terms of the government’s numerous complaints systems. In particular, for ordinary citizens without any knowledge of how the administrative system works, it was a hassle to find the responsible department and the officer in charge in order to report their opinions and complaints. From the administration side, the extant communication channels were not interchangeable with the costs and difficulties in the administration of the civil complaints.

To solve and reduce the red tape characteristics of SMG’s communication policy, Eung-Dap-So was introduced. Its policy goals are as follows:

Figure 6. Overview of Eung-Dap-So System



1.1.1 Increasing Accessibility and Responsibility of SMG

- Quick and easy way to contact for anyone
- Simplified system that incorporates all the existing channels such as phone call, visiting, internet suggestion and social media.
- Immediate response to the citizens' opinion and suggestion
- Constructing a more systematic way to provide feedbacks to citizens' complaints

1.1.2 Improving Public Productivity of SMG Officers

- Increase work efficiency through a refined single-channeled system
- Set up and provide at-a-glance understanding environment for the public officers in terms of complaints handling

1.1.3 Enhancing Effectiveness of SMG

- Answering to all the opinions from citizens by integrated managing system
- Managing the opinions regardless of channel, format, place and time

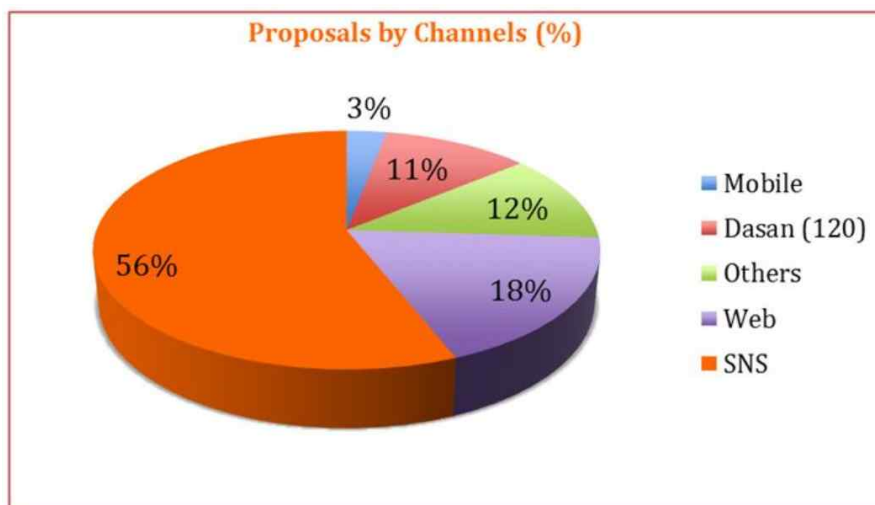
1.2 Performance and Outcome

After the introduction of the integrated management system, SMG obtained the

following outcomes:

First, visible improvement in quantitative performance, which reduces the complaint processing periods. The wait time to obtain responses from the government has been reduced from 3.8 days in 2013 to 2.9 in 2015. Eung-Dap-So enables to make immediate responses to the citizen complaints, which results in the qualitative improvements in communication with the public. Second, due to a significant improvement in the qualitative performance of complaints, the SMG implemented the “immediate answering” system.

Figure 7. The proportion of citizen proposals by Channels (Feb. 2014 – Dec. 2015)



Source: Seoul Metropolitan Government Website, www.seoulsolution.kr

In addition, they disclosed and made public the complaints handling process, including the person in charge and the processing time to the citizen. Third, due to the effort to communicate through SNS with the citizen, the followers of SMG’s SNS accounts (Facebook, tweeter) have almost tripled from 50,000 followers in 2013 to 130,000 in 2015. The detailed policy outcomes can be summarized as follows:

1.2.1 Reduced complaint processing time

- 3.8 days (before) → 2.9 days (in 2015)

1.2.2 Increased Responsibility and Accessibility to SMG

- Easy and convenient real-time complaint management system
- Instantaneous response to simple complaints or questions

1.2.3 Open and disclosed administrative processing

- Public servant responsible for the claim is revealed to the public

1.2.4 Two-Way Communication Interface

- Followers of SMG's Social Media:
- 50,000 (before) → 130,000 (in 2015 after policy adoption)

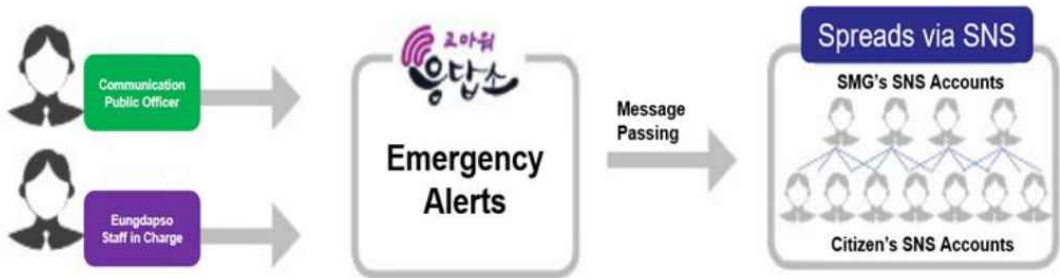
1.2.5 Improved Public Productivity

- Public officers of SMG now can handle the complaints by using a single system

Specifically, since the introduction of the system, citizens' proposals and opinions have been substantially increased, especially through the Social Media. According to the SMG's CCPIS operation report (2015), SNS was the Seoul citizens' most preferred channel when it comes to contact with the government. Of the total 407,122 cases, 56% of proposals have been received via Social Media, which clearly shows that Social Media was the primary channel for communication with the government.

Since the introduction of Eung-Dap-So, the system is known to have achieved considerable public performance not only in terms of citizen satisfaction but also in terms of work efficiency for the SMG officers. For example, Eung-Dap-So has reduced workloads by eliminating duplicate proposals and has simplified the complaints processing system within the government. Most complaints are simple inquiries and require very little administrative determination and, therefore, citizens' satisfaction are generally affected by the promptness of the responses.

Figure 10. Emergency Management by Eung-Dap-So



Source: Seoul Metropolitan Government (2016), EUNGDAPO & Social Network Services, 2016 ASPA Annual Conference

The main functions of Eung-Dap-So can be summarized as follows:

- **Registering Complaints and Proposals.**

Eung-Dap-So files the cases such as complaints and proposal applications, public official corruption reporting, reporting for public interest, applying for help regarding violations of human rights, reporting violations of public welfare, and all other types of complaints and/or proposal. When the detailed and specific opinions are required for any response to the cases, responses are obtained from the SMG’s departments and agencies, affiliated headquarters, and/or from any of the 25 districts within the SMG. The cases about the outside of Seoul will be transferred to Korea central government Ministries, other local governments and/or government offices. Complaints and proposals can be made with text, voice, photo or video files attached. Request for direct consultation is also possible

- **Check Results of Complaints/Proposals.**

If filed before 6PM, simple complaints can be responded to the same day. Content that requires in-depth review will be responded to via mobile phone, email or SNS after being handled by the relevant organization department. Progress on processing steps for registered complaints, process content, and additional responses can all be easily checked anytime, from anywhere.

- **View Example Complaints/Proposals.**

Search through examples of responses to various complaints/proposals posted on bulletin boards is possible with the use of specific keywords.

- **View Frequently Asked Questions**

Ability to search through bulletin boards using specific keywords for citizens' frequently asked question (FAQs) is also possible.

- **Citizens Evaluate Satisfaction to Government's Responses.**

Ratings on a score of 1 to 5 can be given to responses. Additional responses can also be requested.

- **Real-time Social Media Communication**

Complaints, questions, proposals and responses submitted to the City of Seoul can be viewed in real-time by the Mayor of Seoul.

- **Emergency Management**

For the more effective emergency management, the SMG has collaborated with private sectors to distribute emergency messages by using the Social Media of the private sectors. Specifically, as with agencies such as FEMA and Homeland Security in the U.S., and the Policy Agency in Japan, SMG is also authorized to make Twitter Emergency Alerts to the Citizen. Thus, the CCPIS system can spread Emergency Alerts promptly via 31 twitter accounts that possess emergency management function.

Figure 11. Emergency Message through SNS



Source: Seoul Metropolitan Government (2016), EUNGDAPO & Social Network Services, 2016 ASPA Annual Conference

3. Composition and Details

Figure 12. is the list of Social Media Accounts of Twitter and Facebook which are connected to the Eung-Dap-So. So to speak, all the messages, comments and postings to those 16 Social Media Accounts from the citizen are handled clearly and accurately by the SMG.

In addition, in case of disaster situations, the Retweet function of Twitter and Sharing function of Facebook are far more effective than traditional channels, in which the emergency messages can be disseminated instantly with the support of the citizens.

Figure 12. Social Media Accounts Connected and Managed by Eung-Dap-So

		User name	Follower	Proposal
Twitter	Wonsoonpark	Mayor	1,249,980	112,879
	Seoul_eds	EUNGDAPSO	843	14,397
	Seoulmania	SMG	74,246	9,654
	Seoulgyotong	Transportation Division	6,369	3,167
	Seoulhangang	Han-river Division	4,174	961
	Seoulspoke	Spokesman's Office	34,313	1,644
	Seoul_smc	EUNGDAPSO	2,387	922
	Greenseoulcity	Green Seoul Division	1,634	15
	Arisusalang	Water Service Division	41,123	214
	Seoulroadmania	Road Management Division	2,436	49
	Womanseoul	Woman Welfare Division	3,276	28
	Seoultong	Civil Service Division	4,704	424
	Livingenv	Environment Division	4,477	130
Facebook	Wonsoonpark	Mayor	222,310	55,833
	Hope2gether	Mayor	364,999	62,811
	Seoul_eungdapso	EUNGDAPSO	365,002	298

Source: Seoul Metropolitan Government (2016), EUNGDAPSO & Social Network Services, 2016 ASPA Annual Conference

Figure 13. Eung-Dap-So Web Site Composition



Source: Holzer et al. (2016). "Establishment of Bridgehead for Policy Export and International Relations: Digital e-governance of Seoul Metropolitan Government." 2016 ASPA Annual Conference.

Figure 14. Eung-Dap-So Mobile App Composition



Source: Holzer et al. (2016). "Establishment of Bridgehead for Policy Export and International Relations: Digital e-governance of Seoul Metropolitan Government." 2016 ASPA Annual Conference

V Budget

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Government Resources
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of Eung-Dap-So project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

VI Funding Opportunities

Table 1. Grant Opportunities by Korean Government through Various Funding Agencies

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing

- Supporting information resource management in the public sector
- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)

- RESEARCH AREA

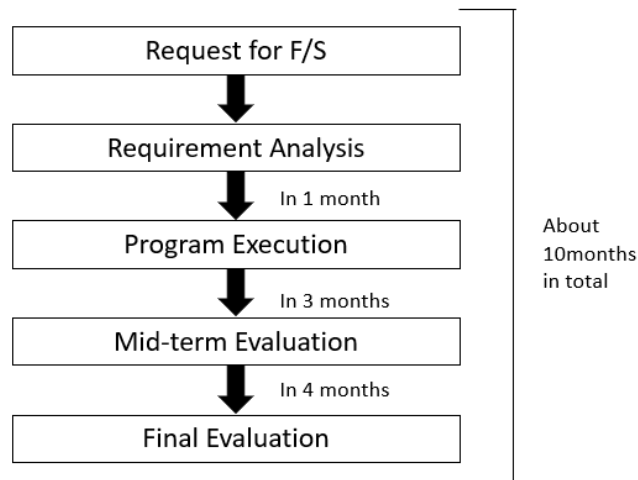
Regular Industries + ICT convergence

SMART SoC

New technology-based Solutions

Beneficiary countries in the needs of ICT Cooperation

Figure 15. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing

- Promote businesses related to the convergence and utilization of ICT technology
- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- PURPOSE

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- RESEARCH AREA

Public administration

education / finance / medical IT convergence

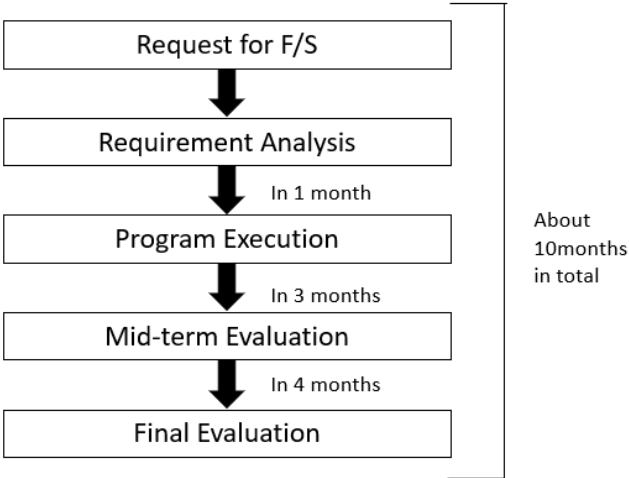
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 16. Project Operation Framework and Application for F/S Project (NIPA

Fund)



VII Conclusion - Lessons from the Eung-Dap-So System Introduction

This Eung-Dap-So System Introduction attempts to examine the Seoul Metropolitan Government's consistent efforts in achieving what was once only possible on the design board. The introduction has shown that service innovations as the result of e-Government can evidently be put to various uses.

Under the principle of transparency, sharing and communication, the SMG has shown that e-Government can gradually lead to new service concepts, new channels of communication and new service delivery system, and sometimes even to the creation of new public services. In essence, what the government is trying to achieve is to revolutionize the current service delivery systems so that values are created during the interaction between the government and its citizens. The vision attempts to shift the e-government development model from that of citizen-oriented to that of citizen-led development in all arrays of the government provided services. When citizens are allowed to participate in the decision-making process, not only is democracy ensured but also create new social values. Not only that, efficiency is increased from the synergy among the stakeholders, thereby improving productivity and even increasing citizen satisfaction. The SMG's e-Government policy has set out to achieve just that.

Despite the rapid growth of e-Government study, few studies have approached the matter from a practical viewpoint of policy recipient in terms of applicability and attainability. In this report, this introduction examines the SMG's exemplary e-Government policies and looks at the main characteristics that make the Seoul's Eung-Dap-So case so powerful. In sum, this study has found that the SMG's e-governance initiatives are designed to provide better and more timely public service contents to all citizens from Eung-Dap-So with its citizens to address declining public trust towards governments, and engage citizens and empower communities through participation and knowledge sharing. Eung-Dap-So has illustrated the essential components of responsive e-Governance for implementing the innovative public administration efforts during all phases of information technology development and social growth.

The reasons behind this phenomenon are subject to future academic research. However, what is undeniable is that through the integration of infrastructure and technology-mediated services, citizens are actively participating in the public policy making process and there has been huge social learning in the process, in terms of

civic duty and civil rights, and governments are actively pursuing reforms to keep up with the progress, thereby bringing about further institutional improvement. More specifically, the integration of public services and technology through e-Government has not only improved the delivery of government services, but improved governance and the institutional framework, and has ultimately led to the creation of sustainable value for the citizens, City Government employees, and other stakeholders.

SMG seems quite accurate in reading the megatrends of the digital technology era, as it prepares itself with the necessary tools to analyze Big Data, open up mobile-based information communication provisions for the public. In addition, in 2014, the SMG has collaborated with the World Bank and the Export-Import Bank of Korea to policy export the Seoul's Smart Complaint System to the City of Bombay. With the creation of WeGO in 2010, the SMG has been at the center of an international cooperation effort to improve e-government and share knowledge with other international cities to reduce gaps between haves and have-nots in the digital divide. There is no arguing that the improvement of digital information capacity would lead to sustainable development and improved efficiency and effectiveness of public administration.

In sum, in order to emulate Seoul's e-Government policies, potential cities need to keep in mind that sustainable services mentioned in this study require all parties to actively partake in the innovation. The government needs to come up with better incentive systems to motivate not only the citizens to participate but also the public employees to engage in the e-Government reform campaign.

Decision makers and policy advisors need to keep in mind that e-Government is not a panacea of all socio-economic problems. The governments still need to take into account the various social issues, including the lasting problem of the digital divide between different regions and generations, and need to physically engage all stakeholders to come up with a comprehensive strategy that reinforces effective coordination and management in dealing with the social-economic problems. That does not mean that e-Government is merely a technological tool for governance. Rather, it is a platform to instigate further engagement from all citizens, also to provide an easily assessable platform for all participants to deliberate and engage in active discussion. Only then can cities and local governments achieve what they have

planned to achieve through e-Government. This study hopes to pass these useful insights to managers all across the world and to provide a point of comparison to guide other cities in the planning and implementing of e-Government policies.



Smart Parking Management System

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I Introduction of Seoul Metropolitan's Smart Parking Management System

1. Background

The Smart City movement comes with a purpose of leveraging on and integrating resources to better manage the complexities that a city presents. Many cities pay a great deal of attention to the 'hard' aspects of the smart city concept, such as improving infrastructure and technical efficiency. Seoul's example demonstrates that 'softer' aspects, such as citizen participation, can matter just as much. Citizens, as the real agents living in the urban system, will bring greater possibilities to look at the complex urban issues in novel ways. Cities start becoming smarter not merely by getting more systems and tools or by putting out more data, but by making good use of them to address real problems. And the way that Seoul has done this is by engaging citizens sincerely and inviting them to participate in smart initiatives, so as to make those initiatives meaningful and successful.

The city now has a much keener sense of what residents are thinking, as well as where municipal issues are and how they can be fixed. Using technology, it has significantly widened the pool of people who can potentially work to tackle the problems that the city faces. The role of Mayor Park in Seoul's smart journey has also been key, highlighting the importance of leadership. His unique insight in combining the top-down aspects of smart city governance with the bottom-up ones has, in retrospect, been a true exemplification of his slogan, "Citizens are the Mayor".

2. Objectives – Purpose of Smart Parking Management System Introduction

The "smart city" is an umbrella for cities that use information technology to improve services and provide better quality of life for its citizens. As cities fill up and current mobility and transport options are strained to their limits, moving from one urban address to another becomes significantly more difficult. In order to ensure smooth transport of both people and goods, it is necessary to develop alternative modes of transportation or substantially upgrade the current systems. Smart Parking

Management System projects have the potential to 'give back' 59.5 hours per year per citizen; these are broken down as follows:

ITS (Intelligent Traffic Systems) technology can be used to dynamically adjust traffic light phasing, with the aim of minimizing red light delays and smoothing overall traffic flow. Meanwhile, parking space availability can be used to inform drivers where the nearest available space is, minimizing the time spent 'cruising' for spaces.

The time benefit based on a long-term outlook of an average commute round-trip of 74 minutes. Meanwhile, ITS are expected to have a 10% positive benefit over the baseline. In both instances, the figures used are the result of anticipated population rises leading to greater pressure on infrastructure.

Projects of smart parking management have an impact on the quality of life of citizens, aim to foster more informed, educated, and participatory citizens. Additionally, smart parking system initiatives allow members of the city to participate in the governance and management of the city and become active users.

3. Project Scope and Methodology

Other cities around the world are endeavoring to ensure citizen engagement with open government and desires to establish a strong communication channel between the government and citizens. For this purpose, the smart parking management system is recommended and in order to come up with accurate findings and the effective smart parking management system during the Project, it is important to first understand the current status of beneficiary cities' e-Government environment. Therefore, the Seoul Metropolitan Government (SMG)'s consultant team initially conducted surveys for in-depth investigation of the solution and also assist other cities to utilize the smart parking management system by producing a scientific analysis on the case study of other cities' smart mobility system. This smart parking management system introduction report, therefore, includes not only an analysis on SMG's e-Government environment, but also recommendations of smart cities services to be established for the ICT development in other cities, including the smart parking management system.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this smart parking management system introduction,
- (ii) Analysis on the smart parking management system of Seoul Metropolitan Government for the effective implementation of the solution
- (iii) Case study of smart parking system and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

II ENVIRONMENT ANALYSIS

For the past ten years, the Korean government has been putting enormous effort to create Smart Cities in various cities. In the mid-2000, the Ministry of Information and Communication (current Ministry of Science, ICT and Future Planning) had first started the Ubiquitous City project which now is under the Ministry of Land, Infrastructure and Transport (MOLIT) in the name of U-City project. Due to this continuous support in the smart city industry, the increase in the interest of the Smart City has increased that the MOLIT has selected this industry as one of its New Industrial Engine in 2016.

1. Smart City Status in Korea

The Smart City business is continuously led by the Central government, and there are two main ministries which are heavily involved in this sector. As mentioned from the introduction, MOLIT takes care of U-City project and the other is the Ministry of Science, ICT and Future Planning (MSIP) which deals with Internet of Things (IoT) test side development projects. Followed information will introduce the difference of each project.

1.1 U-City Project by MOLIT

U-City project led by the MOLIT mainly focuses on the building infrastructure in the new cities such as management of gas, water and sewage, energy, transportation and building structures. Their plan is to collect the big data of those management systems and use this data to serve better services to public and also share this data publically for their own use. However, recently, the policy trend has changed to urban regeneration, so the budget to execute the U-City has diminished. The U-City project is most suitable to apply to constructing new cities, but it can be hardly applied to the urban regeneration projects. Thus, the project has lost its driving force.

1.2 IoT test side development project led by MSIP

MSIP is leading the 'project of IoT test side development' in order to create an IoT market in Korea. Part of this project is about developing the 'Global Smart City test side.' SK Telecom and Busan City formed a consortium in 2015 to test 16 different services in 4 main sectors at Haeundae district. The four main sectors are transport,

energy, safety and lifestyle, and smart parking, smart lighting, intelligent emergency evacuation system and beacon based small business marketing are examples of the 16 services. Unlike the U-City project, this IoT test side development project can be applied to existing buildings and infrastructure by installing wire/wireless network and adopting IoT technology to transportation, energy, safety and lifestyle sectors. For this reason, this project has advantages to strategically commercialize the IoT technologies.

1.3 Development Direction

There has been no collaboration between two ministries, but in order to have competitiveness in the global market, they agreed that it is necessary for both ministries to cooperate with each other. In fact, while MOLIT focuses on building infrastructure at new cities, MSIP focuses on establishing network and installing IoT system in existing areas. Therefore, both organizations could be a perfect match for complementary cooperation.

III Case Study

How cities manage parking really matters, as how we manage parking can help us be more successful as a city. When parking is difficult to find, many people double park or circle to find a space. This circling doesn't just waste time and fuel—it's also dangerous. Circling drivers are distracted drivers making lots of right and left turns who are more likely to hit someone crossing the street, a cyclist, or another car.

Through real-time data and analytics, cities are finding that they generally don't have a lack of available parking; drivers instead have the perception of scarcity due to a lack of information. In reality, smart parking systems are just the beginning in using technology to improve city efficiency.

This section presents three cities that have successfully deployed various smart parking systems in order to provide motorists in their city real-time availability for on-street locations and static information for its off-street facilities through various consumer-facing applications.

1. San Francisco, USA

Figure 17. SF Park Mobile App & Website



SFpark is the brand for SFMTA's approach to parking management. SFpark was a demonstration project funded through the Department of Transportation's Urban Partnership Program. For the SFpark pilot project, the SFMTA used several strategies to make it easier to find a space and improve the parking experience, including:

- Demand-responsive pricing.

- Making it easier to pay at meters.
- Longer time limits.
- Improved user interface and product design for touch points with the parking system.
- Improved information for drivers, including static directional signs to garages and real-time information about where parking is available on- and off-street.
- Highly transparent, rules-based, and data-driven approach to making changes to parking prices.

In addition to the parking information map available on the SFpark.org homepage, information on parking availability is distributed via a free SFpark iPhone app, Android app, and the region’s 511 phone system.

While the SFpark pilot project had many goals, its primary focus was to make it easier to find a parking space. More precisely, the goal was to increase the amount of time that there was parking available on every block and improve the utilization of garages. Besides helping drivers, making it easier to park more of the time was expected to deliver other benefits (e.g., reducing circling, double parking, greenhouse gas emissions, etc.).

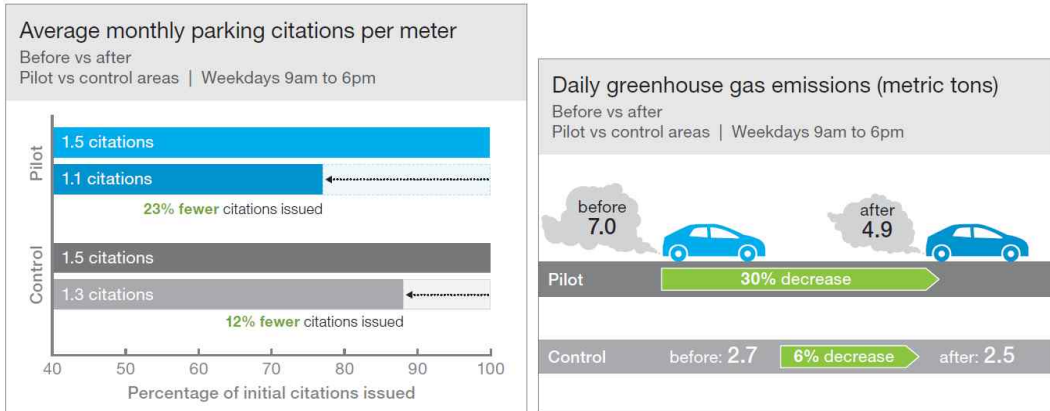
Figure 18. Hourly Parking Rates in SFpark Areas & Parking Search Time(Min)



Over the course of the SFpark pilot project, the SFMTA lowered the average hourly rate at meters by 11 cents from \$2.69 to \$2.58 and average hourly rates at SFpark garages by 42 cents from \$3.45 to \$3.03.

It is easier for drivers to find a parking space. In SFpark pilot areas, the amount of time most people reported that it took to find a space decreased by 43%, compared to a 13% decrease in control areas.

Figure 19. Hourly Parking Rates in SFpark Areas & Parking Search Time(Min)



It is easier to pay and avoid citations. SFpark also sought to create a parking experience that is simple, consistent, easy to use, and respectful. The pilot project improved the experience of parking by lengthening time limits and making it much easier to pay.

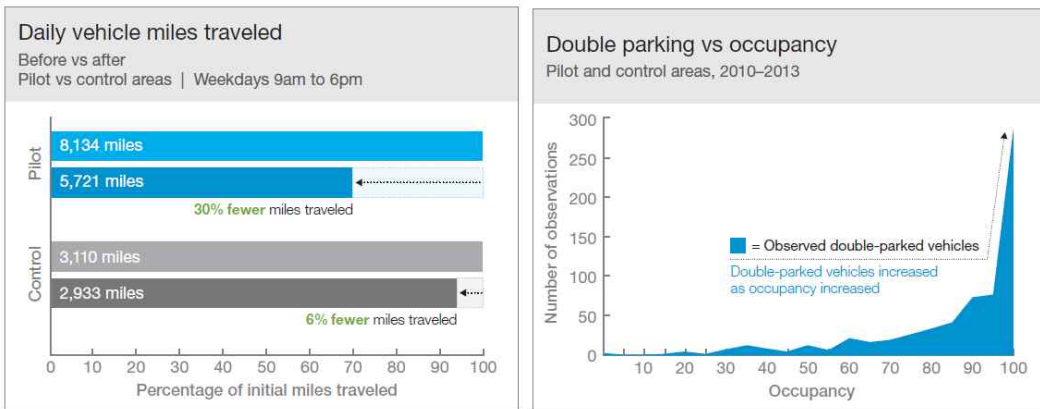
Greenhouse gas emissions decreased. Drivers generated 7 metric tons of greenhouse gas emissions per day looking for parking in pilot areas. This dropped by 30% by 2013, compared to a decrease of 6% in control areas.

Peak period congestion decreased. SFpark encouraged people to drive at non-peak times and improved parking availability when it mattered most.

Traffic volume decreased. In both pilot and control areas, where parking availability improved, traffic volume decreased by approximately 8%, compared to a 4.5% increase in areas where parking availability worsened.

Traffic speed improved. While overall traffic speed decreased, it decreased by 3% in areas with improved parking availability, compared to a decrease of 6% in areas with worsened parking availability.

Figure 20. Daily Vehicle Miles Traveled & Double Parking VS. Occupancy



Vehicle miles traveled decreased. As a result of less circling, pilot areas saw a 30% decrease in vehicle miles traveled from 8,134 miles per day in 2011 to 5,721 miles per day by 2013. Control areas saw a 6% decrease.

Double parking decreased when parking availability improved. Double parking increases as parking gets harder to find, and it increases dramatically as parking occupancy exceeds 80%. In pilot areas, double parking decreased by 22% versus a 5% decrease in control areas.

Other secondary benefits are: Transit speed improved where double parking decreased, net parking revenue increased slightly, improved availability supports economic vitality, safer streets because of reduced vehicle miles traveled and less distracted driving.

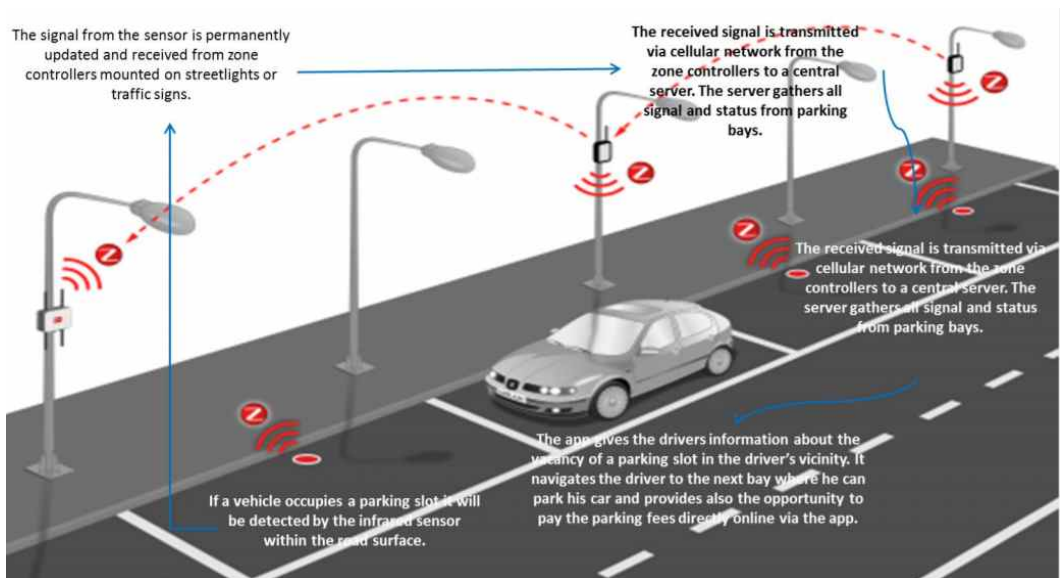
2. London, UK

The diverse nature of Westminster, London, and the many people who live, work and visit create high demand for the limited parking space available; city-wide parking occupancy averages levels of more than 70%, and often in excess of 80% in the West End where demand is most acute. The associated problems of congestion and poor air quality are often compounded by the time taken for motorists to find parking as they drive around the city searching for availability.

In October 2014 Westminster City Council went live with Smart Parking’s SmartPark solution, an integrated package of leading edge technology that provides drivers with real-time information on unoccupied car parking spaces.

The deployment included a network of over 3,400 RFID equipped in-ground vehicle detection sensors which register whether each parking bay is occupied or vacant. This information is relayed live to SmartRep, Smart Parking's powerful car parking management software tool, which collates and analyses the data.

Figure 21. SmartPark Solution Diagram



Powerful yet user-friendly, SmartRep is an advanced parking management software for both daily administration and long-term planning. In-Ground Vehicle Detection Sensors are individual parking space sensors that gather and transmits information for management, payment and compliance monitoring.

The information is fed instantaneously to the council's ParkRight, a simple to use app which drivers can install on their smartphone. The driver then uses ParkRight to identify the best available space and receive clear, precise, GPS-based directions to get them to it. SmartRep software data can also be used for vital future planning to make further improvements to Westminster's parking systems.

The functionality means that motorists now have a much better chance of finding an available and suitable parking space quickly and easily, reducing the amount of time spent idling / circling; increasing occupancy in previously under-used bays; ensuring a better driver experience and reducing the number of parking overstays.

As a result of installing Smart Parking's system, Westminster City Council has been recognized and awarded with the Tech Success Awards (2013); the Innovation in Technology at the Real IT Awards (2014 & 2016) and the prestigious British Parking Technology award (2014).

3. Moscow, Russia

Moscow Parking Space Administrator is a company which is authorized to manage Moscow Parking operation, namely by: arranging parking infrastructure (parking lots system operation, presence of all respective chargeable parking lots signs and information stands; managing revenues from chargeable parking; checking compliance with chargeable parking policies, writing out tickets and fines for any parking violations on the territory of Moscow.

The first chargeable parking slots appeared in Moscow on November 1, 2012 as part of a pilot project. Now chargeable parking lots exist in the majority of neighborhoods and districts that are the busiest and the most popular among the drivers

Since June 1, 2013 chargeable parking was introduced within the Boulevard Ring. Since June 1, 2014 chargeable parking lots appeared near the Moscow City International Business Center where the differential rates were introduced for the first time in Moscow.

- ① The project proved to be efficient:
- ② Travelling speed increased by 12%;
- ③ Parking violation reduced by 64%;
- ④ The number of personal vehicles entering the territory within the Garden Ring reduced by 25%;
- ⑤ Vehicles turnover rate increased 4-fold (before the average parking time used to be 6-8 hours, now this parameter is not exceeding 1.5 hours).

Since August 1, 2014 the Moscow Parking Space expanded up to the Third Transport Ring of Moscow and then scaling up became more occasional.

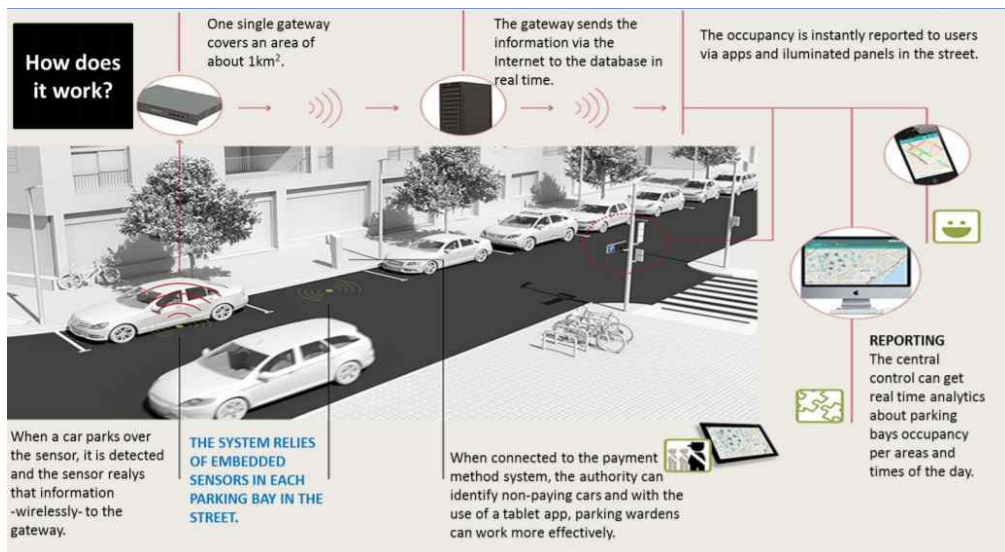
The main objectives of the project are:

- ① Reduction in the number of the city parking violations;

- ② Increase in travelling speed in the parking zone areas;
- ③ Increase of parking slots turnaround rate;
- ④ Reduction in the number of personal vehicles entering the territory and promotion of public transport services

Moscow installed the smart parking sensor system SENSIT from Nedap in more than 1.000 on-street parking bays, situated in the most challenging infrastructural part of Moscow. SENSIT technology consists of wireless parking sensors that detect in real-time whether or not a single parking bay is occupied and how long it has been occupied for.

Figure 22. Moscow's Smart Parking System Diagram



A user-friendly mobile application is available for free download and provides the following functions: searching for different types of parking and points of payment for parking; checking of your fines, checking the online-status of the personal parking account, the history of Parking sessions.

Parking payment at the parking meter can be done with a parking card or bank card. Citizens check parking meter locations on a parking map available on the main page of the website, or in the Moscow Parking mobile application.

IV Smart Parking Management System

1. System Diagram

Figure 23. Solution System Diagram

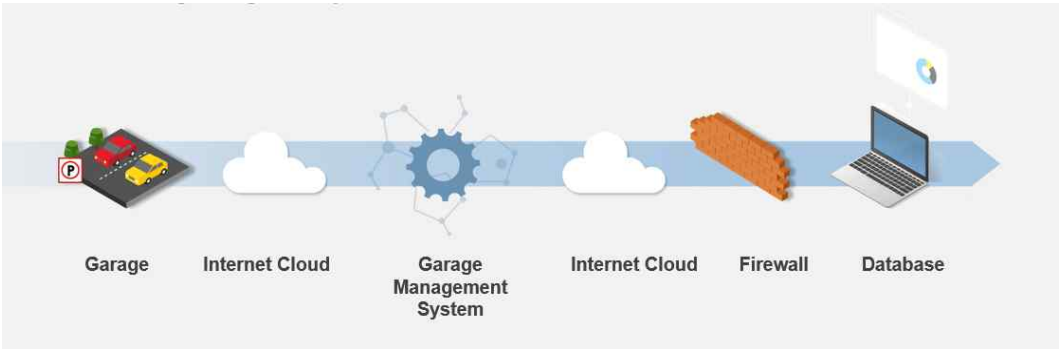
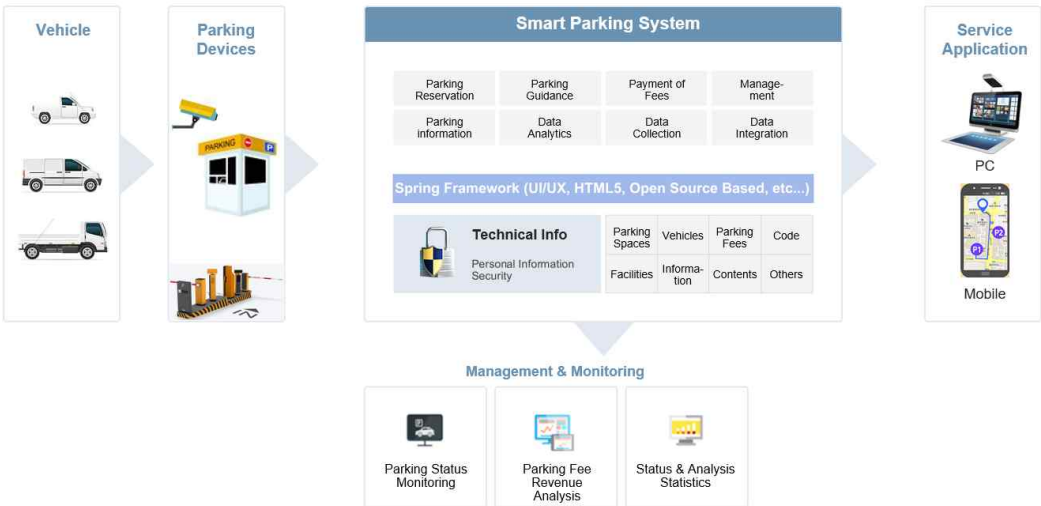


Figure 24. Components of Smart Parking Solution System

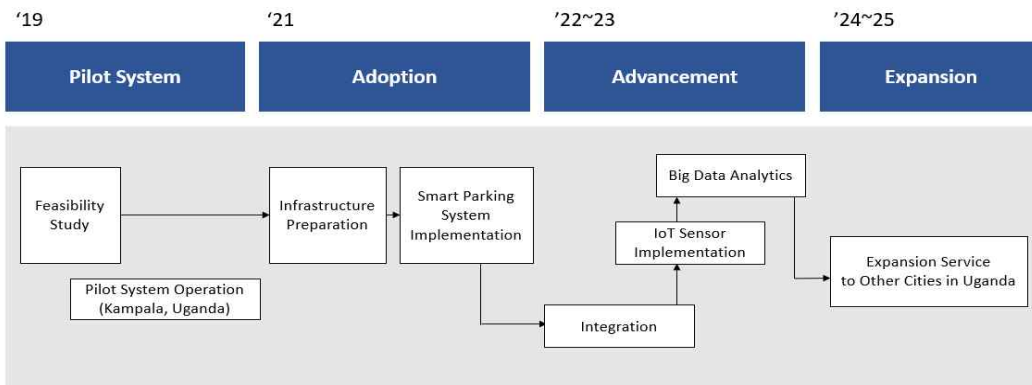


The prototype system entails three primary components: hardware technologies (Parking Devices), mobile apps (Parking booking and payment apps), and a cloud software network (Management, and monitoring)

2. System Implementation

It is highly recommended to implement a smart parking pilot system in the area after conducting, and analyzing FS project. Through the pilot system, evident outcomes can be seen.

Figure 25. Road Map



2.1 Pilot System Period

After the FS, it is highly recommended to implement a smart parking pilot system in the area of where IT infrastructure for operation of the control center can be prepared in one particular city of a country. Furthermore, the system ranging from GIS, navigation, and wireless network to other infrastructure can be implemented through PPP with private telecom companies. Through the pilot system, evident outcomes can be seen.

2.2 Adoption Period

After implementing the pilot system, the project can begin with coming up with related laws and regulations. For public service, related laws and regulations are the most important factor. At the same time, IT infrastructure for operation of the control center should be prepared, and local players who can maintain the system should be developed. Implementing the smart parking system in the whole city will not be completed in a short period of time.

2.3 Advancement Period

The smart parking is an important IT infrastructure to become a Smart City. Various IoT sensors can be attached on street parking to gather information for parking management.

2.4 Expansion Period

With the successful operation of the smart parking system, the beneficiary city will be able to introduce the system to other cities and states in Uganda. Following the case of City of San Francisco, the beneficiary city should make the system as a package (by customizing and developing smart parking system as optimized model) and get royalties or fees from other cities and states for using the solution.

V Smart Parking Pilot System Implementation Plan

1. Hardware

1.1 Smart Exit Auto Pay Station

- Depending on the type, the exit settlement can be settled directly at the exit, with the driver boarding the car. The pre-settlement type can be set aside before departure.
- Registered members are automatically paid at the time of departure. (Parking pass) Non-members who are not registered in the parking app can pay by card, deferred transportation card, etc.
- After searching the mobile number by mobile and web, discount and payment can be done by mobile and web. The color LCD touch screen makes it easy and easy to search car information.

1.2 Smart License Plate Recognition

- Recognition of the vehicle number by analyzing the image transmitted by the camera.
- Recognition of the car number, which is connected to the number management computer by LAN and transmits the image screen.
- When the detection signal is received from the vehicle detection sensor, Receives the signal and recognizes and processes it.
- Receiving the signal of the vehicle sensor and transmits a signal that can operate the infrared lighting device to photograph the vehicle with a constant illumination.
- The recognized vehicle number is stored in the database of the local server, It is stored on the server and can be checked by web and mobile app regardless of time and place.

1.3 Smart Car Gate

- It is automatically opened by interlocking with the car number recognizer. When the car passes, it is automatically closed by the loop coil.

- It is composed of slow start, constant speed section, slow stop and so on. Can be minimized. There is a manual opening / closing handle for opening and closing in case of power failure. Up to three detectors can be connected.

1.4 LED Display Board

- If the recognized car number is recognized when entering the car park, a message will be displayed to inform the incoming car.
- Various events and announcements will be transmitted and displayed as letters.
- Display of the car number entry information connected to Local Server
- Connecting with Cloud Server to inquire whether it is a parking member and display member information guide and member notice
- Display of parking fee when leaving.

1.5 Smart Digital Signage

- It is a device that displays information by using a display in a parking lot.
- It provides customized information related to parking and an advertisement to an unspecified or a large number of users.
- It is possible to transmit information in real time based on a network, Provide information and announcements
- Management of the entire display from a central location, so it is easy and convenient to manage and distribute content, and can reduce operating personnel and costs.

1.6 Smart Front & Rear LPR

- Front / rear shooting is possible, and front and rear can be taken in a small space, so space can be used efficiently. - Built-in auto focus control module for motorized zoom lens
- Acquiring / analyzing the image (image) when the detection signal is received from the vehicle detection sensor - obtain a high recognition rate by analyzing and recognizing the moving image when the vehicle enters the

recognizable area.

- Analyzing the image by the embedded PC and transmitting the recognized information and image.

1.7 Local Server

- The parking management server has a communication port and program that can integrate and manage each local equipment, and a parking control computer installed in a distributed parking lot is constructed a LAN network with each other, and a centralized management system is provided.
- The parking management server can communicate by using VPN or TCP / IP when it is remote from the parking lot. - It is constructed as a LAN (TCP / IP PROTOCOL) with the upper server.
- All Programs and printouts are displayed in Hangul and are provided as standard. - Can be used as an incentive fee calculator by connecting a card reader, a receipt printer and a safe.

1.8 Central Management Computer

- The local server installed in the distributed parking lot can be updated in real time to the Cloud Server through the LAN network, so that it can manage the sales and utilization situation by the parking lot at all times on the web and mobile.
- Among the equipment connected with the vehicle circuit breaker, , It is possible to open or close the breaker remotely by using the web and mobile app even if the administrator does not go to the site directly.
- You can use the receipt printer and safe in parallel with the incentive fee calculator.

1.9 CCTV Camera

- The vehicle number and the appearance of the vehicle when the vehicle enters the vehicle and provides image information.
- In case of an accident, the car number and the exterior of the vehicle are checked and information is provided to judge the accident.
- Built-in IR light for nighttime shooting to ensure visibility. Monitoring is

possible. - Designed to be waterproof and dustproof, it can be installed outdoors exposed to rain.

2. Software

2.1 Parking information system

Parking information systems, including transit information services of different transport means. This type of systems provide information to aid the decision making process of drivers in choosing their transport means to reach their destinations, and help them in finding a vacant parking space within a parking lot.

2.2 Parking guidance system

These systems provide guidance toward a free parking space within a parking facility. The availability and location of a free parking space are unknown for users before they arrive at the facility.

2.3 Parking reservation system

A parking reservation system enables users in advance to examine the availability and reserve a parking space at a desired parking facility. However, this kind of systems has not been widely adopted as the users of these systems are difficult to find parking spaces they have reserved due to the lack of indoor location capability.

2.4 Smart payment system

These systems are implemented to facilitate the payment for parking as conventional payment methods usually cause delay in the payment process. The utilization of smart payment systems also reduces the cost and staffing requirement for payment handling

Table 2. Pilot System Implementation Timeline

		Dec 2018	Jan 2019	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Pilot System Implementation	Solution Model Implementation										
	Feasibility Analysis										
	Installation										
	Test										
	Training										
	Final Report										

VI Budget

Table 3. Budget for Smart Parking Pilot Implementation

Depth 1	Depth 2	Depth 3	Quantity	Cost(USD)
Feasibility Study	Feasibility Study	Preparation / data collection, internal and external environmental surveys, field surveys, requirements analysis	1	\$200,000
Pilot System Implementation	Software	Software development	1	\$500,000
	Hardware	Server and network equipment	1	\$1,200,000
		2 year maintenance	1	
	Training	Manager course / 2 weeks / 1 person	2	\$100,000
		Operator course / 4 weeks / 1 person	2	
	Technical experts	Field survey, Needs analysis,	1	\$130,000
		Equipment installation / Education, system installation / Education	1	
	Policy specialist	Policy Advisory	1	\$100,000
	Business management	Preliminary investigation, implementation consultation, business evaluation	1	\$220,000
		logistics, etc	1	
Total(USD)				\$2,450,000

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan, Smart parking)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of smart parking project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

X. Funding Opportunities

Table 4. Funding Opportunities for Smart Parking Management Project

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing
- Supporting information resource management in the public sector

- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

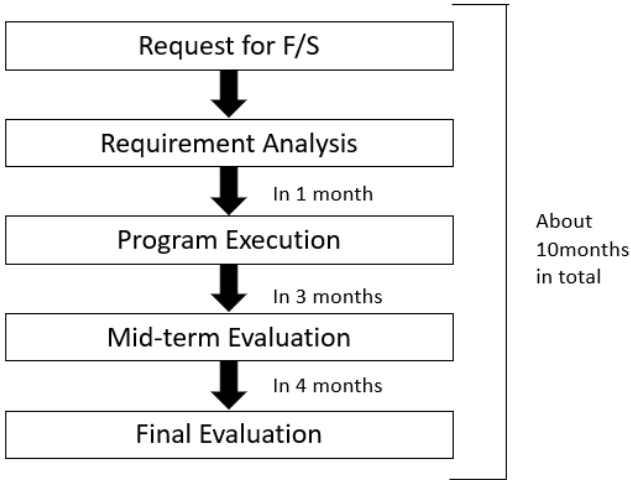
- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)
- RESEARCH AREA

- Regular Industries + ICT convergence
- SMART SoC
- New technology-based Solutions
- Beneficiary countries in the needs of ICT Cooperation

Figure 26. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing

- Promote businesses related to the convergence and utilization of ICT technology
- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- **PURPOSE**

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- **RESEARCH AREA**

Public administration

education / finance / medical IT convergence

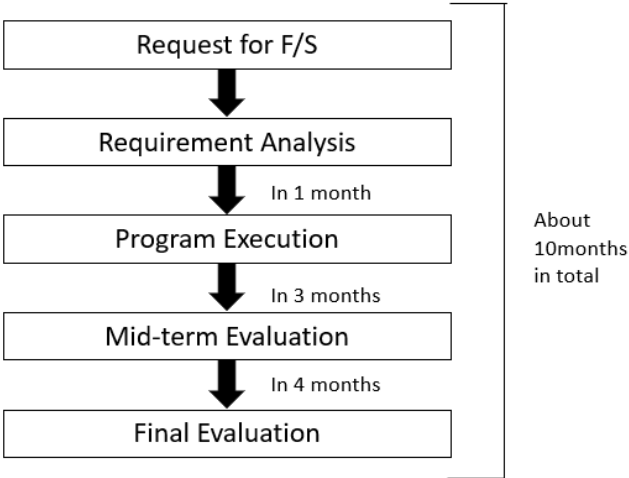
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 27. Project Operation Framework and Application for F/S Project (NIPA

Fund)



XI. Conclusion

Although parking management services exist in nearly every community, the current operating standards have proven to be highly resource-intensive without much innovation. The inefficiency can be largely contributed to outdated manual parking methods and logistical processes that are devoid of efficient data-driven solutions. As cities around the world race to adopt new smart solutions, there has been a wave of innovation in a variety of city infrastructure. Among these innovations, IoT-based hardware and software solution is a critical puzzle piece in every smart city initiative. Smart parking management does not simply entail finding parking space; it incorporates health, economic, and sustainability implications as well. From densely populated cities to smaller rural communities, parking management systems are an integral part of our businesses and public areas.

The primary objective of this Feasibility Study should be to examine ways to keep cities around the world safe implementing innovative means and methods of parking. The overall scope of the project should encompass an in-depth analysis of the current status of other cities around the world assessing the parking management procedures, current challenges and problems, adverse impacts of such management system, and municipality initiatives. Upon evaluation of the current parking management system, a smart model is supposed to be designed and developed.

The pilot project comprises of three main components including hardware system and software platform. Comprehensive analyses embodying quantitative, qualitative, and technical data will be examined post-installation. Several case studies will be included to provide aggregated data that will provide insights for important parking management regulators. By reaching maximum efficiency and optimization of smart parking management through innovative technologies, we are essentially helping ourselves and our neighbors live in a world that is more environmental conscience.

Pilot project implementation plan includes the current As-Is analysis, future road map approaches, and feasibility study to help decide regarding whether or not the smart parking solution is feasible for the beneficiary cities. Additionally, a pilot project will be implemented, which further demonstrates that a full phase implementation of the proposed model solution is technically and economically feasible in the beneficiary cities.

Several advantageous impacts will be observed including improved quality of life by

simplifying parking experience, reduced greenhouse gas emissions, reduced noise and pollution, significant revenue generation, as well as increased promotion of sustainable economic development. These effects are not only environmentally friendly but socially-beneficial; The smart parking system will increase the people's overall level of satisfaction.

References

The Role of Citizens in " Smart Cities

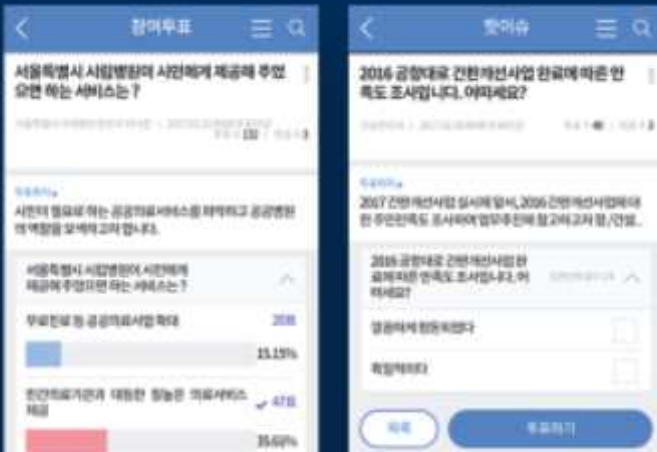
<https://www.researchgate.net/publication/309040628> The Role of Citizens in Smart Cities

mVoting

Mobile Voting Solution



Communicate with Citizens



WHAT IS MVOTING

mVoting is the optimized Mobile Voting solution to offer all citizens equal opportunities. It provides service in various internet environments with enhanced security based on Block-Chain technology. Its various features make citizens to participate in the vote easily.

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I Introduction

1. Background

As an endeavor to advance the development of Smart City & e-Government environment, The Seoul Metropolitan Government (SMG) conducted a Smart City & e-Government Solutions Introduction Project for other cities around the world by examining its current e-Government status and providing technical support to boost its Smart City & e-Government level.

The Seoul Metropolitan Government (SMG) has been a leader and innovator in Smart City and e-Governance and has successfully applied information technologies in public administration to achieve better public service delivery, as well as improve communication channels for citizen engagement and empowerment. Both the United Nations e-Government Survey by the United Nations Department of Economic and Social Affairs (DESA) and the Digital Governance in Municipalities Worldwide by the e-Governance Institute at the School of Public Affairs and Administration (SPAA) at Rutgers University consistently rank the Seoul Metropolitan Government (SMG) as the top municipality in e-Governance.

Since 2003, the City of Seoul Metropolitan Government and the Republic of Korea have continuously ranked in the top spots in The Municipal e-Governance International Survey conducted by Rutgers University, as well as The E-Governance Survey by the United Nations (2003~2016). During the last 13 years, the Seoul Metropolitan Government has become what numerous international governments seek to benchmark as their vision for e-Government. The city has shown strong leadership in envisioning a long-term strategy in the development of e-Government. Based on its Five Year Long-term Strategy, a dedicated team of experts gathered around the municipality's IT division, whose main responsibility is to manage the city's e-Government strategy, policy, infrastructure and regulation. The Office of the Mayor acted as the liaison between various government agencies in the development of the new infrastructures, while outlining the guiding principles for sharing information and collaboration with related agencies.

The ITU (International Telecommunication Union), which is under the auspices of the United Nations, published a special report titled "Smart Cities - Seoul: a case study¹" as part of its technology watch report in February 2013. Referring to the City of Seoul

as one of the world's tech-savviest cities that has retained its top ranking in the UN e-Government Survey since 2003, the report cited the Seoul Metropolitan Government's e-Government capacities along with diverse and unique digital services for its citizens⁴

2. Objectives – Purpose of mVoting (Mobile Voting Solution)

Introduction

The objective of this project is to help to establish a digital, two-way communication channel for the government and the citizens in other cities around the world, by leveraging relevant ICT technologies, to advance transparency, efficiency and accountability in the city's public administration. Whereas public service has been delivered one-way from the government to the citizens, it is now crucial to set up a communication channel that will promote interactive discussions among all stakeholders in the city to solve a mixture of diverse urban problems derived from rapid urbanization. The project therefore also aims to accelerate citizens' engagement and collaboration in the city management, by encouraging citizens to actively inform their needs to the government, ask for the government's support, and express their thoughts while the government meets the citizens' needs in an efficient way. Such process will enable the government to better collect the citizens' opinions and data on the city which will result in greater transparency and improvement of city services based on efficient administration.

This communication process can be facilitated by the development of a digital government system. Launching of the mVoting solution can be the stepping stone to establish an Open Government Management System and is expected to be a trigger point for the development of other cities' e-Government

3. Project Scope and Methodology

Other cities around the world are endeavoring to ensure citizen engagement with open government and desires to establish a strong communication channel between the government and citizens. For this purpose, the mVoting solution is recommended and in order to come up with accurate findings and the effective

mVoting system during the Project, it is important to first understand the current status of beneficiary cities' e-Government environment. Therefore, the Seoul Metropolitan Government (SMG)'s consultant team initially conducted surveys for in-depth investigation of the solution and also assist other cities to utilize the mVoting system by producing a scientific analysis on the case study of other cities' e-Government. This mVoting system introduction report, therefore, includes not only an analysis on SMG's e-Government environment, but also recommendations of e-Government services to be established for the ICT development in other cities, including the mVoting system.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this Mobile Voting Solution introduction,
- (ii) Case study of other cities' mobile voting system and,
- (iii) Analysis on the mVoting system of Seoul Metropolitan Government for the effective implementation of the solution and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

II ENVIRONMENT ANALYSIS

1. Seoul Metropolitan Government's e-Governance Policy

1.1 e-Government Infrastructure

The role of Seoul Metropolitan Government is to organize information systems dealing with all city governments' public services, to establish telecom network connecting its 32 related organizations, and to arrange an extensive e-Government promotion group headed by the chief information officer (CIO).

Figure 28. Seoul Metropolitan e-Government. Source: Seoul e-Government Brochure (2016)



The Seoul Metropolitan Government has arranged a total of 614 types of information systems for IT-based highly efficient city administration which control integrated public services, including urban planning, culture, tourism, transportation, and housing.

In March 2012, the entire efforts of Seoul Metropolitan Government were directed to developing a new content management system (CMS) on which employees can

post their blog-type writings and develop other websites. Therefore, the information on each site could be spread out across social networks and citizen. It is also possible to make comments through the internet.

1.2 Administrative e-Communication Policy with the Public

The Seoul Metropolitan Government (SMG) has constructed multiple joint-platforms to share various contents with the public. Portals display a wide range of information, including city news, welfare, housing, traffic and much more on a real-time basis. At the same time, SMG is building a social network service (SNS) that enables two-way communication with citizens, while engaging private Social Media Providers.

This chapter will examine the effectiveness and practicality of the SMG's administrative communication through various channels beyond the traditional ones. The four major administrative e-communication policies of the SMG will be the focus of analysis in the series of this Smart City & e-Government's Introduction report: (1) Eung-Dap-so, (2) mVoting.

More specifically, this chapter will explore each SMG's administrative e-Communication policies with respect of their Policy Goals, Performance & Outcomes, Policy Details and Procedures. This chapter will also review the specific cases of other international municipal governments and offer a general applicability of the SMG's e-Communication policies. Based on the comparative analyses, this chapter will then provide the essential factors to consider for the adoption and export of administrative e-Communication Policy for the better understanding of e-communication with the public.

1.2.1 Policy Background

The Seoul Metropolitan Government (SMG) and other private web sites, such as web portals, are being constructed as a joint-platform to share various contents with the public. The portals can now display a wide range of information, including city news, welfare, housing, traffic and much more on a real-time basis. At the same time, the SMG will build a social network that enables two-way communication with citizens, while engaging private social media providers. City news, living information, and other information can be delivered to citizens in a much easier and more precise way through the official website.

The social media and social network service (SNS) are used as a channel for direct communication with the public. This communication network of SNS can be an

effective tool for citizens – the recipients of public services – to better comprehend the various policies and viewpoints of the SMG on many issues.

The ongoing communication channel, which is currently available through web sites open to citizens, can be turned into a unique social network service that can be used by citizens, without being limited by time and space. For example, the City of Seoul has a disaster prevention plan which links all relevant organizations into a tightly knit network. The city would be able to use all possible channels, including SNS, mobile devices, Smart TVs, and call centers to provide a real-time warning and response system.

In series of this system introduction, the two major communication policies of Seoul Metropolitan Government will be introduced: (1) Eung-Dap-So, (2) mVoting.

Table 5. History of SMG’s Administrative Communication Policies

Periods	1999~2002	2003~2006	2006~2010	2011~2015
Master Plans	Basic Plan for Informatization	Master Plan for Informatization	U-Seoul Master Plan	Smart Seoul Master Plan
Key Concepts	Computerization	Online Information	Netowrking	Smart Technologies
e-Opinions	<i>Eung-Dap-So</i> <i>mVoting</i>			
e-Complaints				
e-Proposal				
e-Voting				
Features	Preparatory Stage	Internet Stage	Mobile Stage	SNS Stage

Table 5. represents the changes in the SMG’s administrative communication tools with its citizen. The table exhibits the efforts of the SMG to devise diverse methods to promote the Seoul citizens’ direct participation regardless of the channels. As shown in the table, the SMG’s administrative online channels have been diversified since the 1990s so as to improve governance.

Specifically, SMG’s internet-based communications with City of Seoul citizens has evolved considerably by incorporating the traditional government’s functions (i.e., hearing citizens’ opinions and handling complaints) with those of broader citizen participation (i.e., receiving policy and administrative proposals and engaging citizens

to participate through electronic voting).

As societies grow more complex and are flooded with information, governments need to invent new modes of effective administrative communication. In light of the advent of social media, citizens require information about public services that are disseminated beyond traditional and outdated means of communication. However, existing communication tools do not sufficiently meet the growing needs of citizens who wish to be more aware of their communities nor provide reassurance that communication from the government is a dependable source of information. On top of that, the different and disjointedly operating communication channels created more confusion for citizens and led to problems of coordination within the government.

The government communication through social media has become vital in order to respond to these challenges and cope with the development of WEB 2.0 and Government 3.0 of Korea (GOV 3.0). In this context, the SMG has been trying to keep up with the recent development trends and has been spearheading the global leadership in e-Government. In particular, the SMG's Social Media Usage is rated remarkably in (1) Accessibility, (2) Immediacy, (3) Consistency and Reliability and (4) Efficiency.

The primary purpose of this chapter is to examine the effectiveness and practicality of the government's administrative communication through Social Media and Social Network Service. The four major policies of the SMG will be the object of analysis of this study; more specifically, the study aims to introduce the Seoul Metropolitan Government's ICT-based communication policies; then, we will address the essential factors to consider for policy export and policy adoption.

III Case Study

1. Case of Estonia

In 2005, Estonia became the first country in the world to hold nation-wide elections using this method, and in 2007, it made headlines as the first country to use i-Voting in parliamentary elections. In the European Parliament elections in 2014, 31.3% of voters cast their ballots in this way. In the 2015 Parliamentary Elections, internet voting accounted for 30.5% of the votes cast. Estonians worldwide cast their votes from 116 different countries. In the case of i-Voting, the cumulative time savings in the Estonian parliamentary elections of 2011 were 11,000 working days, which would amount to around 504,000 euros in average wages.

The groundbreaking i-vote system allows citizens to vote at their convenience, no matter how far they are from a polling station. i-Vote has been made possible only thanks to the fact that the vast majority of people in Estonia have access to secure digital authentication and signatures. By the beginning of 2017, internet voting has already been used on eight occasions, and already 30% of voters prefer this method. A secure QR code based mobile application is used to ensure that each vote is correctly received by the National Electoral Committee server.

Unrelated to the costly electronic voting systems with problematic machinery used in some countries, the Estonian solution is simple and secure. You can cast your ballot from any internet-connected computer anywhere in the world. During a designated pre-voting period, the voter logs onto the system using an ID-card or Mobile ID, and casts their ballot. The voter's identity is removed from the ballot before it reaches the National Electoral Commission for counting, thereby ensuring anonymity. Since each vote cancels the last, every voter has the option to change his or her vote during the pre-voting period

The secrecy of the vote is guaranteed as with the early-voting procedure by mail – the vote is signed and encrypted with the voter's own certificates and placed within a double e-envelope for protection. The encrypted votes are collected, but their content will not appear outside of the cryptograms. Only after voting has closed will a device be activated by the electoral unit, which can open up the votes. The

necessary security is ensured by precise organizational measures. The server software is public; observers are welcome.

- there is a legal basis for the use of digital signature, and all acts concerning elections provide for a legal basis for the conducting of i-voting;
- most of the persons who have the right to vote possess an ID card that enables secure electronic identification and giving digital signature; many people also have an additional legally backed electronic ID document, like Digi-ID or Mobile-ID.

1.1 Scope of the i-voting system

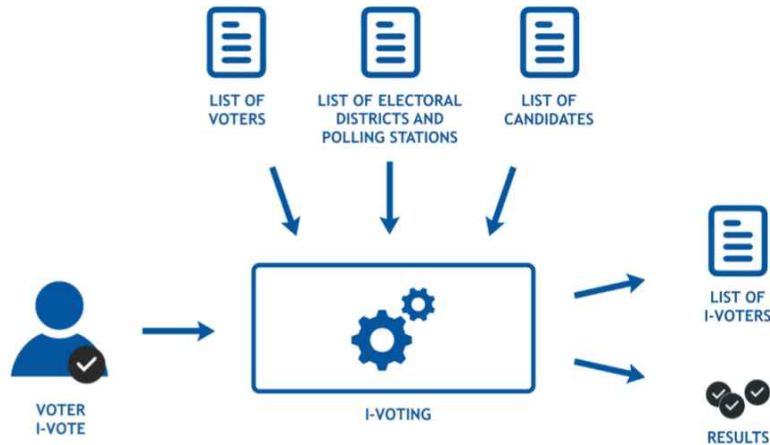
i-voting is a part of the voting process. Elections consist of the following principal stages:

- declaration of elections
- registration of candidates
- preparation of lists of voters
- voting
- counting of votes
- announcement of election results

The i-voting system partially covers only the three last stages, i.e. the voting via the Internet, the counting of votes and, after the announcement of election results, the destruction of the key necessary for counting the i-votes. Prerequisites for the i-voting system.

- the lists of voters (with the polling division and electoral district linked to the voter) have been prepared and are available in a suitable format;
- the lists of candidates (by electoral districts) have been prepared and are available in a suitable format;
- i-votes are counted separately, and the results are later added to the results of the counting of paper votes, keeping in mind that the votes of one person (the electronic vote and the paper vote) are not counted twice.

Figure 29. Scope of i-voting



1.2 Principal requirements for i-voting

I-voting must adhere to all Acts concerning elections and must follow all election principles, and be at least as secure as regular voting. Thus, i-voting has to be uniform and secret, only the persons who have the right to vote may (i-)vote, every person has one vote, and it must be impossible for voters to prove for whom they cast their vote.

The main difference between i-voting and voting with paper ballot is that the voter can vote repeatedly electronically; only the last vote cast is counted. This principle enables to protect i-voters against coercion. A coerced voter can vote again after becoming free from coercer, invalidating the vote cast under pressure.

I-voting takes place before the election day, during the period specified by law. If something unexpected happens to the i-voting system (large-scale attack, serious software error, etc.), the organizer of the election may annul a part or all of the i-votes in extreme cases. In such a case those who i-voted can vote again at the polling station.

If advance voting at polling stations takes place at the same time as i-voting (parallel voting), then it may happen that a voter votes in two ways. In that case, only the paper vote is counted, and all i-votes of the voter are annulled. This principle also protects the voters against coercion.

Another important requirement of i-voting is the use of digital signature. The voter

has to confirm their choice with a legally accepted digital signature. Compliance with the provisions of the Digital Signatures Act ensures the fulfilment of the main security requirement of i-voting – secure personal identification of voters.

The voter must have the possibility to verify whether their i-vote has arrived safely. This can be done with the help of a separate smart device (mobile phone, tablet). A device different from the computer used for i-voting should be used for checking the arrival of i-vote. In this way it is possible to increase the probability of detecting attacks directed against the i-voting system (primarily against the voter's computer).

When building up an i-voting system, its auditability must additionally be taken into account – the system must be technically sufficiently simple so that a widest possible range of specialists could audit it.

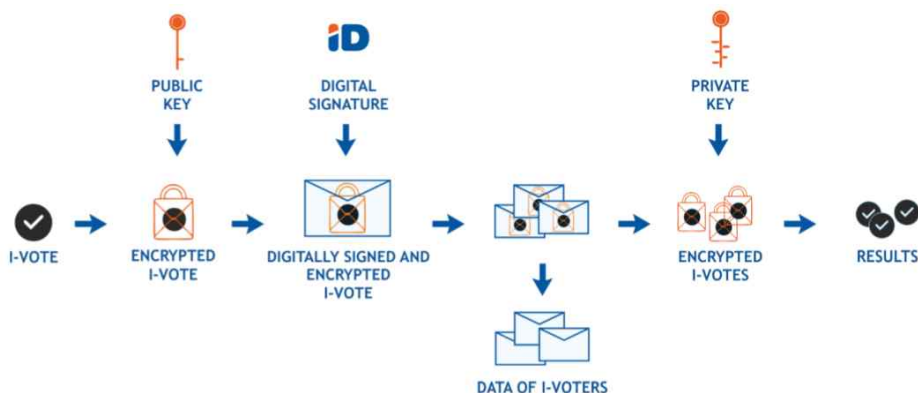
1.3 Envelope Scheme

I-voting system is based on so-called “envelope scheme”, which is known from voting by paper mail, where an anonymous closed envelope with the vote is placed into an outer envelope with the voter’s name and signature. With the help of the programme used for i-voting (so-called Voter Application), the i-voter:

- encrypts the vote and the random number generated by the computer with the elections specific public key, forming the “inner envelope”;
- signs the encrypted vote by using a digital signature tool, forming the “outer envelope”

A vote encrypted with the public key can be decrypted only with the private key.

Figure 30. Envelope Scheme



Encrypted and signed votes are collected and sorted, the eligibility of voters is checked, and repeated i-votes and the i-votes of the persons who also voted at a polling station during advance voting are removed. Before the counting of i-votes they are sorted by electoral districts, the list of i-voters is compiled, and then the digital signatures are removed. During the counting of votes, anonymous and mixed votes are decrypted with the elections-specific private key, and the summarised results of i-voting are issued.

IV Seoul Metropolitan's mVoting System

mVoting is the optimized Mobile Voting solution to offer all citizens equal opportunities. It provides service in various internet environments with enhanced security based on Block-Chain technology. Its various features make citizens to participate in the vote easily.

mVoting is one of the e-Government services representing the SMG, which is made up of the combination of the words "mobile" and "voting." With more than 37 million smartphone users in Korea, and approximately half of them residing in the Seoul Metropolitan area, this smartphone application has been developed to collect citizens' opinion rapidly using real-time online voting.

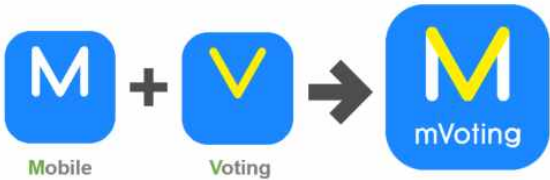
Citizens can directly participate not only in voting on contemporary policy issues, but also other pressing issues associated with all types of real-life situations. The SMG, for example, can attach images and additional information to the policy issues; thus, citizens are more aware of what is at stake and can view detailed descriptions by clicking on the items. Furthermore, the SMG has the option to target the eligibility of voters to certain groups or

Vote targeting all the Seoul citizens Target voting through the database classifications of age, location and gender Target voting through use of data in existing DB (phone numbers) Location based voting (Patent applied for) Targeted vote participating and relating in specific events

Vote targeting all the Seoul citizens Mobile vote through text message and Social Media authentication Mobile voting through external platform such as Facebook, Naver and Kakao Talk. Vote targeting designated individuals without phone number information demographics within a specific region in a given time frame to ensure that important information is appropriately distributed to the key stakeholders in case of emergency.

The accessible and easy-to-remember "120" is a telephone complaints handling system of the SMG that directs all inquiries and complaints towards a single integrated call center, which is designed to process the daily grievances of the citizens more quickly and conveniently on a one-to-one consultation.

Figure 31. Definition of mVoting



1. Policy Goal

Before the implementation of mVoting Policy, public officers of the SMG had no choice but to conduct surveys, offline, and at town hall meetings, to assess the sentiments of the citizens. However, those traditional ways of listening to residents' comments are too costly and require too much time and human resources.

In order to solve this endemic problem of modern democracy, the SMG has tried to involve citizens in the policy decision-making process. With this objective, the SMG introduced the mobile app voting policy based on the 44 million Smartphone users (88% of entire population) in Korea. "mVoting" is a compound word which combined Mobile and Voting together. The policy goals of the mVoting are as follows:

Figure 32. mVoting App Menu



In order to solve this endemic problem of modern democracy, the SMG has tried to involve citizens in the policy decision-making process. With this objective, the SMG introduced the mobile app voting policy based on the 44 million Smartphone users (88% of entire population) in Korea. "mVoting" is a compound word which combined

Mobile and Voting together. The policy goals of the mVoting are as follows:

- **Sharing the Policy Decision-making Process with Citizens**

Transparent Disclosure of Information and facilitating citizen Participation and Engagement on Specific Policy Issues

- **Promoting Citizens' Participation on Policy Determination**

Seoul Citizens as Policy “Prosumers”

Improving Public Performance through Public-Private collaboration

- **Increasing the Public Policy Quality of SMG**

An Interactive Policy Communication Process (G2C and C2G)

Resident-centered Policy Debate and Determination

Figure 33. The policy goals of the mVoting



In addition, this participatory policy allows citizens to vote not only on policy issues, but also on any ordinary city life issues. It is very user friendly, and the App can be reached both on a smartphone and a personal co

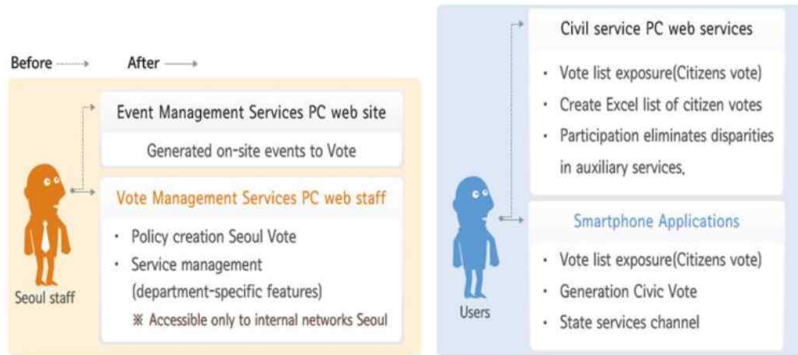
Figure 33. illustrates the main page and the menu of the mVoting mobile App. To differentiate it from the general governments' mobile app, the mVoting App provides an intuitive interface based on voting-related policy contents.

The main objectives of the mVoting App are to reduce the cost of citizen participation and draw citizens into the SMG's Policy Formation Process by expanding and providing more convenient channels. Traditional opinion collection methods, such as face-to-face discussions, letters, telephones and faxes, are still the main modes for

assessing the sentiments of the citizens.

However, mVoting can be integrated with traditional modes to provide multichannel service delivery. In addition, mVoting is able to satisfy citizens’ expectations during government’s policy formation process and enhance public sector quality improvement by providing promptness, responsiveness and citizen participation within limited resources.

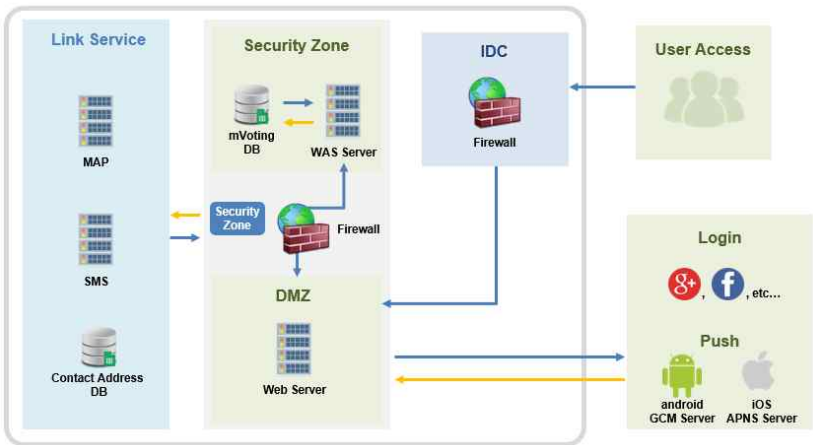
Figure 34. mVoting: Before and After of the Policy Introduction



Source. Seoul Metropolitan Government. (2014). Digital Seoul e-Government

2. Features of mVoting System

Figure 35. mVoting: System Diagram



2-1 Responsive Web & App Service

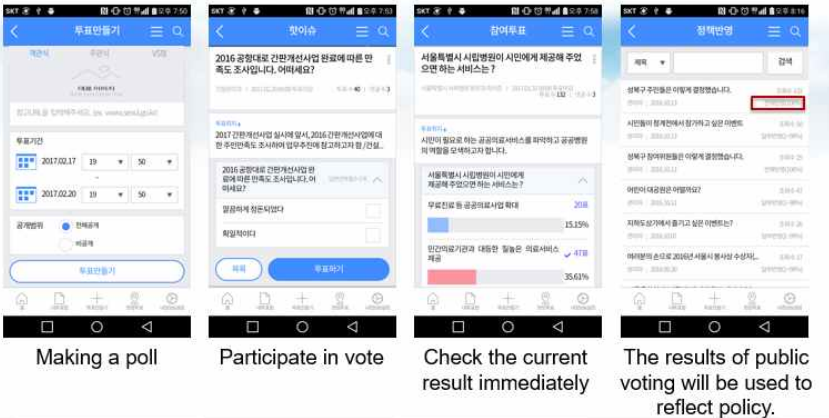
mVoting is Responsive Web based application using various Smart devices, users can participate in the service.

2-2 Collecting public opinion easily and quickly

Using mVoting Application, users can experience all about voting at once.

Easy to make a poll, voting, check the result and reflect policy.

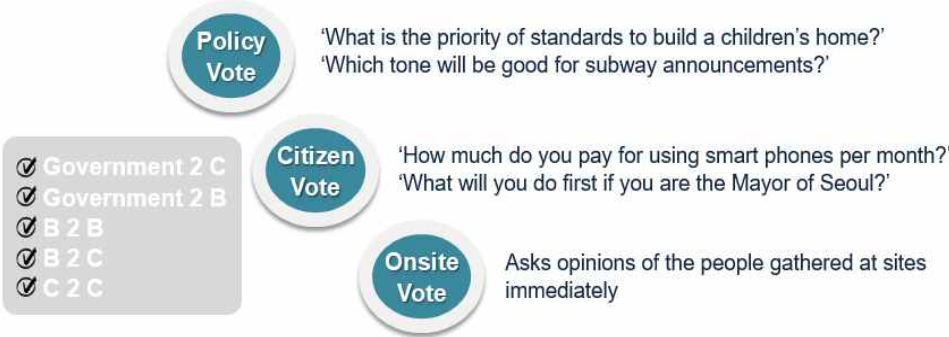
Figure 36. mVoting: System Process



2-3 Multi-directional Voting Method

Any citizen can join this system, ask questions about the policy, vote on the policy, and exchange opinions with each other on the system. This is the most popular citizen participation system in Seoul Metropolitan Government.

Figure 37. mVoting: Multi-directional Voting Method

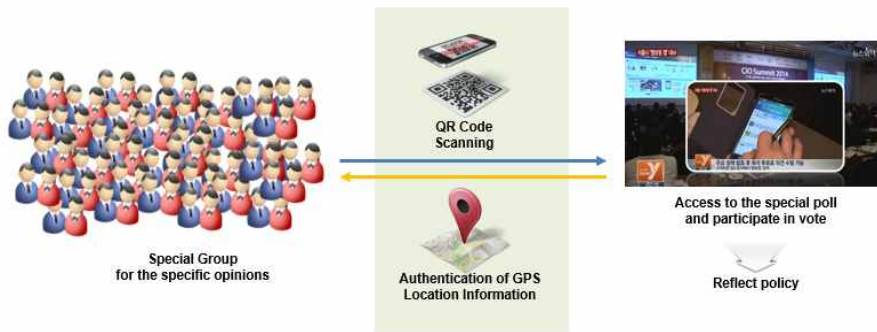


2-4 Specific Voting – GPS & QR Code

To gather the specific opinions for higher accuracy, mVoting system provides special

voting functions with ‘Authentication of GPS Location Information’ and ‘QR code Scanning’.

Figure 38. GPS & QR Code



3. Main Functions

Through the mVoting App and Web page, citizens of Seoul can ask about and participate directly not only in policy votes, but also in votes related to all types of real life issues. Images and the GPS tag can be attached to questions or voting items, which allow others to understand the detailed situation more specifically.

User-targeted voting is possible thorough the mobile web as well; thus, regional and private-centered groups and citizens can proceed to examine citizens’ opinions more conveniently within a specified time. In other words, when the SMG needs to find out people’s perceptions and opinions in a short time, it can obtain real data through mVoting without expensive surveys.

Figure 39. mVoting: Open Vote Process



Source. Seoul Metropolitan Government. (2014). Digital Seoul e-Government

- **Open Vote for Everyone (G2C)**

Regardless of which department in SMG is involved, the SMG officers can request a vote when Seoul citizens' opinions are required. Thus, SMG officers would be able to understand what the citizens' preferences are and how they differ depending on the modes (e.g., emergency message channel vs. traditional notice, web site notice, and social media posts) and opinions from citizen.

- **Targeted Vote in Specific Context (G2C)**

Based on the existing Seoul database, mVoting offers the SMG officers the option of opening a targeted vote to specific citizens depending on age, municipality, job, and gender. Specifically, targeted votes enable the SMG to generate specific policies and to store the data on the specified.

- **Making a Poll by Citizens (C2G)**

Just as Seoul officers can use the voting function of mVoting to ask citizens' opinions, Seoul citizens can also suggest a voting poll on specific policy and other issues of interest.

- **Location Based Vote with GPS, register and QR (G2C)**

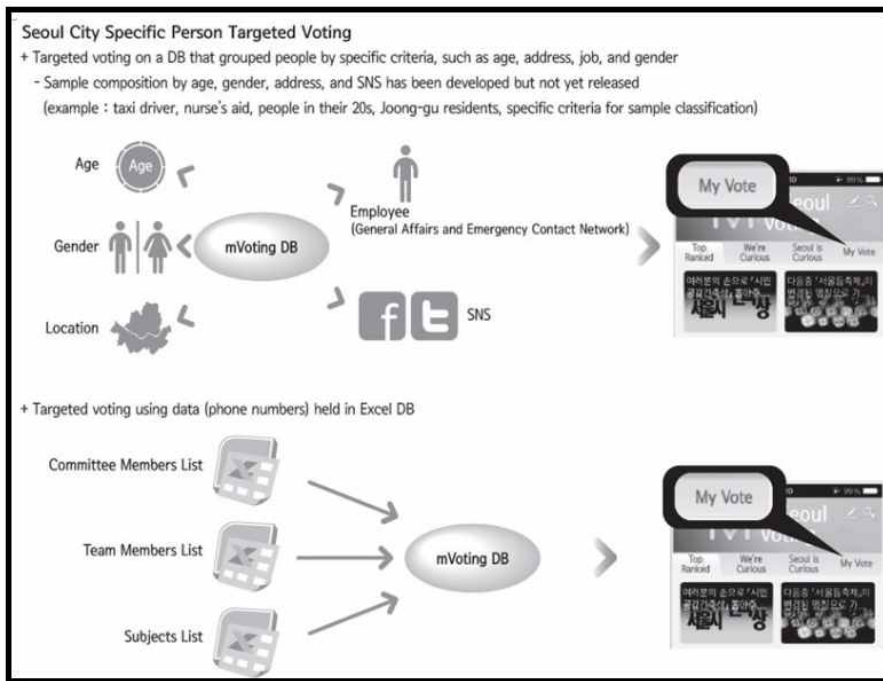
In many cases, policies are related to a location's unique context such, as traffic signs and city hall events. In order to inform those kinds of policy problems, mVoting can provide a GPS-based vote (e.g. to citizen who are within a radius of 2 miles).

Figure 40. mVoting: App Composition and Details

Type	Contents of policy vote	# of participants
G2C	Vote on designating of non-smoking area in the Han River park	1,048
	Vote on the restriction of vehicle driving when the level of air pollution rises extremely	1,085
	Vote on utilization plan of <u>Nodeul</u> Island	2,368
	Asking opinions to citizen about <u>RandD</u> supporting policy for solving the urban problems	4,371
C2C	Asking opinions to citizens about the policy of riding public transportation for free over the age of 65	1,466
	Asking opinions to the citizen about standing seats of Red-bus between the Seoul city and <u>Kyungki-do</u> (Safety first? or not)?	2,185
	Asking opinions to citizen about the problems of public buses	1,281

Source. Seoul Metropolitan Government. (2014). Digital Seoul e-Government

Figure 41. mVoting: Targeted Vote Process



Source. Seoul Metropolitan Government. (2014). Digital Seoul e-Government

4. Composition

Figure 42 shows the mVoting Application as of Aug. 2016. The “Only One-Touch” function provides citizens with recent issues of the SMG and Seoul citizens. In addition, rather than the one-sided informative function of traditional communication, citizens can express their opinions directly without having to go through a “hassle.”

Figure 42. mVoting: App Composition and Details



5. Performance and Outcome

Figure 43. mVoting: Policy Performance and Expectation



Source. Seoul Metropolitan Government. (2014). Digital Seoul e-Government

The most important features of this policy are trying to gather opinions about specific policies through two-way communication between government and citizens (C2G and G2C). The Policy characteristics of the mVoting are as follows:

- **A New Type of Communication Platform: High Use and Download Rate (as of June 2016)**

App downloads: 280,000 downloads

Vote participants: 1,100,000 participants

- **An Actual Space for Policy Discourses**

Vote Proposals: 4,404 cases

→ 3,889 proposals from the citizen (88.3%), 515 proposals from the officials (11.7%)

Reflected to the Policy Process: 181 cases are accepted as Seoul's Policy

- **Improving the Quality of Two-way Communication between Citizens and Government**

Citizen-driven Communication Platform

Active Use in Policy Formation and Implementation Process (Policy Agenda – Policy Decision Making – Policy Implementation – Policy Evaluation)

V Budget

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Government Resources
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of mVoting project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

VI Funding Opportunities

Table 6. Grant Opportunities by Korean Government through Various Funding Agencies

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing
- Supporting information resource management in the public sector

- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

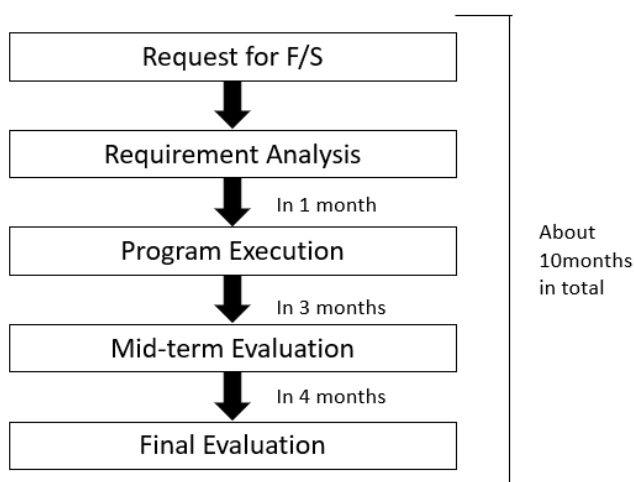
- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)

- RESEARCH AREA
 - Regular Industries + ICT convergence
 - SMART SoC
 - New technology-based Solutions
 - Beneficiary countries in the needs of ICT Cooperation

Figure 44. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing

- Promote businesses related to the convergence and utilization of ICT technology
- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- PURPOSE

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- RESEARCH AREA

Public administration

education / finance / medical IT convergence

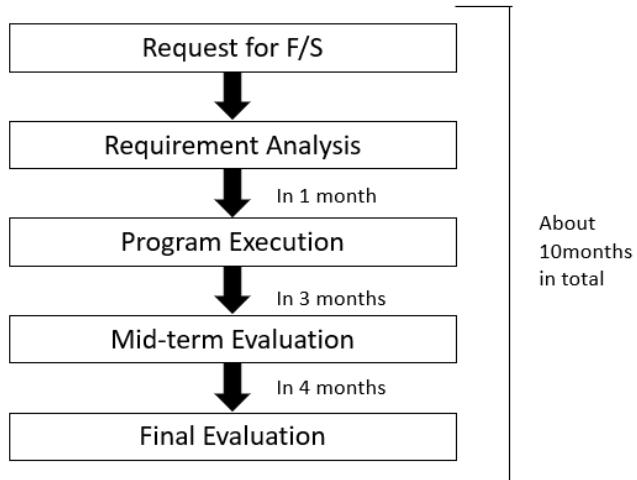
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 45. Project Operation Framework and Application for F/S Project (NIPA)

Fund)



VII Conclusion - Lessons from the mVoting System Introduction

When confronted with complex social challenges, the government must acknowledge the significance of collaborating with its citizens as they may not only be the source of information but also the producer of creative ideas. Citizens' involvement in local governance through a smart communication tool such as the mVoting can create unique value in producing innovative solutions in the city.

Moreover, there is a great number of ways on how the mVoting can be developed in the future to support the city administration for a variety of matters. From the initial narrow focus on collecting and managing the citizens' services of the mVoting can eventually be expanded to conducting voting among citizens on a particular issue and/or to alerting citizens of the air pollution status based on the monitoring of air quality.

Civic engagement can play an essential role in bringing citizen-centric social innovation through participatory and transparent governance. The mVoting can serve as a critical, open communication tool for other cities around the world to initiate its citizens' participation in the city's decision-making process which will not only increase citizens' trust in the government and strengthen democratic governance, but also enhance innovation in the city through citizens' ideas and improve the quality of citizens' lives.



Smart City & e-Government

| Seoul Metropolitan Government

SMART CITY PLATFORM FOR MAYOR

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Document Information

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I INTRODUCTION

1. Background

Officially “Seoul Special City”, Seoul is the capital of South Korea and the country’s largest metropolis with a population of over 10 million people. Having hosted the Olympic Games, the FIFA World Cup, and 2010’s G-20 summit, Seoul is world renowned as both a highly-advanced economy and leading tourist destination.

Seoul is however best known as one of the most tech-savvy cities in the world, retaining its No.1 ranking in the UN e-Government Survey since 2003²⁶, and creating a true world-first in the PC-gaming equivalent of the Olympic Games, The World Cyber Games²⁷.

Smart Seoul 2015²⁸ was announced in June 2011 to uphold Seoul’s reputation as a global ICT leader by boosting its sustainability and competitiveness through smart technologies.

Strictly speaking, Smart Seoul is not Korea’s first attempt to incorporate ICT in city-development strategies. In 2004, Korea initiated the u-City project whereby ubiquitous computing technologies were applied to strengthen cities’ competitiveness.

The smart city achievable today differs fundamentally however, in that today there are ways to simultaneously enhance a city’s sustainability, competitiveness and citizen happiness. A smart city emphasizes the continued maintenance, protection, reinforcement and regeneration of its attractiveness in the future no less than it prioritizes its short-term competitive edge.

Smart Seoul 2015 was adopted to overcome the limitations of u-Seoul which applied ICTs only to existing ‘traditional’ city infrastructure. u-Seoul improved the delivery of services such as transportation and safety, but failed to produce material improvements in the quality of life enjoyed by Seoul’s citizens.

Smart Seoul 2015 is a more people-oriented or human-centric project; and Seoul now aims to implement as many smart technologies as possible, but also to create a more collaborative relationship between the city and its citizens.

2. Objectives – Purpose of 'Smart City Platform for Mayor Introduction

The world is rapidly entering into a Smart age going beyond the Digital age. Information Technology is not just a tool in pursuit of efficiency. IT, in the Smart age, interacts with people and helps people fully display ingenuity and sensibility.

The world has been upgraded once again by utilizing potential of Smart technologies since the advent of smart phones in 2007. Smart technologies allow services that best serve the need of people. Goods and services applying Smart technologies know what people want and provide what people need. In some cases, smart devices monitor the real world and the current conditions of certain objects in real time, and then automatically respond to any situation. Furthermore, Smart technologies enable people to transcend the limit of time.

Unlike the past when people reacted to what already happened, people now can proactively respond to situations even before something happens. - 2 - Smart technologies have enormous potential. If applied properly, Smart technologies could entirely transform giant public spaces like cities, as well as private spaces such as homes and offices, into a space that best serves the need of people.

We can find fundamental solutions to a number of critical issues facing every society, including public administration, welfare, industries, environment and energy 'Smart Seoul 2015' has been prepared aiming to utilize the huge potential of Smart technologies for urban development. Seoul has been successful in using broadband internet since late 1990s.

Seoul has topped in the UN-supported Rutgers Global E-Governance Survey since 2003. It can be proudly said that Seoul has the highest internet competitiveness in terms of broadband internet penetration, mobile service usage, level of online services, and other categories.

However, the paradigm shift into "Smart" means major internal and external changes in the administrative environment. With other nations and cities catching up with the world best e-Government, there is a growing need for Seoul to take proactive measures under the new circumstances

3. Project Scope and Methodology

Other cities around the world are endeavoring to ensure citizen engagement with open government and desires to establish a strong communication channel between the government and citizens. For this purpose, the Smart City Platform for Mayor is recommended and in order to come up with accurate findings and the effective Smart City Platform for Mayor during the Project, it is important to first understand the current status of beneficiary cities' e-Government environment. Therefore, the Seoul Metropolitan Government (SMG)'s consultant team initially conducted surveys for in-depth investigation of the solution and also assist other cities to utilize the Smart City Platform for Mayor by producing a scientific analysis on the case study of other cities' e-Government. This Smart City Platform for Mayor introduction report, therefore, includes not only an analysis on SMG's e-Government environment, but also recommendations of e-Government services to be established for the ICT development in other cities, including the Smart City Platform for Mayor.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this Smart City Platform for Mayor introduction,
- (ii) Analysis on the Smart City Platform for Mayor of Seoul Metropolitan Government for the effective implementation of the solution
- (iii) Case study of other cities' Smart City Platform for Mayor and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

II ENVIRONMENT ANALYSIS

1. Seoul Metropolitan Government's Smart City, and e-Government

Seoul has ranked No.1 in the UN e-Government Survey* for five consecutive years since 2003 * UN e-Government Survey: An assessment of the OECD member cities. Conducted by Rutgers University and sponsored by the UN.

Private-public cooperation in policy making: The Seoul Metropolitan Government (hereafter referred to as "SMG") encourages participation of experts from both the public and private sector in the policy-making process. The CIO, responsible for the Information System Planning Bureau under the Vice Mayor of Administrative Affairs, works with experts from the IT Strategy Committee, the Smart Seoul Forum, other advisory committees, and the citizens to formulate e-government policies.

Sound administrative information system: SMG manages a comprehensive administration information system to provide some 490 civil services in all sectors including urban planning, culture, tourism, public transportation, and housing.

Reliable ICT infrastructure: SMG was the first in the world (in 2003) to establish and utilize subway tunnels for high-speed optical communication network to ensure the safety and reliability of the network for administrative information.

Civil administrative services based on participation, communication, and sharing: "Open Government 2.0" - SMG's main webpage was revamped to a content management system (CMS) based webpage to encourage more participation from employees and citizens. - SMG introduced Oasis, the online policy suggestion system, to enable citizens to suggest their ideas and opinions about city policies. - SMG fully discloses all public DB including the policy making procedure, conference videos, and the maintenance of facilities through services such as "Information Communication Square" and "Seoul Open Data Square."

Ubiquitous, state-of-the-art IT environment - SMG plans to install 1,500 free public, Wi-Fi service zones by 2015. - Seoul citizens have access to the 120 Dasan Call Center, an information hotline for inquiries on everyday life and city policies, via telephone, webpage, or mobile phone. Simple questions can be handled at the 120 Dasan Call Center while other complaints or requests are referred to the relevant division at the

SMG. - SMG collects and analyzes traffic-related data through the advanced traffic information system to provide information such as bus arrival time, bus route, and operation information to the citizens via mobile phone, ARS, and web page.

Global e-Government : As the president city of WeGO, Seoul has been at the forefront of promoting exchanges and cooperation among e-governing cities worldwide.

Figure 46. A Citizen-Oriented E-Government and the World’s Top Smart Seoul of SMG



2. Development of Government-to-Citizen (G2C)

Incurring the heaviest losses in its history of international conflicts, Korea has since recovered from being one of the most war-torn nations to becoming the 12th largest economy in the world. State-led capital allocations, massive urbanizations, and the establishment of diverse industries have laid the foundations from which the country has cultivated global competitiveness in many sectors, ranging from automobiles to consumer electronics. Korea’s success in e-government has been receiving a lot of attention from the international community due to its high ranking in the United Nations’ E-Government Readiness Index, E-Government Participation Index, and E-Government Development Index in recent years. Also, Korea ranked first in the United Nations E-Government Survey for three consecutive years for the government’s effort to meet the needs of the service users and disclose public

information to the users. Furthermore, in 2011, seven government projects in five government ministries and organizations received the United Nations Public Service Award. However, normally industrial and technological advancements do not always translate into transparency in governance and Korea was no exception of this phenomenon.

A highly centralized political culture permeated the latter half of Korea's 1900s, confining much of the power of governance to the rigidity of a top-down political structure. Yet in 1988, the National Assembly broke the political tradition of centralized authority by passing the South Korean Self-Governance Act and encouraged local governance, grassroots democracy, and decentralization. It also required municipal legislations to be verified by the central government, straining top-to-down communication channels.

In 1991, elections for local legislative council seats and in 1995 elections for city mayors and provincial governors began. The Self-Governance Act divided the South Korean government into three levels; the top includes the city of Seoul, six metropolitan governments, and nine provinces, and they all operate autonomously.

The second level of government is cities, districts (or 'gu' in Korean), and counties (or 'goon' in Korean) by population.

The third level is administrative units that are under the provision of the second level government.⁵ Prior to 1995, mayors and other local officials were appointed by the central government and most of them were formerly bureaucrats or ex-central government officials.

Consequently, mayors did not manage their district based on the resident's interest, but their own interest. But after the election, mayors were free to promote citizen-centered local government culture and were allowed to implement local government reforms and innovations in the district.

Amid the central government granting autonomy to local governments, the Korean government was concerned about how to provide better service to the public. In 1978, the government formulated the "Five-Year Plan for Computerization of Government" to fully execute its services to citizens through the Internet.⁸ Accordingly, Korea's e-government development can be divided into four segments:

- initiation stage (1978~1986),

- foundation stage (1987~1996),
- full promotion stage (1996~2002),
- and advanced stage (2003~2012)

In the initiation stage, the Korean government focused on improving the efficiency of government agencies through computerization, instead of establishing a Government-to-Government (G2G) network among ministries or providing direct online service to the public due to lack of network infrastructure.

Based on the computerization of administrative services in the initiation stage, the government built an administrative network between ministries and agencies that allowed them to freely share information and resources in the foundation stage.

In the full promotion stage, physical infrastructure such as high-speed Internet and desktop computers were distributed to the public and accessibility of the public increased significantly. The G2G network and information sharing was systemized and as information on goods and services of individual government agencies were collected in one place, the online procurement service was established and furthered the realization of Government-to-Business (G2B).

Before the early 2000s, a series of national technology plans such as the National Basic Information System (NBIS), Master Plan for Informatization Promotion (1996), and Cyber Korea 21 were developed by the central government. This significantly contributed to increasing the use of IT in Korean government departments.

Consequently, the Korean government appointed the Chief Information Officer (CIO) and stimulated the expansion of IT usage across government departments.

Soon after, in the last stage of e-government development, the President initiated the Special Committee for E-Government to coordinate an inter-agency collaboration and information sharing.

Also, most of the physical infrastructure to provide online service was completed and many of the citizens own personal computers, laptops, or smart phones, making it feasible for them to readily access the necessary public information at any time from any place (Government-for-Citizens, G4C).

In essence, the Korean government's e-government initiative focused on increasing the level of transparency of government procurement practices and the level of

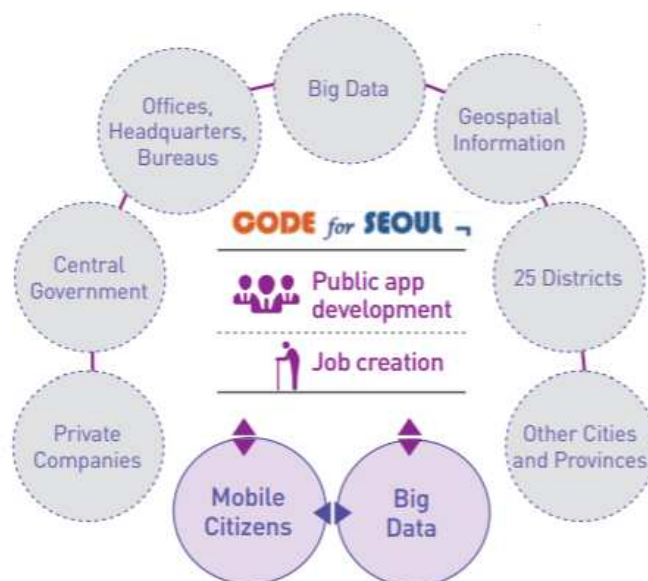
citizens' engagement and participation in government service delivery. It also addressed corruption between business leaders and public officials by making the process more transparent, while facilitating citizens' access to government information.

Consequently, localization of e-government in District A began at the verge of the full promotion stage and it was the leadership of District A's Mayor that led to the widespread adoption of e-government and e-democracy in local governments. District A is one of the 25 districts in the Seoul Metropolitan Government where more than 540,000 citizens reside and is best known as the nation's financial and business capital.

The annual budget of District A is around \$250 million and it has been growing gradually by 3 to 4 percent per year.

As of 2002, the District A office has a total of 1,387 employees, which includes professionals, seated positions, temporary workers, technicians, specialists, and general administrators Under the newly elected mayor's leadership, Mayor Lee Young Kwon, District A implemented 71 e-government applications since 1995 as part of its innovative Smart District – Cyber City Project.

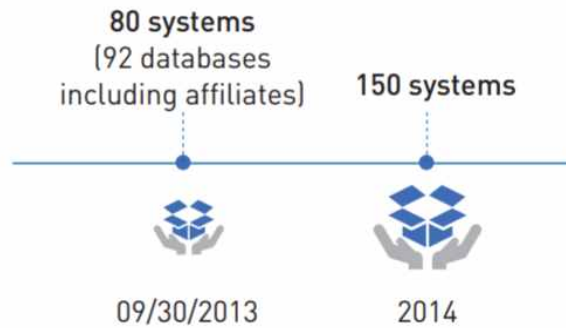
Figure 47. Pursue mobile-centered innovations in City administration



When Mayor Lee initiated the e-government system, he came up with four main objectives:

- (1) citizen or client-centered service in local government;
- (2) e-government innovations through online services;
- (3) transparency in the local government; and
- (4) increase citizen’s participation.

Figure 48. Expansion of public data disclosure



District A developed a wide range of e-government services from Internet civil applications to various transactional services, such as user fee payment, traffic fine online searches and payment, and several electronic-participation applications.

Its citizen-centered implementation of e-government is well known to its residents, and their successful implementation led other districts in Korea to follow their steps.

III Seoul Metropolitan’s Smart City Platform for Mayor

1. Concept and Composition

- 3.63m wide, 1.67m wide screen was built in the mayor room in May 2017.
- A state-of-the-art system that allows you to see all the information of Seoul in real time at a glance even if you do not visit the site
- It links 290DBs managed by administration and Big Data analysis information, and uses 15 million data and 1,200 real-time images.
- There are three main sessions of the main interest information of mayor, real-time city status, citizenship opinion, and visibility status, which allow you to check detailed information. All of these sessions can be accessed through screen touch, voice, motion, etc.

Figure 49. Composition of Smart City Platform for Mayor



2. Development of Smart City Platform for Mayor

The digital market room is not creating new things but it is trying to maximize the intuitiveness by bringing policy, organization, administration, data, and information technology that has been constituting and operating the city for a long time to the viewpoint of the highest decision maker. Cooperation with main department is an essential element.

- The Office of Planning and Coordination
 - Inter-departmental feedback, prioritization
- The Information Planning System Bureau
 - Construction, operation
- The Data & Statistics Division
 - Data research, linkage, analysis, content planning and development, big data analysis, statistical survey
- Data Center
 - Server infrastructure construction and operation
- The Information Communication and Security Division
 - Establishment and operation of communication infrastructure, CCTV network
- The General Affairs Division
 - Creating environment (DID, IP telephone exchanger)
- The Emergency Response Division
 - Disaster management, operation of integrated safety situation room, CCTV connection

3. System of Smart City Platform for Mayor

3.1. System Configuration

The system configuration for smooth service is divided into outside and inside, and CCTV information is provided through a network composed of other closed networks

Figure 50. System Configuration

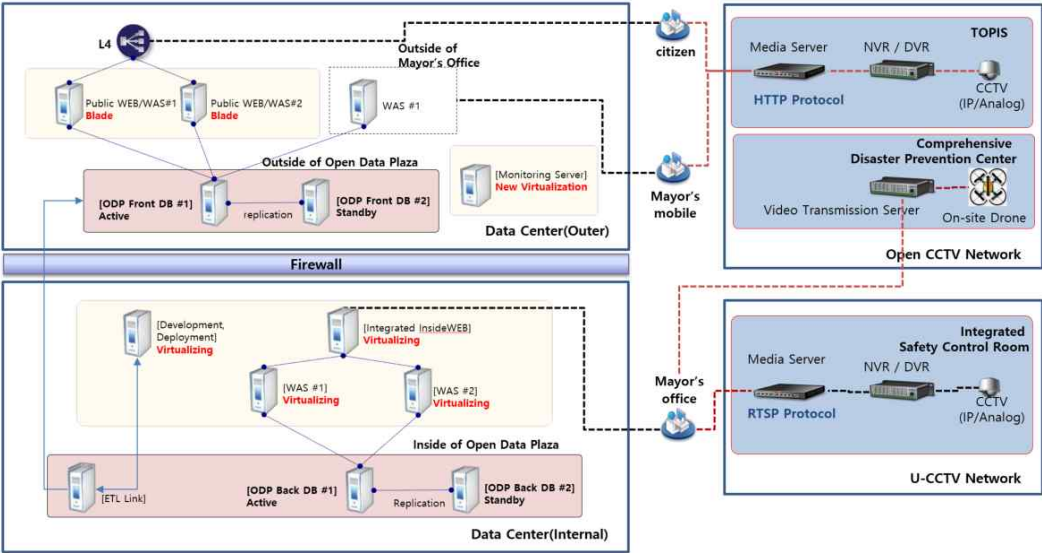
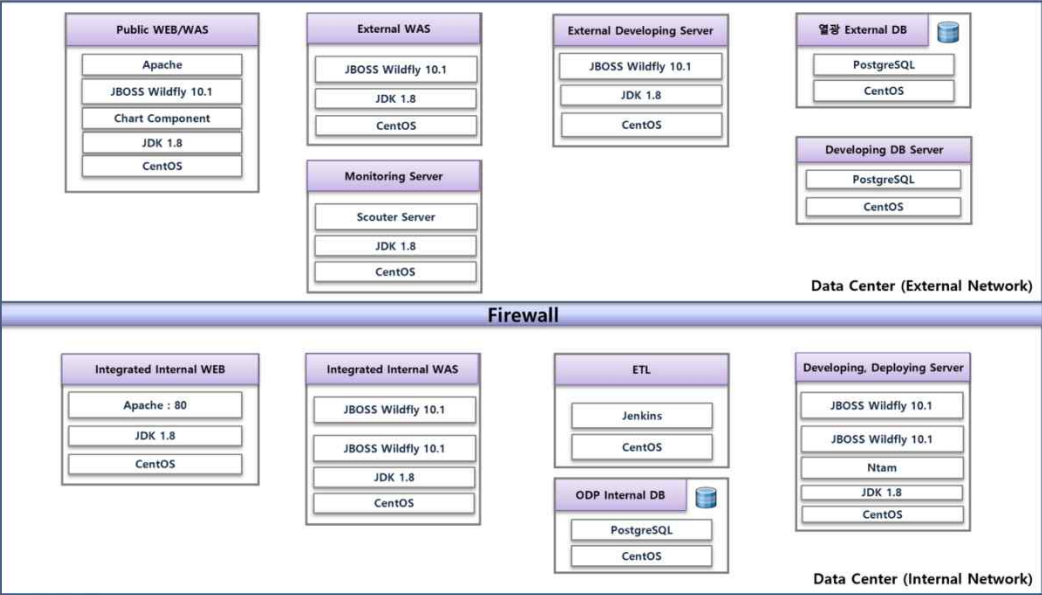


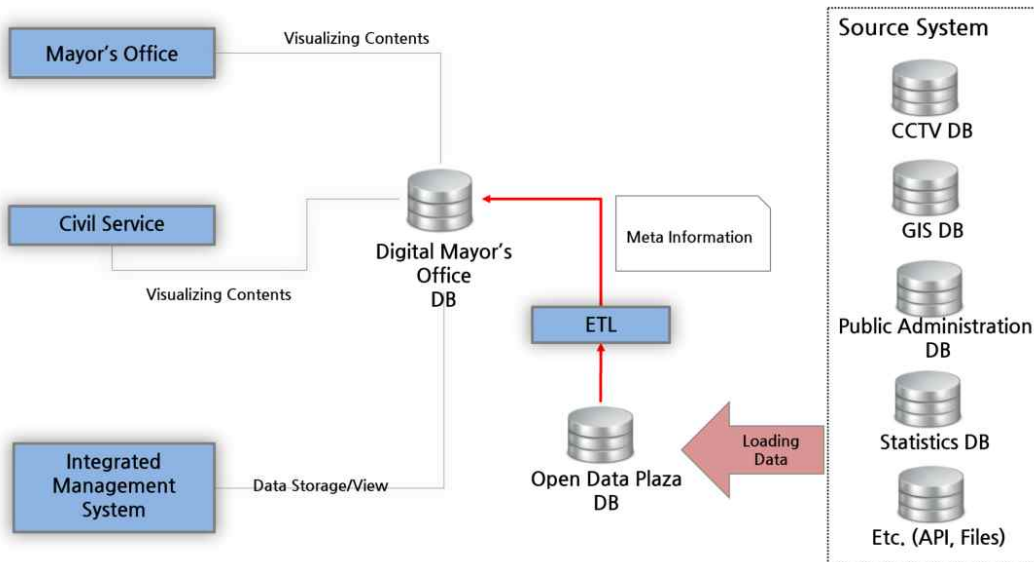
Figure 51. Consist of Open Source Software (OSS)



3.2. Data Association Process

The data is provided in DB, API Web Service, and Manage Site (Data Input) of the source system according to the method managed by business department.

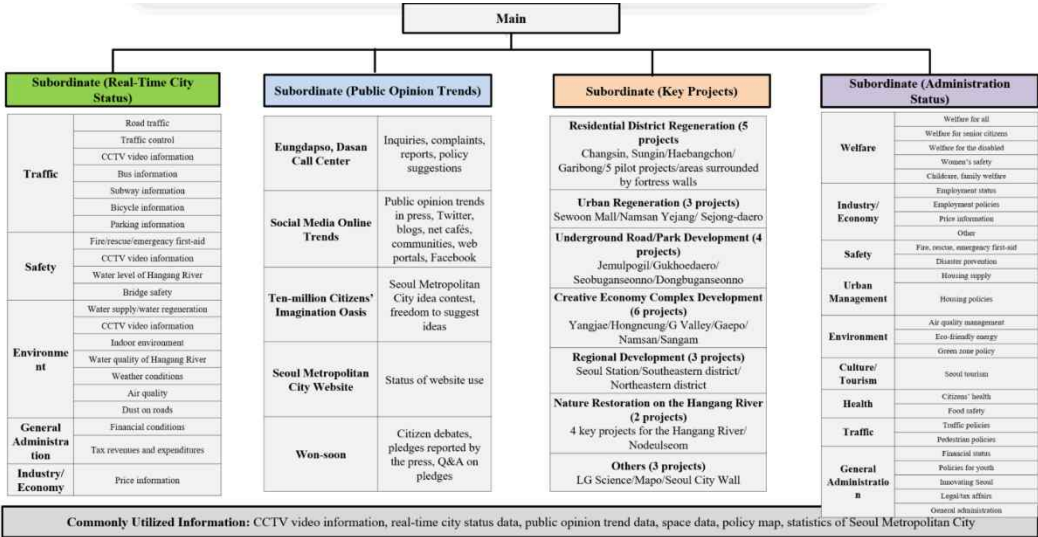
Figure 52. Data association process



3.3. Contents Configuration

- Key Projects: 12 key investment projects, four-year municipal administration projects, key projects listed Balanced Performance Plan
- Administration Status: Four-year municipal administration projects, operations related to key indicators Balanced Performance Plan
- Commonly Utilized Information: CCTV video information, real-time city status data, public opinion trend data, space data, policy map data, Seoul Metropolitan City statistics

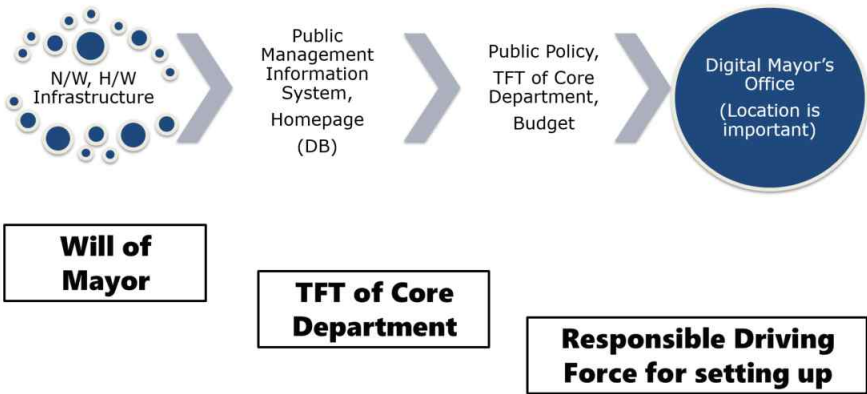
Figure 53. Contents Configuration



4. Key Factors for Implementation

For a successful introduction, it is necessary to identify the current status of the information resource and to identify the data that can be secured at the present level. Also, It is necessary to set up responsible departments centered on mayor's office.

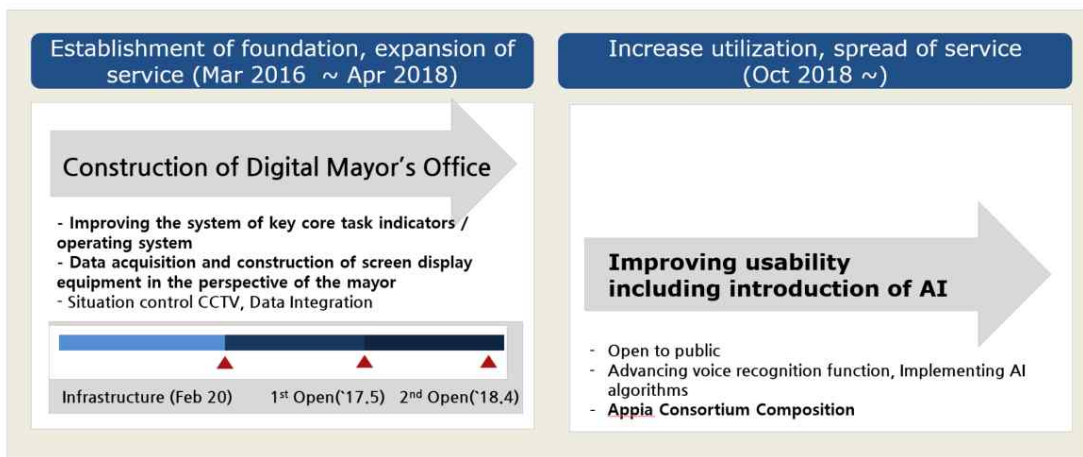
Figure 54. Key Factors for Implementation



5. Future of Smart City Platform for Mayor

Smart City Platform for Mayor will be integrated usable data into the market view and expand services. In the coming future, we will work to increase the usability and spread it at home and abroad.

Figure 55. Future of Smart City Platform for Mayor



IV Budget

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Government Resources
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of Smart City Platform for Mayor project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

V Funding Opportunities

Table 7. Grant Opportunities by Korean Government through Various Funding Agencies

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing

- Supporting information resource management in the public sector
- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)

- RESEARCH AREA

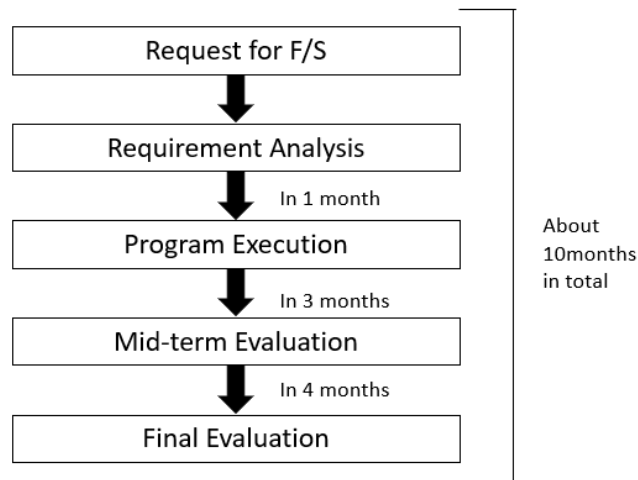
Regular Industries + ICT convergence

SMART SoC

New technology-based Solutions

Beneficiary countries in the needs of ICT Cooperation

Figure 56. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing

- Promote businesses related to the convergence and utilization of ICT technology
- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- PURPOSE

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- RESEARCH AREA

Public administration

education / finance / medical IT convergence

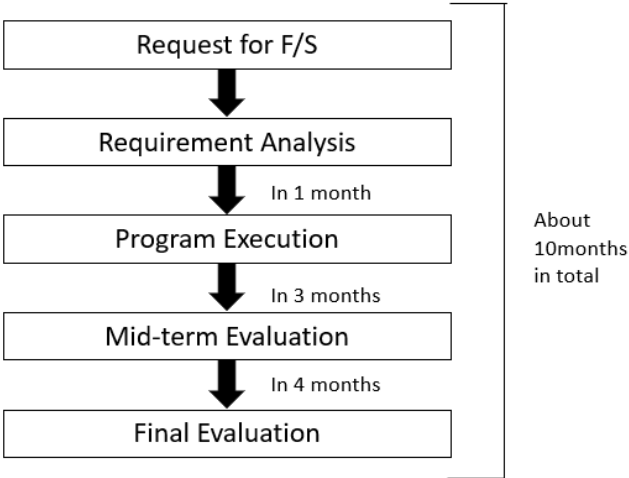
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 57. Project Operation Framework and Application for F/S Project (NIPA

Fund)



VI Conclusion - Lessons from Future of "Smart City Platform for Mayor" System Introduction

Korea has actively pursued e-Government as a crucial means to make its government more competitive, by leveraging the world's best information and communications technology (IT) including broadband Internet.

After laying the groundwork for e-Government, including the National Basic Information System (NBIS) computer networks in the 1980s and streamlining of applicable laws and institutions in the 1990s, the Korean government made the implementation of e-Government a major national agenda for the 2000s. It has concentrated on 11 major tasks for e-Government (2001~2002) and 31 major tasks for the e-Government roadmap (2003~2007). As a result, e-Government has become firmly established in all areas of the Korean government.

The Korean e-Government has produced visible results: both efficiency and transparency of administrative work have been significantly improved; administrative civil services have been greatly enhanced; and opportunities for people to participate in the policy-making process have been expanded.

Accordingly, the effectiveness of the e-Government of Korea is widely acknowledged by the international community and various e-Government systems are being exported to foreign countries. The 2010 UN Global E-Government Survey shows that Korea ranked first among all the member countries, given the highest possible scores in the categories of Online Service Index and the eParticipation Index.

Korea is now promoting e-Government that is focusing on utilization and convergence by consolidating services to maximize the convenience of users and implementing a seamless digital cooperation system connecting government departments and agencies, in order to improve the overall quality.

A sound e-Government environment will be created by actively countering the negative effects of informatization such as hacking, personal information leakage, and illegal information distribution.

E-Government services will be provided that anyone can easily use, including handicapped and senior citizens, who may have fewer opportunities to use IT.

Korean government's experience and know-how will be shared in e-Government with the international community by promoting joint projects with international

organizations and exporting e-Government systems to foreign countries.

With the recognition as the world's No 1 ranking from the UN, the Korean government, the e-Government leader, will be at the forefront of sustained efforts to make continuous contributions to the narrowing of the digital divide between countries by helping developing countries build information access centers and holding workshops for global informatization policy experts.



HRM SYSTEM

Human Resource Management System



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I INTRODUCTION

1. Background

Many organizations in Korea went through fundamental changes in their management paradigms, systems and practices since the financial crisis in late 1990s. Like other managerial functions, human resource management (HRM) in Korea has changed greatly right after the financial crisis began. The direction of changes in Korean HR system was toward ‘performance-based HRM’. The concept of performance-based HRM is characterized by the mechanism in which HR practices such as performance appraisal, promotion or compensation are tightly linked to individual or group performance. This concept is contrasted with the traditional seniority-based HR system where job security is emphasized and promotion and remuneration rules depend basically on seniority.

Digital-based HRM System is thought to have originated from the notion of so-called ‘best practices’. With the trend of globalization, ‘best practices’ have obtained a wider logical foundation for application in global dimension, and the recent HR changes in Korean firms also owe their main direction to this trend. However, while U.S.-type best practices are said to be popular among Korean organizations, it should be noted that the unique social and cultural contexts in a country have influence on the adoption and activation of new HR practices. Especially, considering the contrast between traditional seniority based-HRM and new performance-based HRM in Korean organizations, it is expected that current form of Korean organizations’ performance-based HRM would contain various unique aspects that reflect characteristics from both practices.

Figure 58. Employment in central government under the main GEF

Employment in <i>central government</i> under the main General Employment Framework (GEF): ¹		
2008:	154 317	Full-time equivalents (FTEs)

Source. OECD Human Resources Management Country Profiles, KOREA

In the meanwhile, employment under the GEF in the Korean civil service is governed by the National Civil Service Act (Revised 2004) and Contractual Civil Service Act, the latter of which allows up to five year fixed-term contracts. Employment under the GEF is split into two categories: career staff whose status/job security is guaranteed and are expected to work as civil servants until retirement; and non-career staff whose job security is not guaranteed. Casual employment is permitted but falls under the private sector regulation of the Labour Standards Act.

Regulation of private and public sector employment differs on several issues. Some categories of civil servants, such as educational officials, police officers, members of armed forces, and diplomats, have their own consolidated employment system.

Figure 59. Government production costs (2010)

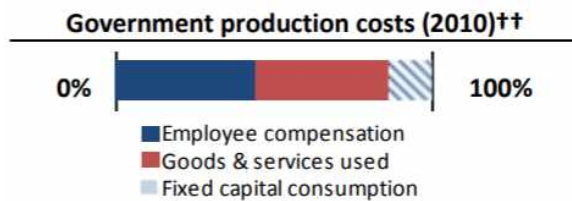


Figure 60. Type of recruitment system (2010)



Source. OECD Human Resources Management Country Profiles, KOREA

Part-time employment accounts for a very small fraction of overall employment under the GEF, partly because it has only been recently introduced, in February 2007. Korea has a very young civil service compared to the OECD average. There was a particularly high proportion of 30-39 year olds, 38.1% in 2008, compared to the OECD average of 24.0%, and Korea also has the lowest proportion of employees aged 50 or older out of all OECD countries, 18.1% in 2008. In addition, the civil service does not show a clear trend regarding age composition whereas the total labor force is clearly ageing, and at a higher rate than the OECD average. Finally, there is low

representation of women in the civil service, both overall and within management. Women account for 35.3% of overall central government staff and 10.3% of management, significantly below the OECD averages of 49.5% and 34.7%, respectively.

Figure 61. Central government employment (2009) & Gender (2011)

Central government employment (2009)¹	
Total employment under GEF:	154 317 FTEs
Part-time employment:	21 FTEs
<i>Part time is defined as those working 15-35 hours per week and was only introduced in February 2007.</i>	
Gender in central government (2011)¹	
Female participation in central government workforce:	35.3%
Share of top and middle positions who are women:	10.3%

Source. OECD Human Resources Management Country Profiles, KOREA

Korea is one of only five OECD countries to report that there are no anticipated changes to public sector employment levels. A range of measures have previously been implemented, including restructuring of government agencies, outsourcing and privatization, but they are not expected to impact public employment in the future. The National Fiscal Management Plan is implementing a considerable consolidation plan; however, reductions in civil service employment levels or expenses do not feature as part of the strategy.~ In the case of restructuring, the government is required to propose reallocation before dismissal, and voluntary departures with attractive allowances are regularly encouraged. General government sector employment (excluding public corporations) as a percentage of the labor force is the lowest of all OECD countries at just 5.7% in 2010. In addition, compensation of government employees as a percentage of GDP, 7.6% in 2010, is close to the OECD minimum of 6.2%. Regulation of private and public sector

employment differs on several issues. Some categories of civil servants, such as educational officials, police officers, members of armed forces, and diplomats, have their own consolidated employment system.

Figure 62. Strategic HR Management

Strategic HR Management	
Existence of HRM accountability framework for managers:	Yes, and HRM is fully linked to strategic objectives.
HRM targets feed performance assessments	Yes
Regular HRM assessment of ministries and departments	Yes
Framework requires top & middle management to plan and report on	General people management Compliance with HR rules & targets for employment and pay
Forward planning use	Yes, with framework design left to discretion of different organizations.
Forward-planning horizon	4-5 years
Key aspects explicitly considered in forward planning	New issues in policy delivery Civil service demographics

Source. OECD Human Resources Management Country Profiles, KOREA

Korea delegates HRM practices to line ministries to a slightly lesser extent than the average OECD country. The central HRM body shoulders a full range of responsibilities but allows ministries' some latitude to apply principles regarding many issues. Delegation has led to a broadly comparable framework across the whole civil service. The utilization of strategic HRM practices is significantly greater than the OECD average and lies in the upper region of the range. Key practices include an accountability framework that feeds performance assessment, regular HRM assessment of departments and a forward planning system with a relatively long horizon. Managerial reporting and forward planning cover a small range of issues, however.

2. Objectives – Purpose of 'Electronic Human Resources Management System' Introduction

The purpose of this paper is to introduce the HRM system of Seoul Metropolitan Government (SMG), Korea and to give better understanding of the configuration of Smart HR system in Korea. The Smart HR system of Seoul Metropolitan Government went through great transformations after the financial crisis in the late 1990s.

In the framework of best practices, there is one HRM system set has been applied to Seoul Metropolitan Government. Although Korea maintained much of its unique organizational culture and HR practices, Korea also modified its HR system after the ‘best practices’ to a great extent.

Figure 63. Development History of Smart HRM System

Developed by	System	Practice Period	Remark
Seoul Metropolitan Government	Human Resource Management System (Web Application for PC)	'82 ~ '84	
	Integrated HR and payment system development	'94 ~ '95	
	The 2 nd development of HR and payment system (The matrix of the current system)	'98 ~ '99	
	Development of e-Insamadang	'00~'04 The 3 rd Development	- Delphi 3.0 C / S environment - Self-maintenance
Ministry of the Interior and Safety	Insarang	'05 ~ '06	Co-operation of HR & Payment System

Source. Planning on Smart HRM System Development for Seoul Metropolitan Government (2010)

The world is now undergoing a digital revolution, which is the third social change in human history. It is underway a definitive change from the industrial age to the information and knowledge age. Now knowledge and information are regarded as the most important resources. We live in a world of e-mail, cyber communities and Web pages, which make this world more interconnected as ever before. Internet and information brings people closer to each other but these relationships are shallow and impersonal. Everything is information and information is everything, both for employees, and employers even in government. Also citizens are looking for

something genuine, and they are more and more willing to pay attention, and participate in better quality or service provided by civil servants.

By understanding the Smart HRM system and best practices of Seoul Metropolitan Government, we will be able to better understand the current Korean HR Management system in Korea. In this study we call for empirical work on the changing configuration of HRM system in Korea.

Seoul has topped in the UN-supported Rutgers Global E-Governance Survey since 2003. It can be proudly said that Seoul has the highest internet competitiveness in terms of broadband internet penetration, mobile service usage, level of online services, and other categories.

However, the paradigm shift into "Smart" means major internal and external changes in the administrative environment. With other nations and cities catching up with the world best e-Government, there is a growing need for Seoul to take proactive measures under the new circumstances

3. Project Scope and Methodology

Electronic Human Resource Management System provides a centralized view of employee data, for the express purpose of making that data available to complete HR processes. In recent years, comprehensive HR solutions have spawned several iterations; there's the human capital management, and human resources management systems.

Human Resource Management System is a one-stop-shop of employee information. Because they bundle in different functionalities of human resource departments — payroll and benefits administration, for example — they simplify overall people management skills. Many HRM System users happily say that they have been able to transition into (almost) paperless environments. An ideal Human Resource Management System provides an intuitive way to customize workflows, manage electronic employee files and integrate with supporting HR tools.

Many Human Resource Management Systems offer self-service functionality, which helps ease some of the burden of employee engagement off of HR professionals. One of the aspects that an HRIS works on is the simplification of managing employee

performance and feedback. With an effective HRIS, businesses can monitor and analyze all human capital management elements.

This Human Resource Management System introduction report includes not only an analysis on SMG's e-Government environment, but also recommendations of e-Government services to be established for the ICT development in other cities, including the Human Resource Management System.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this Electronic Human Resources Management System introduction,
- (ii) Analysis on the Electronic Human Resources Management System of Seoul Metropolitan Government for the effective implementation of the solution
- (iii) Case study of other cities' Electronic Human Resources Management System and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

II ENVIRONMENT ANALYSIS

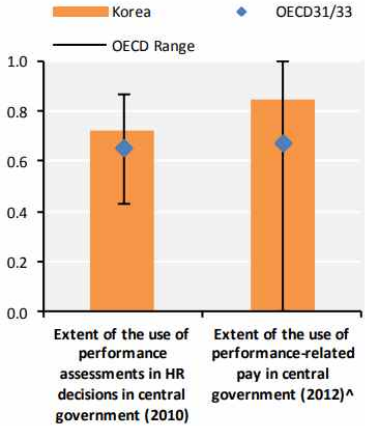
1. HR Management Practice in Korea

The recruitment system in use in Korea is slightly more career based than the OECD average but is firmly in the middle of the range. The open competitive recruitment process is usually managed by the central HRM unit through centrally conducted examinations, while a career-based recruitment system is managed by the central HRM unit and also other related agencies. The ratio of competitive recruitment was 44.7% in 2010. There are hiring targets regarding gender, disabled persons and low income groups. If the proportion of one gender passing a recruitment examination is less than 30%, additional applicants of that gender will be recruited. In addition, there is a 1% quota for all new recruits to be from low income backgrounds and a 3% quota for disabled people.

And Korea uses performance assessment to a slightly higher extent than the OECD average. Almost all public employees are obliged to undergo performance assessment, which takes the form of a meeting with, and written feedback from, a superior two levels above every six months or annually. Assessment covers a wide range of criteria, including activities undertaken, timeliness and quality of outputs, and values. It is particularly important for remuneration, and of medium importance for career advancement and contract renewal. Korea uses performance related pay substantially more than the OECD average, and lies in the upper range of the composite measure. It is used for most employees, as both one-off bonuses and permanent increments, and can be as much as 6-10% of base salary.

When it comes to payment setting, there are no negotiations, neither collective nor individual, regarding salary or bonuses in Korea and remuneration is set by the government in power. Base salary and bonuses are revised annually and are set taking into consideration standard living expenses, inflation and the average wage of the private sector. Seniority is of key importance to pay rates in most posts and performance is also factored in. Seniority pay is still used but has been reduced in recent years.

Figure 64. Performance Assessments



Source. OECD Human Resources Management Country Profiles, KOREA

The average yearly working hours in the Korean civil service, 1 816 hours in 2010, are higher than the OECD average of 1 745. This is driven by a higher than average working week and fewer annual leave days. The yearly sick leave rate for 2009 was 7.8 days per employee. Sick days with doctor’s certificate are limited to 60 per year and employees receive one extra day of annual leave if no sick days were taken in the previous year.

Figure 65. Work Conditions in Numbers

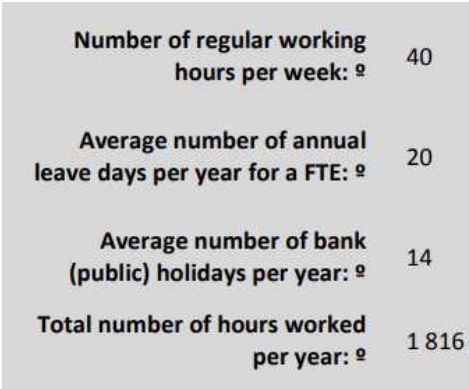
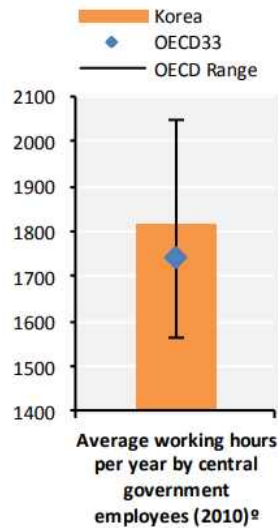


Figure 66. Average Working Hours per Year by Central Gov. Employees



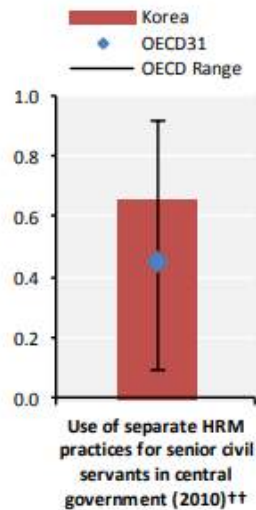
Source. OECD Human Resources Management Country Profiles, KOREA

Korea makes use of separate HRM practices for senior civil servants (SCS) to a greater extent than the average OECD government, as measured by the composite index. SCS are considered a separate group and are recruited soon after entry into the public service. There is a centrally defined skills profile, more emphasis is placed on the management of their performance and the portion of their pay that is performance related is higher. A good proportion of management positions are open to external recruitment. The highest level of the civil service, the vice ministers, are appointed directly by the president, while lower levels of management are appointed by the relevant minister or ministry head. All of the advisors to the ministry's leadership and the vice ministers typically turn over when there is a change of government.

In the meanwhile, civil service unions do not receive public funding in Korea and they are not typically consulted regarding the majority of HRM issues. However, union consultation is voluntary regarding base salary, bonuses and working conditions, and negotiations on these issues are conducted both centrally and at delegated levels. All but certain categories of the civil service are granted the right to unionize and only the post office union and national hospital union have the right to strike.

Figure 67. Use of separate HRM practices for senior civil servants in central

government (2010)



Source. OECD Human Resources Management Country Profiles, KOREA

Since 2011, Korea has been making efforts to attract experienced personnel to public positions from an extensive range of private sectors by introducing the Grade 5 Recruitment for Private Sector Applicants, which aims to enhance the diversity and depth of expertise among public officials. One collective hiring process per year is now conducted for Grade 5 level staff, with reduced applicant requirements to allow a broader range of talent from the private sector to enter the government workforce. This program largely consists of three processes: the assessment of fitness for public office, which is of the nature of a written exam; the job fitness assessment through document screening; and the interview. This program resulted in a total of ninety three hires in sixty job categories.

2. Development of Electronic HRM System of Seoul Metropolitan Government

Development of Electronic HRM System is inevitable to establish scientific and active means as a key policy resource to determine the direction of human resources development strategy and personnel policy of the government. And Development of Electronic HRM System aims at the achievement of administrative efficiency through establishment of core infrastructures of local governments human resource

management and support for establishment of transparent and comprehensive personnel policy based on data.

Figure 68. Development History of Electronic HRM System

Developed by	System	Practice Period	Remark
Seoul Metropolitan Government	Human Resource Management System (Web Application for PC)	'82 ~ '84	
	Integrated HR and payment system development	'94 ~ '95	
	The 2 nd development of HR and payment system (The matrix of the current system)	'98 ~ '99	
	Development of e-Insamadang	'00~'04 The 3 rd Development	- Delphi 3.0 C / S environment - Self-maintenance
Ministry of the Interior and Safety	Insarang	'05 ~ '06	Co-operation of HR & Payment System

Source. Planning on Smart HRM System Development for Seoul Metropolitan Government (2010)

HRM System is to be improved as in below major elements.

- Upgrading based on latest IT technology
- Integrated code system based on standard code
- Improvement of user ID management system (department ID ⇒ individual ID)
- Integration of personnel management system and personal major career management system through .Net
- Enhancement of security of HRM System: Implementation of document security solution

Firstly, Establishment of Internet application reception center construction aims at submission of application forms for various tests conducted by the local governments on the Internet. And It is to improve applicants' convenience for examination of over 500,000 local governments per year. Secondly, development of financial analysis program analyzes the correlations between organizational

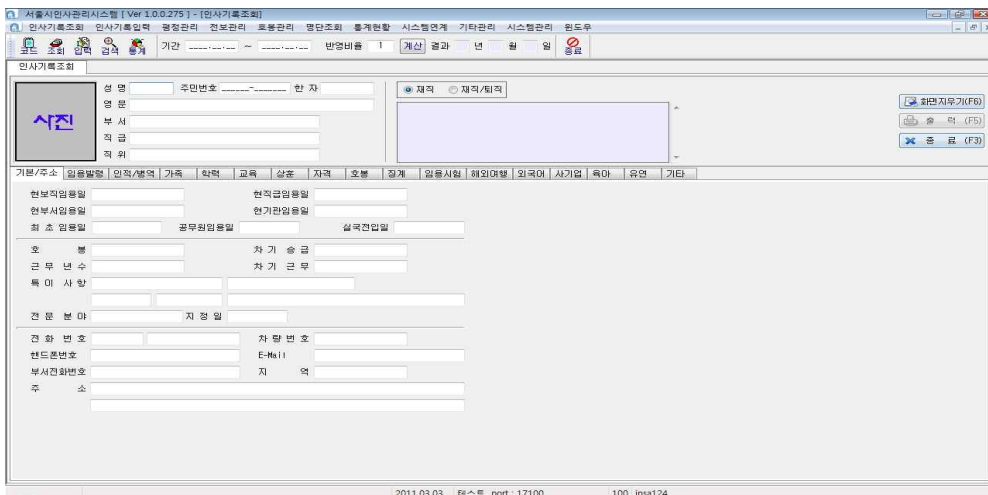
personnel policy and financial management support of rational organizational management based on cost performance based on each site.

III Seoul Metropolitan's Electronic Human Resources Management System

1. Concept and Composition

The most important functions of E-HRM system which play a significant role in reducing the organizational costs and of course towards globalization paradigm. .With the implementation of HRMIS, human resource activities can be undertaken with greater ease and speed with the availability of human resource information system. Uniform human resource management policies and procedures as well as the integration of human resource information into a centralized data bank will make it easier for all agencies to use this system. In addition E-HRM, automation of human resource processes would enhance productivity through faster processing, better work environment and reduction in mistakes or errors as well as in overlapping work. The integrated human resource information system will enable the sharing of reliable information quickly. It will also allow for better and faster communication among all the agencies involved. When completed, the HRMIS will link all government agencies electronically so that human resource information from the grass root level can be easily transmitted to higher levels such as to the headquarters of agencies, ministries, and Human resource activities that are less productive can be reduced and greater emphasis can be given to more productive work that enables human resource management to function at the strategic level.

Figure 69. Composition of Electronic Human Resources Management System



Source. Planning on Smart HRM System Development for Seoul Metropolitan Government (2010)

2. Benefits of Smart Human Resources Management System Implementation

The E-HRM is the cause of significant impacts. Putting emphasis on this system and the globalization paradigm and their interrelated cycle can foster creativeness and synergistic dimensions and provide the grounds for competitive advantage.

- In order to implement and develop the E-HRM system in global setting the following items should be considered;
- Change in current official role and move towards professionalizing human capital and developing electronic human resources
- Recruiting part-time and full-time professional and knowledge-oriented employees
- Developing computer skills and optimized use of web facilities
- Increasing the number of managers and experts in utilizing worldwide web in order to save time and costs
- Creating growing intellectual changes concerning how to use the tools of the E-HRM and its role.
- Paying attention to new technological environment in organizations is one of the necessary functions of the EHRM in near future. Therefore preparing the technological infrastructures including worldwide web and designing web pages according to such an environment in organizations should be considered.
- Educating managers and the mobility of traditional structures in human resource management requires a fundamental revolution in this area and in the future may lead to more dynamism of human resource system in organizations.
- And finally attention should be drawn on specialized education for experts and actors in digital domains as an effective workplace to enter such areas

And benefits of Electronic Human Resource Management System as follows:

- E-HRM has the potential to influence both efficiency and effectiveness.
- Effectiveness can be affected by improving the competence of both managers and employees to make better, quicker decisions.
- A higher internal profile for HR leading to better work culture.
- It leads to a more transparent system.
- Considerable reduction of administrative burden
- Provides Integral support for the management of human resources and all other basic and support processes within the organizations.
- A more forceful workflow in the business process, productivity and employee Satisfaction
- E-HRM can save costs while maintaining the quality of data
- Decentralization of HR tasks
- Standardization
- Access to training enrollment and self-development.
- User-friendly interface.
- Connectivity with the client's existing information system (payroll accounting, attendance registration, document systems... gradual implementation.
- Parametric and customizability.
- Access to archived records and documents Employee & time managers self-manage employee mgt.
- The generation of HR metrics to support strategic decision making
- Transforming HR professionals from administrative paper handlers to strategic partners
- The automation of routine HR tasks and replacing “filing cabinets”

3. System of Electronic Human Resources Management

3.1 Functions

The E-Employee Profile web application provides a central point of access to the employee Contact information and provides a comprehensive employee database solution, simplifying HR management and team building by providing an employee skills, organization chart and even pictures. E-Employee profile maintenance lies with the individual employee, the manager and the database manager. E-Employee profile comprise of the following: Certification, Honor/Award, Membership, Education, Past Work Experience, Assignment Skills, Competency, Employee Assignment Rules, Employee Availability, Employee Exception Hours, Employee Utilization, Employee tools, Job information, Sensitive job Information, Service Details, Calendar, Calendar Administration, Employee Locator easy and to make decisions with less cost and and speedy time.

Organizations first started using computers as a recruiting tool by advertising jobs on a bulletin board service from which prospective applicants would be contacted by the employers. Some companies began to take e-applications. Today the internet has become a primary means for employers to search for candidates and for applicants who look for a job. As many web based job portals are there were the employers will post their vacancy position in the job search web portals to stimulate the applicants to apply for that particular job. And this websites help in review resumes of various types. E-HRM is online recruitment. It refers to posting vacancies on the corporate web site or on an online recruitment vendor's website, and allowing applicants to send their resumes electronically via e-mail. It also includes the active search of the internet and the location of resumes. However, there is always the danger of resume overload, as well as low reputation and effectiveness of various web sites and databases, not to mention its questionable effectiveness for senior executive positions.

E-Learning refers to any programmed of learning, training or education where electronic devices, applications and processes are used for knowledge creation, management and transfer. E-Learning is a term covering a wide set of applications and processes, such as web-based learning, computer-based learning, virtual class room, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio-and videotape, satellite broadcast, interactive

TV, CD – Rom, and more. Training program provides.

A web-based appraisal system can be defined as the system which uses the web (intranet and internet) to effectively evaluate the skills, knowledge and the performance of the employees which reduces the money. E-HRM can also provide managers with information on how to conduct a Performance Appraisal, the specific criteria and measurements of given positions and roles as well as examples and models of effective appraisals. The penetration rate of computer-mediated communication, mainly e-mail, is higher than 75 percent in corporate environments and e-mail has emerged as the communication medium of choice. The email and electronic forms on the intranet of the company or a restricted web site are used to gather information on training needs assessment, inducing benefits in terms of less paperwork, lower administration cost, shorter distribution and response time, and higher response rate

3.2 Key Factors for Implementation

For successful implementation, key factors should take place, and they include;

- When an organization implements a new E-HRM system, some of the HR processes must be reengineered in order for the E-HRM system to be more effective i.e., the inevitable alignment of processes and activities with the new systems requirements.
- Such reengineering mechanism is applied when transforming HR manual processes to paperless forms.
- Reengineering should begin before choosing the software system to make sure changes are accepted by the stakeholders and the process can actually be aligned with the new system. Good planning consumes a considerable amount of time prior to implementation.
- Training and education is a critical step in managing change itself, as employees must be educated about the new system to understand how it changes business processes.
- Education is the catalyst that brings the knowledge of the users up to the point where they can familiarize themselves with the new E-HRM system quickly and sufficiently.
- Managing change within the organization could be a full time job by itself as

it requires the management of people and their expectations, resistance to change confusion redundancies and errors.

- In order for E-HRM implementation to be successful, top managers have to approve and continuously support the responsible parties during the implementation stage to make sure no obstacles prevent or delay the progress.
- One of the most critical success factors for implanting an E-HR system is the support and involvement of top managers in the project during its life cycle. Also an executive sponsor should be appointed to coordinate, communicate, and integrate all aspects of the project between the development team and top management.
- The executive sponsor should communicate, integrate and approve the shared vision of the organization and the responsibilities and a structure of the new E-HRM system.

IV Budget

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Government Resources
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of Human Resource Management System project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

V Funding Opportunities

Table 8. Grant Opportunities by Korean Government through Various Funding Agencies

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing
- Supporting information resource management in the public sector

- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

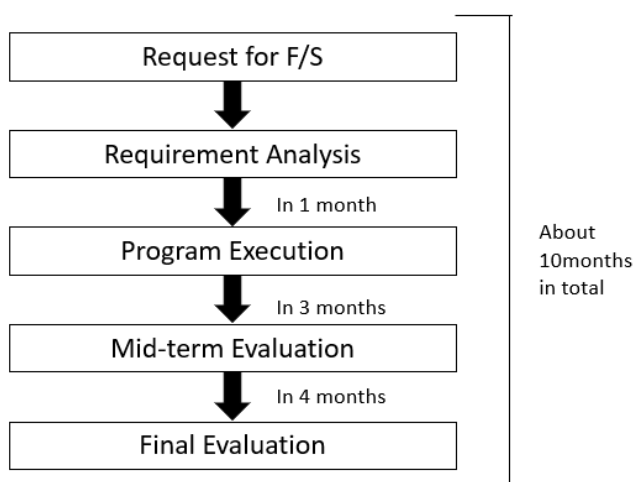
- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)

- RESEARCH AREA
 - Regular Industries + ICT convergence
 - SMART SoC
 - New technology-based Solutions
 - Beneficiary countries in the needs of ICT Cooperation

Figure 70. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing

- Promote businesses related to the convergence and utilization of ICT technology
- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- PURPOSE

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- RESEARCH AREA

Public administration

education / finance / medical IT convergence

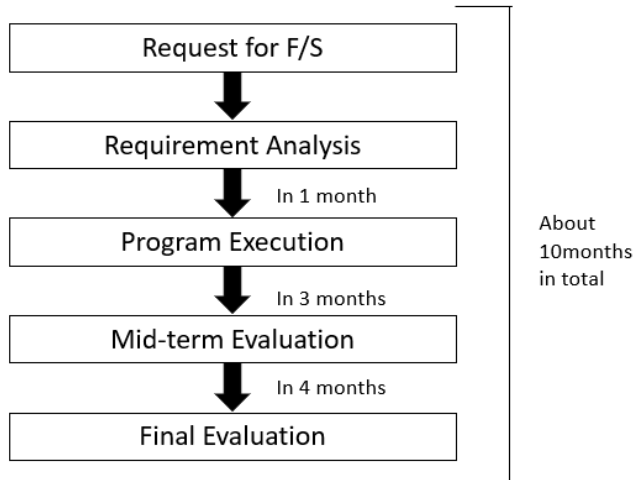
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 71. Project Operation Framework and Application for F/S Project (NIPA)

Fund)



VI Conclusion - Lessons from The Electronic Human Resource Management System

In today's demanding world, IT plays a fundamental role in creating new opportunities and delivering competitive benefits to enterprises. The HR profession has had to respond to increased competition for changes in both workforce attitudes and composition, shifts in the employer/worker relationship and rapid advances in HR technology. Therefore, moving towards the electronic world is a predictable phenomenon. In recent years electronic human resource management (E-HRM) is being used in most of the big companies and institutions and is among the leading organizational systems in human resource management (HRM) because its applications are considered to be very effective and cost-effective. Using a research framework based on the Unified Theory of Acceptance and Use of Technology Model, this study examines the relationship between HR employees' attitudes (Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions) and attitude towards electronic human resource management (E-HRM) systems in HR departments. Finally, the study concludes that understanding employee attitudes about electronic human resource management systems is essential if organizations are to use such systems for employee welfare and organizational improvement.

The Korean e-Government has produced visible results: both efficiency and transparency of administrative work have been significantly improved; administrative civil services have been greatly enhanced; and opportunities for people to participate in the policy-making process have been expanded.

Accordingly, the effectiveness of the e-Government of Korea is widely acknowledged by the international community and various e-Government systems are being exported to foreign countries. The 2010 UN Global E-Government Survey shows that Korea ranked first among all the member countries, given the highest possible scores in the categories of Online Service Index and the e-Participation Index.

Korea is now promoting e-Government that is focusing on utilization and convergence by consolidating services to maximize the convenience of users and implementing a seamless digital cooperation system connecting government departments and agencies, in order to improve the overall quality.

A sound e-Government environment will be created by actively countering the

negative effects of informatization such as hacking, personal information leakage, and illegal information distribution.

E-Government services will be provided that anyone can easily use, including handicapped and senior citizens, who may have fewer opportunities to use IT.

Korean government's experience and know-how will be shared in e-Government with the international community by promoting joint projects with international organizations and exporting e-Government systems to foreign countries.

With the recognition as the world's No 1 ranking from the UN, the Korean government, the e-Government leader, will be at the forefront of sustained efforts to make continuous contributions to the narrowing of the digital divide between countries by helping developing countries build information access centers and holding workshops for global informatization policy experts.

The primary responsibilities of the Human Resources Management in any organization and all managers is the utilization of human capital, to achieve organizational goals. Other definition is that, identify, select, train and develop manpower organization to achieve defined goals. Also the main tasks of HRM were that its related to Job Analysis, Planning for manpower requirements of the organization, Staffing, Selecting and hiring the best staff for the job, Design programs that facilitate the entry of new employees to the organization and to help them in their social organization and find the right place, Staff training, System design and performance evaluation, compensation, payroll, communications, health and safety and discipline systems.

120 DASAN CALL CENTER



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I INTRODUCTION

1. Background

Around the globe municipalities are facing a wide range of challenges as businesses and citizens demand better, more efficient and more flexible services. Municipalities are working hard to become more citizen-driven, and to change how they deliver services to respond better to their citizens' demands.

A contact centre is the organizational unit in the municipality that serves citizens across a range of different channels (desk, telephone, paper, internet, etc.). The citizen contact centre of a municipality is the place where citizens and businesses can get their questions answered. Municipalities often design their contact centres so they can answer 80% of citizens' questions at the first point of contact –without having to involve other municipal departments or other municipal staff.

the issues that municipalities faced when trying to set up citizen contact centres (and the factors which affected their success) were remarkably similar across municipalities– be they small towns or large cities. The challenges municipalities face when trying to deliver this sort of systemic change cannot be ignored: the need to put citizens first, and to develop a demand-driven approach to delivering services, often requires significant changes in how municipalities work – a transformation that many have struggled with.

We believe that the first step to improving municipal services is to develop a strategic approach to service improvement: how services are delivered and how they can be improved services must be carefully planned and based on realistic aims and objectives. This strategy must be supported by senior management within the municipality; it must be process-oriented, and should exploit ICT and knowledge management systems where possible.

The key task for organizations isn't to find a 'perfect' system or set of technologies, but to develop an approach that 'fits' their organization. This will only happen if you get 'buy in' from front line staff and managers to the service improvement process, so they will adopt new systems and new ways of working.

This publication brings together what the partners in the Smart Cities project have learned when they developed their contact centres in a practical format that clearly identifies the key issues that managers and staff who are planning the creation of a citizen contact centre will have to tackle. Taken together, these building blocks will make a firm foundation for the development of a citizen contact centre.

2. Objectives – Purpose of 120 Dasan Call Center Introduction

The transformation of local authorities and municipalities into more customer-focused organizations is spreading around the world—it is hard to find a municipality that is not working hard to improve the services it offers. There are great variations in how citizen contact centres have developed in different towns and cities. Municipalities which pioneered centralized citizen contact more than a decade ago usually now have well-oiled operations where the citizen contact centre is at the hub of a citizen-centric service delivery approach. On the other hand, many municipalities are still toying with the idea of developing citizen contact centres, and are unsure and hesitant about how to implement such radical changes in work patterns, business processes and in service philosophy.

The Smart Cities project brought together staff to share their experiences and ideas from Seoul, Korea about how they developed their call center system. This introduction brings together this knowledge for other local government employees who need to develop and improve their municipality's citizen contact operations.

This is not a how-to manual, nor do we offer a check list of 'do's' and 'don'ts' for establishing or developing call center system. While we have identified a number of basic principles that underpin successful call center system, there is no magic system or approach that you can follow that will guarantee a smooth running, call center system that delivers services through phone calls. Your local context is key – you need to develop and implement solutions that are appropriate for your organization and for your citizens.

This will lead to very different approaches and solutions and development pathways in different municipalities. In other countries, this stimulus has come from national or central governments, through service improvement programs and through large e-government initiatives. In some country, municipalities are collaborating at regional levels to develop jointly their customer contact infrastructure.

3. Project Scope and Methodology

Other cities around the world are endeavoring to ensure citizen engagement with open government and desires to establish a strong communication channel between the government and citizens. For this purpose, the 120 Dasan Call Center system is recommended and in order to come up with accurate findings and the effective 120 Dasan Call Center system during the Project, it is important to first understand the current status of beneficiary cities' smart cities system environment. Therefore, the Seoul Metropolitan Government (SMG)'s consultant team initially conducted surveys for in-depth investigation of the solution and also assist other cities to utilize the 120 Dasan Call Center system by producing a scientific analysis on the case study of other cities' smart cities. This 120 Dasan Call Center system introduction report, therefore, includes not only an analysis on SMG's smart systems environment, but also recommendations of smart city services to be established for the ICT development in other cities, including the 120 Dasan Call Center system.

The main components of the entire the Project are as follows;

- (i) Investigation and production of this Smart Call Center System introduction,
- (ii) Analysis on the 120 Dasan Call Center system of Seoul Metropolitan Government for the effective implementation of the solution
- (iii) Case study of other cities' Smart Call Center System and,
- (iv) Introduction about the government grant programs with the actual budget for the system implementation

II ENVIRONMENT ANALYSIS

1. Seoul Metropolitan Government's Smart City

Many of the world's major cities have embarked on smart city projects, including Seoul, New York, Tokyo, Shanghai, Singapore, Amsterdam, Cairo, Dubai, Kochi and Malaga. Smart cities may still be viewed as cities of the future, but considering today's rate of innovation it is highly likely that smart city models will over the coming decade become very feasible and certainly very popular strategies for cities' development.

A smart city has been defined as a 'knowledge', 'digital', 'cyber' or 'eco' city; representing a concept open to a variety of interpretations, depending on the goals set out by a smart city's planners. We might refer to a smart city as an improvement on today's city both functionally and structurally, using information and communication technology (ICT) as an infrastructure. The concept of a smart city is evolving and the work of defining and conceptualizing the term is in progress. Some of the earlier outcomes of this activities included:

"A city well performing in a forward-looking way in [economy, people, governance, mobility, environment, and living] built on the smart combination of endowments and activities of self-decisive, independent and aware citizens."

"A city that monitors and integrates conditions of all of its critical infrastructures including roads, bridges, tunnels, rails, subways, airports, sea-ports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens."

Smart cities demand careful planning and, at an early stage, it is essential that national and municipal governments, citizens and all other stakeholders agree on the smart city definition they aim to fulfill. A clear definition or strategy must address two key factors: the city's desired 'functions' and 'purposes', with its 'functions' referring to the appearance and operation of a city, and its 'purposes' to the benefits promised by a smart city model.

Looking at its functions as well as its purposes, a smart city can perhaps be defined as "a city that strategically utilizes many smart factors such as Information and

Communication Technology to increase the city's sustainable growth and strengthen city functions, while guaranteeing citizens' happiness and wellness."

A human-centric smart city thus relies on an advanced ICT infrastructure and continued urban development, always taking environmental and economic sustainability into account as early as possible.

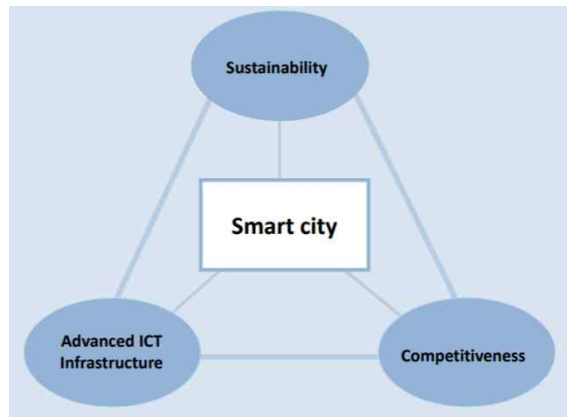
Officially "Seoul Special City", Seoul is the capital of South Korea and the country's largest metropolis with a population of over 10 million people. Having hosted the Olympic Games, the FIFA World Cup, and 2010's G-20 summit, Seoul is world renowned as both a highly-advanced economy and leading tourist destination. Seoul is however best known as one of the most tech-savvy cities in the world, retaining its No.1 ranking in the UN e-Government Survey since 2003, and creating a true world-first in the PC-gaming equivalent of the Olympic Games, The World Cyber Games.

Smart Seoul 2015 was announced in June 2011 to uphold Seoul's reputation as a global ICT leader by boosting its sustainability and competitiveness through smart technologies. Strictly speaking, Smart Seoul is not Korea's first attempt to incorporate ICT in city-development strategies. In 2004, Korea initiated the u-City project whereby ubiquitous computing technologies were applied to strengthen cities' competitiveness.

The smart city achievable today differs fundamentally however, in that today there are ways to simultaneously enhance a city's sustainability, competitiveness and citizen happiness. A smart city emphasizes the continued maintenance, protection, reinforcement and regeneration of its attractiveness in the future no less than it prioritizes its short-term competitive edge.

Smart Seoul 2015 was adopted to overcome the limitations of u-Seoul which applied ICTs only to existing 'traditional' city infrastructure. u-Seoul improved the delivery of services such as transportation and safety, but failed to produce material improvements in the quality of life enjoyed by Seoul's citizens. Smart Seoul 2015 is a more people-oriented or human-centric project; and Seoul now aims to implement as many smart technologies as possible, but also to create a more collaborative relationship between the city and its citizens.

Figure 72. Strategic goals of Seoul Smart City Projects



2. Smart Seoul Infrastructure

ICT is the basic infrastructure of a smart city, used not only in cyber space, but also as communicating elements of physical infrastructure, transmitting real-time data on a city's status by way of sensors and processors applied within real-world infrastructure. A diverse range of city functions and services rely on this ICT infrastructure, and this brings about a convergence of processes that enables a smart city to function as a giant, independent intelligence unit.

Structurally, a smart city is a system of systems. Many individual, independent systems are combined to form meta-systems which in turn become sub-systems. This interoperation of countless independent systems demands that openness and standardization be adhered to as the key principles in smart city construction. At the subsystems level, a lack of openness limits the scope of a smart city, and a lack of standardization increases the costs of a city's construction. Without openness and standardization, a smart city project quickly becomes cumbersome and expensive.

As a consequence of its service-driven ICT infrastructure, a smart city's relationship with its citizens is what distinguishes it most from a traditional city. The ICT-supported services of traditional cities cannot respond to changing economic, cultural and social contexts in the way that smart-city services can, and one could say that smart cities are relatively more considerate of people; responding attentively to individuals' tastes and preferences, and relying on the city's inhabitants to pinpoint the most needed improvements to city services. A smart city

is above all a human-centric city, adapting its behavior in response to that of its citizens – the ICT users constantly interacting with city infrastructure and services.

Smart Seoul Infrastructure refers to the functional ICT framework essential to the provision of Smart Seoul's services. The development of Smart Seoul's services has to date been led by Seoul's Metropolitan Government, and Seoul is currently transferring a larger portion of this task to its citizens through the publication of the city's administrative information and the creation of open-source app-development models.

2.1 Smart Devices for All

A smart city relies on an inclusive network of smart device users, with the city's inhabitants demanding or creating the services they most value. The inclusive network in Seoul encompasses high-speed broadband optical wire and wireless networks (including Wi-Fi, NFC technology, etc.). All citizens' voices should be heard in this effort, and a key pillar of Smart Seoul 2015 is to increase access to smart devices and to educate new users on their operation

1.1.1 Device Donation

In 2012, Seoul began distributing second-hand smart devices to low-income families and others in need. The ICT market moves rapidly and typical smart device users buy new products well within the useful lives of the devices they are replacing. Citizens are encouraged to donate their old devices when buying new ones, and after these donated devices have been inspected and repaired by manufacturers they are distributed free of charge to vulnerable populations, such as beneficiaries of Korea's National Basic Living Security. Smart devices donators are incentivized by tax deduction in the range of USD 50 to USD 100 per device donated

1.1.2 Smart Capability for All

Smart devices have the potential to give voice to vulnerable groups, whether impaired financially, physically, or by the effects of ageing.

Dialing 120 reaches "120 Dasan Call Center" which consolidates the call centers of 25 district offices. Those with hearing impairments are able to call the call center through a video-call system which is today available as a mobile device application.

Seoul has been providing education courses on smart ICTs since 2009, offering both city-run lectures and city-funded smart ICT classes through private education institutions. Aimed at immigrants, low-income individuals and elderly people using smart devices for the first time, these classes attracted over 47,000 people over 2009-2011. Although still addressing the basics of smart technology's use, these classes will in the future teach more advanced skills, giving more citizens the tools to improve Smart Seoul's services.

2.2 u-Seoul Net

Establishing a communication network dedicated to smart services has been a priority to Smart Seoul. An administrative optical network called "e-Seoul Net" was established in 2003, embedding fibre-optic cable along Seoul's subway tunnels to connect the city's main public buildings, its affiliated offices and municipalities.

However, e-Seoul Net is not equipped to support new smart services, as it was specifically designed to connect only public offices in the interest of administrative data exchange. Citizens have no access to this network at all, and it is not equipped to support the massive volumes of data flowing over a smart-city network. Completed in 2011, the 192-kilometre "u-Seoul Net" overcomes these restrictions, providing citizens with free Wi-Fi service and full access to public web sites and enabling metropolitan government to handle huge amount of data generated from variety of smart devices. With u-Seoul Net citizens have access to administrative services anytime, anywhere. -Seoul Net is divided into three communications sub-networks: a Wi-Fi network used to serve administrative functions; a CCTV network enabling the exchange of video data generated by Seoul's 0,000 CCTV installations; and the u-service network, which connects the websites of all the public offices under the Seoul Metropolitan Government, allowing citizens to bypass internet service-provider networks, and instead access u-Seoul Net for free information on city services.

In the future, Seoul plans to utilize u-Seoul Net in areas such as children's safety and vehicle-emissions control systems able to reduce the city's energy costs.

2.3 Smart Work Center

Seoul Metropolitan Government is piloting a "Smart Work Center"³¹ project, allowing the government's employees to work from 10 offices – Smart Work Centers – located much closer to their homes). As employees check-in to a Smart Work

Center for their shifts they are permitted access to sophisticated groupware and teleconferencing systems, ensuring their absence from City Hall in no way impedes their job performance.

The project has attracted the interest of the international community, and Seoul plans to offer Smart Work to 30 per cent of its government employees by 2015. The first Smart Work Centers opened in August 2011, and by the end of that year, 2,792 employees had made use of Smart Work (available to all government employees on request). Moreover, a Metropolitan Government survey found that 79 per cent of its employees believed this service was valuable, and 91 per cent expressed interest in working from a Smart Work Center in the future.

2.4 Mobile Seoul (m.Seoul)

Mobile Seoul (m.Seoul) makes use of Mobile Web technology and mobile applications to provide Seoul's citizens with 62 unique services over 11 types of mobile device. A wide range of public information is available over the Mobile Web, but the inconvenience of navigating is averted by mobile apps concentrating on the provision of the most commonly-demanded information (see Box 3. A list of services is available at <http://itu.int/techwatch/>).

m.Seoul apps support location-based services pinpointing nearby public offices, restrooms, hospitals, supermarkets or bus stations. Other services include live real-estate listings, daily job-search updates, and notifications of free cultural events. Apps also enable citizens to suggest actions to improve the city, participate in yes/no votes, and freely exchange city information over social networks; and another service, "Staying Safe in Seoul", alerts citizens of emergency situations brought on by heavy rain, snow, typhoons or fires.

III Case Study

1. Case of New York City, U.S.

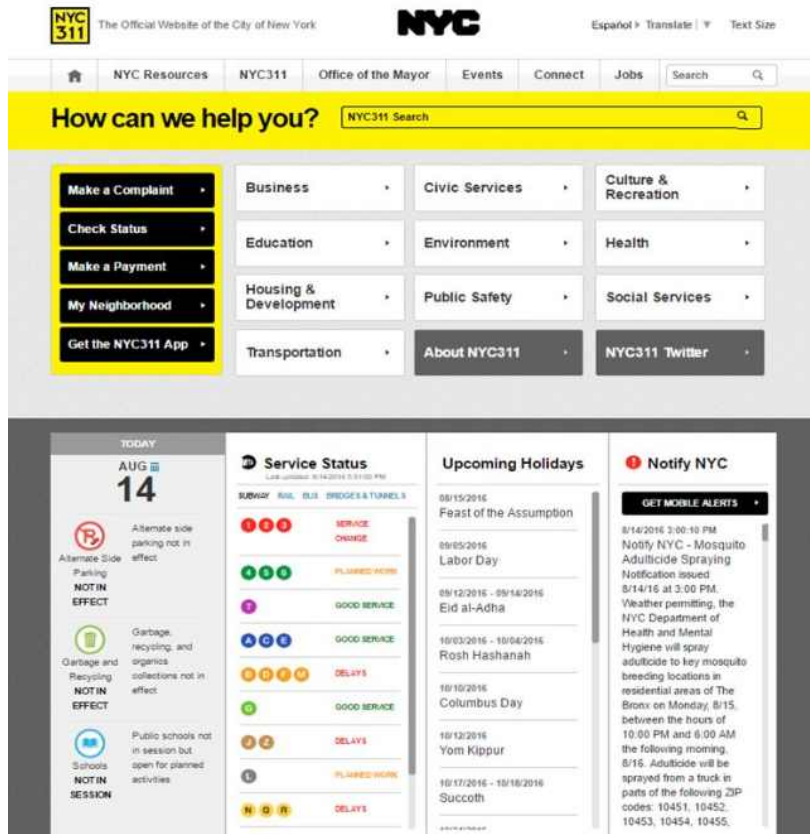
1.1 Overview

311 is committed to serving the public interest of all New York City residents, business owner and visitors by providing equitable service delivery to all its customers. 311 provides access to government resources while maintaining the highest possible level of quality service for all. Ongoing enhancement efforts have strengthened the focus on availability and customer experience through a diverse range of access points to ensure fair delivery and quality service. 311 continues to promote ease of access and transparency in making government services more available to non-English speakers, by providing service in more than 180 languages.

311 was formally established for the City of New York in March 2003. Prior to its inception, citizen requests and queries were processed by 40 agency help lines and the Mayor's Action Center. Both the transition and the operations of 311 thereafter were placed under the Department of Information, Technology and Telecommunications (DoITT) The integration of all 40 agencies into a single call centre under the 311 system had an uncommonly short implementation period of one year Accenture, a consultancy, was chosen as the system integrator and Siebel, a software company, provided the Customer Relationship Management (CRM) software. Mayor Bloomberg's firm support has driven both the inception and various innovations in 311. Today 311 in New York is in all ways the largest non-emergency city service system in the US.

311 runs on a knowledge database that houses over 7000 pieces of information on over 3600 services from various city agencies and non-profit organizations. 311 services are available in 180 languages. Calls are answered 24 hours a day, 365 days of the year. Calls can also be made via skype, an online communication provider recently acquired by Microsoft, which is an asset for customers who might be calling from remote locations without having to incur calling charges. In sum, 311 is "New York City's online website and phone number for government information and non-emergency services"

Figure 73. New York City Government 311NYC Website: Main Page



Source. <http://www1.nyc.gov/311/index.page>

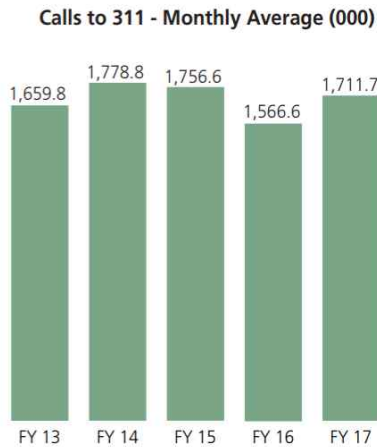
1.2 Services, and Goals

To provide public access to City government.

The goal is to increase public access to non-emergency government services. 311 received almost 37.8 million inquiries in Fiscal 2017. More than 0.5 million contacts were made via telephone and almost 17.3 million contacts were made through 311 Online. The 311 Mobile App was used to contact 311 more than 1.3 million times in Fiscal 2017. In addition, more than 144,000 contacts were made via text. 311 has also continued to increase its social media presence on Twitter and Facebook, with a combined following of more than 400,000 people. 311 exceeded its target of answering 80 percent of calls within 0 seconds in Fiscal 2017. The average wait time to speak to a representative after the initial recorded messages was 18 seconds, an increase of two seconds compared to Fiscal 2016. The results of the July 2017

customer satisfaction survey, which was conducted and published by CFI Group Inc., evaluated the experiences of 1,076 people who contacted 311. The total composite score of 4 represents a six percentage point improvement from the 2008 baseline measure.

Figure 74. Calls to 311 - Monthly Average



Source. 311 Customer Service Center

Figure 75. Calls to 311 - Monthly Average

Performance Indicators	Actual					Target		Trend	
	FY13	FY14	FY15	FY16	FY17	FY17	FY18	5-Year	Desired Direction
★ 311 calls (000)	19,917	21,346	21,079	18,799	20,540	*	*	Neutral	*
★ 311 Online site visits (000)	3,998	5,248	9,656	13,018	17,246	↑	↑	Up	Up
311 mobile app contacts (000)	NA	NA	705	1,010	1,365	*	*	NA	Up
311-NYC (text) contacts (000)	NA	234	175	156	144	*	*	NA	*
Calls handled in languages other than English (%)	2.1%	1.8%	2.5%	3.0%	2.7%	*	*	Up	*
★ Average wait time (tier 1 calls) (minutes:seconds)	0:38	0:23	0:23	0:16	0:18	0:30	0:30	Down	Down
★ Calls answered in 30 seconds (%)	81%	83%	84%	89%	85%	80%	80%	Neutral	Up
Call takers time occupied (%)	78%	79%	77%	74%	73%	*	*	Neutral	Up
Calls resolved at 311 without transfer to agency for resolution (%)	91%	93%	94%	93%	94%	*	*	Neutral	Up
Complaints about 311 per million calls	26.0	23.0	26.0	32.0	30.0	*	*	Up	Down

★ Critical Indicator *NA* Not Available ↑↓ Directional Target * None

Source. 311 Customer Service Center

1.3 Call Process

The Interactive Voice Response System (IVR) is the first line of reference that faces a caller. In its early stages the mayoral mandate clearly instructed that calls needed to be handled by an operator and not an IVR. This was the case for a little over the first three years of operation. Since then, DoITT has added an IVR feature that has changed the way in which calls are handled. The IVR is recognized to be a ‘thin-layer’

in order to maintain a simple response to a citizen’s service request. It was added and sustained for two main reasons. Firstly, it gives citizens the option to receive an immediate, upfront message should they prefer not to speak with a representative. Secondly, the IVR has proved to be a resourceful way of meeting a significant proportion of total calls⁹ and therefore controlling the human / budget resources needed.

When it first started, the IVR resolved approximately 20-25% of total calls concerning alternative street parking. Since then it has grown to address almost 50% of total calls. The IVR is managed in-house with the help of a programmer who maintains and enlarges the system as needed. The IVR is available in the six most frequently requested languages, which has further helped to resolve many calls at this level.

If the call is not resolved through the IVR, it passes on to the Call Center Representative (CCR). The CCR uses the Customer Service Management System (CSMS) and types in keywords that prompt the relevant information from the database. This process helps the CCR to identify the specific need as well as determine the next step.

Figure 76. NYC 311 Call Process

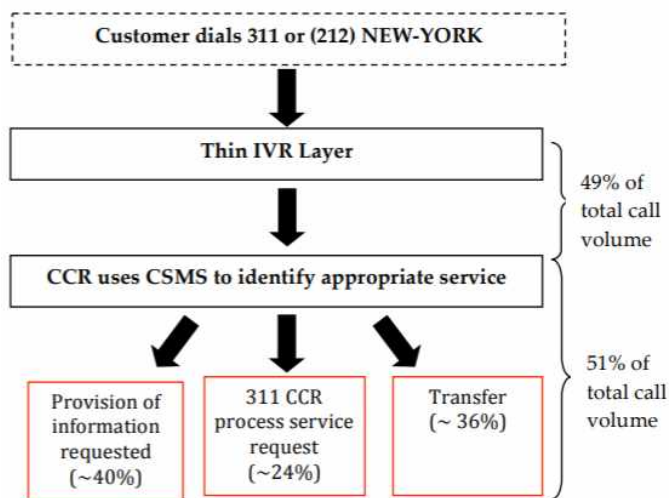
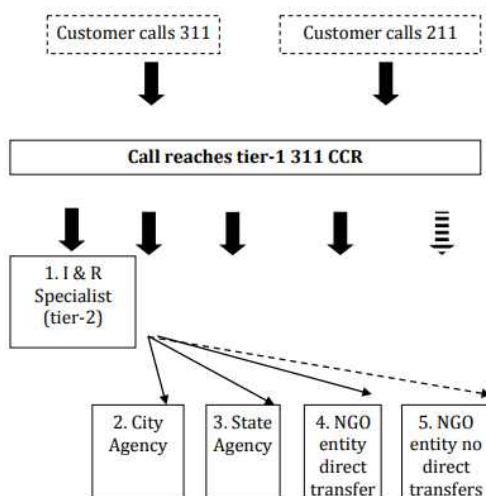


Figure 77. Enhanced e311 Call Process



Consequently, calls fall into three categories. The first is one in which the CCR is able to provide the customer with the exact information requested. Such calls are approximately 40% of the total call volume. The second category has a call volume of about 26% and involves transferring the call to an external agency. Some agencies, such as the department of finance maintained their own Call Centers in the early years of operation for reasons such as billing functions and the private nature of the information processed. Steps - such as integrating the Department of Finance into the 311 system in the summer of 2009 - have been taken to curtail the incidence of these types of calls. As call volume in the second category is now decreasing owing to these measures, the third category, in which the 311 CCR processes a service request, is rising from its current value of 24%.

1.4 Knowledge Management System/Database

The Oracle/Siebel (CSMS) knowledge management system houses information on over 3600 services and processes, which is an increase of 450% within a two year timeframe. 80-90% of the content is stable and it is the narrow remainder that is usually updated.

A content team of 20 people oversees the system. Five of these are responsible for managing the actual language and content while the other 15 liaise with city agencies. Those that face the agencies are responsible for updating the content on a daily basis on a variety of fronts. These include obtaining information that customers have requested but is not available in the knowledge management system. Conversely, the

agencies also directly provide updated information to the 15 designated points of contact. Both types of information are then put into a standard format in the knowledge management system. A quality assurance team frequently listens to the calls in order to monitor whether the information is relevant and intelligible to the audience. If a piece of information is too complex, the content is adjusted to become more understandable.

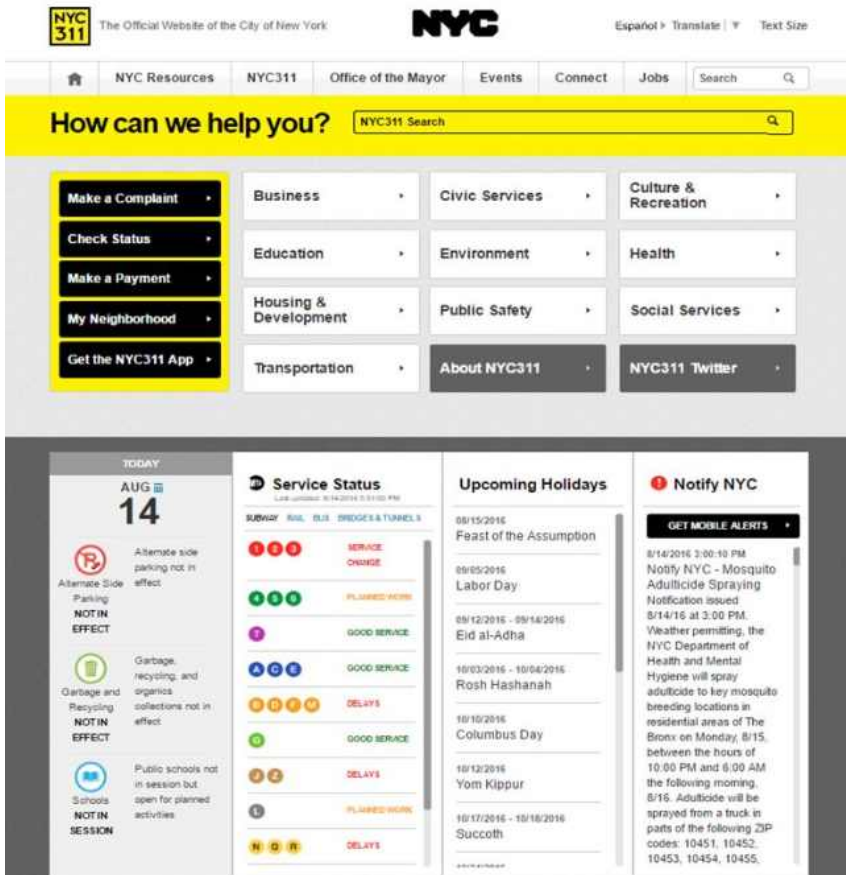
The knowledge management system was first built for the Call Center function of 311. Joe Morrisroe, Executive Director of DoITT, identifies this as a weakness in the initial implementation strategy, since it limited public access to these resources via just the call function. The migration of this information to a 311 website that customers could access anytime began in 2007. To this end, Morrisroe advises the build-up of a web-based knowledge management system that can be accessed via the Call Center and the website at early stages of implementation.

1.5 Web presence of 311

The 311 website was first launched in January of 2008 and offers a wide range of options from providing information to viewing the status of existing service requests. Almost 60% of the service requests are now processed online. Users also have the possibility to visualize service requests on a map. 311 online receives approximately 2000 unique visitors a week. It is a fairly new initiative, and is thus intended to grow as a source of information in time and with greater publicity.

The transfer of information on the 3600+ services to the website was handled by the 20-person content team that oversees the CSMS. This process involved converting the information into the US standard that is geared towards the average web reader and is simpler than the format provided to CCRs to answer calls. The conversion process was completed in March of 2009.

Figure 78. New York City Government 311NYC Website: Main Page



1.6 Additional Mobile Capabilities

Beginning in September of 2008, customers were able to send pictures to log a service request. Customers can send pictures on potholes or videos of vandalism and graffiti, for example, to report crime. Popularity for this function is projected to rise as the use of smart phones is becomes more prevalent. A recently developed iPhone application has also increased the visibility of 311 among smart phone users catering to the needs of the mobile citizen.<Figure 79. NYC 311 Smartphone Application: Main Page and Functions>

Figure 79. NYC 311 Smartphone Application: Main Page and Functions



1.7 Languages

Almost 95% of the calls received are in English. All other languages do not exceed 5% with Spanish being the second most frequently requested language. English and Spanish services are provided in-house. If a caller requests another language, the CCR connects with an external live operator: a translation vendor who speaks a minimum of 5 languages. If the translation vendor is not skilled in the requested language, he/she will transfer the call to a colleague within his/her company to provide the needed translation assistance. This is an uncommonly long call, with three people present: the customer, the CCR and the translation vendor. With 180 languages potentially requested, 311 only experiences between 80-100 different language requests annually which is 0.00001% of the total call volume.

1.8 Complex service requests

Apart from specialized language services, 311 has two tiers of trained CCR to respond to diverse and complex requests. This division exists because of technological constraints that were carried over from the early stages of implementation. Five agencies had 'legacy systems', which are deeply entrenched in the business functions of each agency, making them difficult to replace. Each of the 450+ staff in 311 are trained in at least 2 of the legacy systems, which occupy about 12% of the total call volume. A workaround solution concerning these legacy systems is still in process as it is exceedingly challenging to overcome.

1.9 Future Prospects

This multi-dimensional study of 311 shows it to be a dynamic and growing system. Despite the minor challenges mentioned in the preceding sections, there are still

some larger challenges that require significant attention. Some of these issues are being currently addressed while some require time for processes to be perfected and better managed.

A number of interviews and a survey of several performance reports in 311 reveal that the biggest challenges lie in the social service offerings. A 2008 report from the public advocate demonstrated an inconsistency in how 311 CCR responded to complex social problems for parents of children with special needs. Incidentally, education is a social service that council woman Gale Brewer identified as not adequately addressed by the e311 system. One reason is the lack of graduate-level trained social workers answering the calls. While the system might be able to prompt I & R specialists to redirect calls, it cannot reasonably address all possible combinations of compound social issues. Being trained in the 311 system is an inadequate means of combating these sorts of problems.

Councilwoman Brewer also identifies an ongoing disconnect between the community boards and DoITT even after Local Law 47 was established. She argues that the data that is presented to the community boards, albeit regular and in a standard format, is not very useful. Even if it was useful, it is provided in a PDF format that cannot be accessed but must be reconstructed. Thus while transparency might have increased on the whole, the real question is the lack of relevance of the data, pointing to the need for better coordination between 311 and the community boards. Such collaboration could also benefit the complex social service requests that 311 cannot single-handedly resolve. As council woman Brewer points out, issues of this nature often need trained individuals who not only have a relevant educational background but are also able to follow-up.

Looking at complaints on air quality and water maintenance in New York, Kim raises the question of how 311 affects a citizen's access to public services in the city. Her findings indicate that 311 alone does not aggravate social inequities preventing the access to public services. Nonetheless, she notes geographic discrepancies with wealthier neighborhoods having a higher incidence of using 311. To this end, she highlights the potential for growth in 311 in less affluent neighborhoods. Another recommendation is to conduct further research to see how 311 can be utilized to better facilitate public service delivery in low-income neighborhoods, enlarging the scope of 311 from a "reactive" tool to a "proactive" one.

IV Seoul Metropolitan’s 120 Dasan Call Center System

“120 Dasan Call Center” is the Korean name for the system of “Seoul Call Center System”. The single number 120 is a complaints handling system that handles inquiries and complaints related to life in Seoul quickly and accurately. Not only 24 hour telephone counseling, consultation using SMS, and SNS counseling, but also text chat and sign language video chat counseling for people with disabilities, and counseling in five languages for foreigners are available.

1. Policy Goal, Performance and Outcomes

1.1 Policy Goal

Before the development of e-Government, during the period of traditional government, citizens of Seoul had no choice other than to visit City Hall directly, or had to waste time holding the phone for the information they needed. To make matters worse, even though citizens could get in contact with the person in charge, the quality of response from City Hall was very unsatisfactory.

In order to resolve this repeated problem of government’s accountability, 120 Dasan Call Center was introduced. Through the single number “120,” Seoul citizens can now contact the SMG regardless of the kind of complaints, questions or suggestions.

Table 9. Policy Goal of 120 Dasan Call Center

Increasing Accessibility to SMG	
1	Through the “Single Number 120,” citizens can contact Departments and Officers in charge regardless of any questions
2	To provide governmental services more conveniently by Simplified Procedures
Enhancing Citizen Satisfaction toward SMG through Technology Adoption	
1	To expand the counseling service from Telephone Call to Text Message, Chatting, and Social Media
2	To develop 120 Dasan Call Center Counseling Information Database
3	To adopt Scientific Complaints Management by introducing Counseling Record

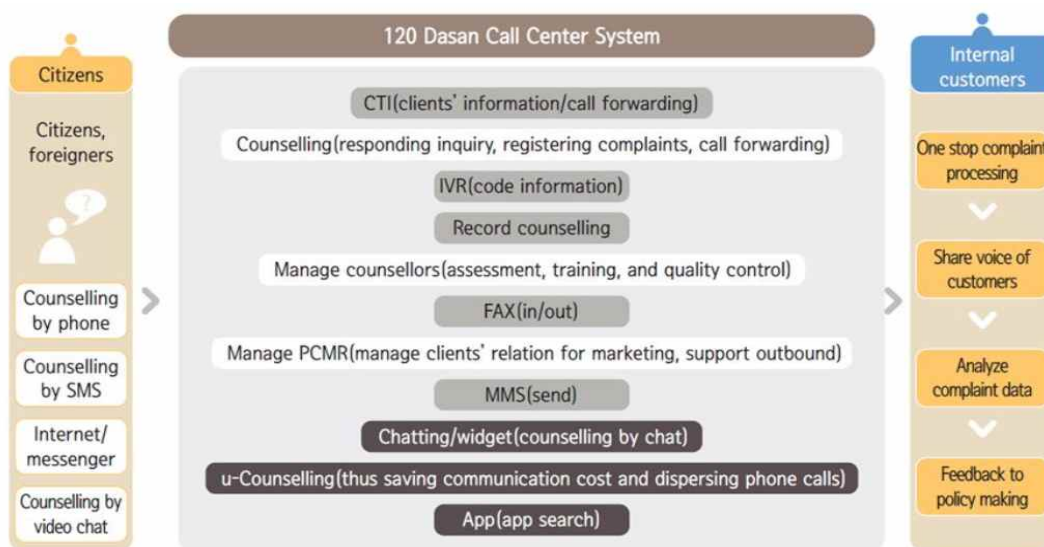
	Program
4	To expand Service Area by providing Smartphone Application

Table 10. Major Performance of 120 Dasan Call Center

Major Performance	
1	Service satisfaction 90.6 points, over 67 million consultation cases(as of June 2014)
2	Call center service management system acquired ISO9001 international certification (31th Dec. 2008, NOA Korea)
3	Dasan Call Center has facilitated a weekly program that introduces the knowhow of running the call center

Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government.

Figure 80. 120 Dasan Call Center: A Summary of System



Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government.

1.2 Performance and Outcome

The primary policy goal of 120 Dasan Call Center is to enhance Seoul Citizen satisfaction through reconstructing an essential contact line with the government. Through ISO 20000 standardized IT service management technology, the center now can now provide 24/7 services to the citizens. Seoul citizens can ask questions and

receive inquiries more quickly and accurately with just one call.

Table 11. Major Expectations

Improved ease of civic life
Citizens, through a single phone number, are able to solve issues regarding life in Seoul.
Reduction of complaints handling for the call center integrated network member organizations
Members who have to always respond to public inquiries and complaints by phone in addition to existing business, can see the effects of a reduction of complaints handling workload.
Increased convenience and conflict resolution for multi-cultural families, foreign tourists and foreign workers life
Lack of information, and inquiries about everyday life and institution caused by language barrier of the foreigners can be solved. The prevention of conflict between Koreans and foreigners may have a positive role in enhancing national competitiveness and image.
Achieve equality of access to information and counseling services via a variety of platforms such as voice call, video call, SMS/MMS, chatting, SNS, etc

Table 12. Performance and Outcome of 120 Dasan Call Center

High Public Use of the System (As of June 2016)	
Total Number of Counseling → 83 Million Cases	
Daily Average Numbers → 22,000 cases per Day	
Seoul Citizens' Satisfaction	
91.4% of the users have answered "Satisfied with 120 Dasan"	
Reducing Barriers for the Non-native Speaker and Hearing-impaired Person	
Providing Foreign Language Counseling Services → Daily Average: 87 Cases	
Offering Sign-Language Services for the Hearing-impaired through Video Chat → Total Number: 2.39 Million Cases; Daily Average: 65 Cases	
A Faster Services through Text Message Counseling System	
→ Total Number: 7.2 Million Cases	
→ Daily Average: 2,545 Cases	

Sharing Know-how to Manage 120 Dasan Call Center with Domestic and International Governments	
	On-the-spot information sharing Program
	50 Countries and 800 Municipalities and Organizations have visited the center

Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government

Figure 81. Major Expectation



Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government.

Figure 81 on the system summarizes 120 Dasan Call Center’s entire management system. Most importantly, the SMG is expanding channels to receive citizens’ public service needs from phone calls to Text Messages, Video Chat and Internet Messenger. After the establishments of 120 Dasan Call Center, citizen satisfaction for the SMG has improved considerably (an approximately 91.4% of service satisfaction rate). Moreover, by consolidating all the services into a single center which is in charge of serving citizens’ public service needs, the productivity of other departments has increased due to the fact that they do not have to spend so much time dealing with civil complaints.

Table 13. Outcome of 120 Dasan Call Center Operation as of June 2014

High public usage and satisfaction	
	Cumulative total number of counseling : 61 million cases (Daily average : 25,000 cases)
	Service Satisfaction: 96.0% (Ratio of solved inquiries by first contact : 84.2%)

Creation of a sign language service to eliminate discrimination against the hearing impaired.	
	Total accumulated sign language counseling : 139,000 cases (Daily average : 126 cases)
Creation of SMS counseling service that enables simple inquiry and swift handling	
	Total accumulated SMS counseling : 5.3 million cases (Daily average : 2,100 cases)
Creation of foreign language counseling services that provide administrative services to foreigners	
	Daily average foreign language counseling : 168 cases
120 Dasan Call Center operational expertise / know how transferred to various national and international organizations.	
	120 Dasan Call Center runs a weekly '120 onsite program' for the transfer of 120 Dasan Call Center's operational expertise. So far,
	120 Dasan Call Center has been visited by the central and provincial governments from a total of 50 countries and 800 organizations, including the United States, China, France, Sweden, Russia, Singapore
Domestic and International Certifications and Awards	
	Call Center IT Service Management System ISO20000 Certification (Sep. 2008, BSI Korea)
	ISO9001 Call Center Service Management System International Certification (Dec. 2008, NQA Korea)
	Received Grand Prize for < Customer Satisfaction Management 2009 >, 2 consecutive years in the < Public Administrative Sector > (Jan. 2009, Korea Consumer Forum, Korea Sustainability Assessment)
	KSQI Korea's Outstanding Call Center Certification (Mar. 2009 Korea Management Association Consulting)
	Received the prize for < Korea Human Rights for the Disabled 2010 > (Dec. 2010, Korea Disabled Organization Federation)

Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government

2. Policy Details

Table 14. Main Functions

Voice Call Counseling

Seoul Citizens can ask questions and inquiries by calling the single number 120 anytime and anywhere.
Text Message Counseling
In case citizens do not want to call directly, it is possible to ask questions and inquiries through a Text Message (SMS or MMS message, within 1,000 letters). Images can be received by the system to provide for more convenient counseling and complaints.
Video Chat Counseling
In the case of hearing and speech impaired citizens, 120 Dasan Call Center provides video chat counseling through the website. This service can also be provided through the 120 Smartphone Application.
Foreign Language Counseling
For foreigners, tourists and visitors, the SMG's counseling services can offer various interpretation services through the number 120 and extension 9. Currently, English, Chinese, Japanese, Vietnamese and Mongolian counseling is available, and the SMG is planning to include additional languages in the near future.
Social Media Counseling
The Seoul Government and the District Offices are constantly on standby to respond to citizens' requests via Social Media such as Twitter. In most cases, the inquiries are processed within 24 hours and are responded to through Twitter as well.

Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government

3. Composition and Details

120 Dasan provides an easy and quick means of contacting the SMG, and it is intrinsically a Call-Center based policy. However, in addition to the multilingual voice call counseling, citizens still can get counseling services through the 120 Dasan Smartphone Application. Moreover, through the 120 App, users can easily get access to other e-Communication services such as Eung-Dap-So, mVoting and Seoul Smart Inconvenience Reporting. Therefore, the 120 Dasan is the most essential connection link between the SMG and Seoul citizens.

Because phone call counseling alone is not sufficient to meet the diverse needs of the citizens, the SMG is providing the same service through another channel. Figure 82. represents the 120 Dasan Application and the main functions. Through this App, Seoul citizens can use Video Counseling more efficiently. App users can get in contact

with Dasan Call Center quickly and conveniently by using Voice Call Counseling and Text Message Counseling.

Figure 82. 120 Dasan Mobile App Compositions



Source: Seoul Metropolitan Government. (2014). Digital Seoul e-Government

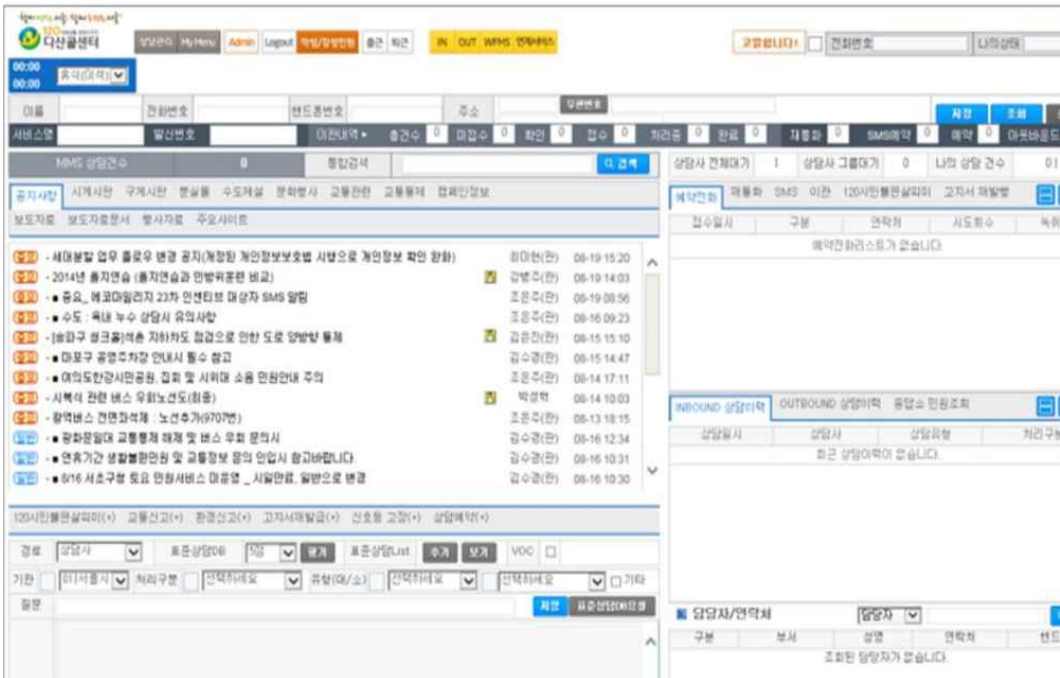
3.1 120 Dasan App: Details

Chat and Video Counseling provide sign language services for the hearing-impaired. As described earlier, foreigners can also ask and make inquiries about living in Seoul or about other public services for the non-nationals. Through this ongoing effort to provide counseling services even for non-natives, the SMG is actively trying to resolve the problem of information gap, generation gap and the issues involving diversity in Seoul.

Figure 83. represents a Counseling Record Program of 120 Dasan Call Center. In order to manage the deluge of requests, inquires, and public service needs from the citizens, 120 Dasan Call Center manages calls by specific programs or policies.

Through the program, counseling and complaints information is recorded in real-time, and the data is stored and processed statistically without any omission. By utilizing technology actively, counselors of 120 Dasan Call Center can deal with citizens' public service needs more efficiently and effectively.

Figure 83. 120 Dasan Call Center: A Counseling Record Program



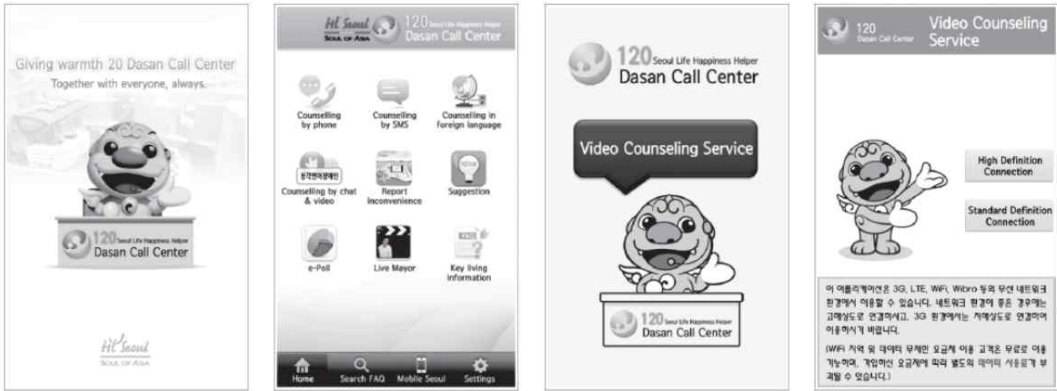
Source. Seoul Metropolitan Government. (2014). Seoul Metropolitan Government' E-Government Policy Tool-Kit Development Report.

3.2 Compositions of 120 Dasan Call Center

The database is constructed of a total of 13,000 Seoul City region massive civil affairs cases. When complaints and inquiries come up, even if it's not a dedicated worker, a professional counselor can accommodate through the use of the standard counseling database. Without commission, counseling and complaints information is received, stored and processed statistically by the program, and the complaints processing information and status process is handled in real-time.

Through the app as in Figure 84, not only voice calls, SMS, foreign languages, and video counseling are available, but also users can register complaints and read various policies.

Figure 84. Smartphone App of 120 Dasan Call Center



Source. Seoul solution

Through the website as in Figure 85, key life information can be searched, and sign language counseling reservations, chatting counseling for the hearing impaired can also be submitted.

Figure 85. Website of 120 Dasan Call Center



Source. Seoul solution

V Budget

1. Feasibility Study Strategy

1.1 Preparation and Data Collection

1.1.1 Pre-Research with experts

- Task distribution, and defining the project scope
- Business role sharing, business scope consultation

1.1.2 Literature survey

- ICT status
- Government Resources
- Analysis of data from embassy

1.1.3 Developing and distributing completed checklists

- Arrangement of meetings with local agents and confirmation on the schedule

1.2 Survey and environmental analysis

1.2.1 Case Study

- Analysis of implemented projects in Korea (ICT master plan)

1.2.2 Business Environment

- Status of National Network, and Regional Network
- National Development Plan and ICT Policy Plan

1.2.3 ICT Development Status

- Background, purpose and method of Eung-Dap-So project
- Study on the organization and performance

1.2.4 Feasibility Study Strategy

- Defining problems, needs and ideas through interviews

1.3 Business Model (FS Analysis)

1.3.1 Establishment of business model

- Establishing business model and reviewing the scale and scope of business

1.3.2 Analysis of the technical, economical, socio-cultural and environmental feasibility of the project

- Analyzing the necessity of project execution ability and dispatch of experts

1.4 Action Plan

1.4.1 Specifying the scope and direction of implementation

1.4.2 Establishment of strategy, components, plans, budgets and schedule

1.5 Monitoring and Follow-up Plan

- Establishing monitoring plan, indicators and measurement methods
- Establishing a follow-up management plan

VI Funding Opportunities

Table 15. Grant Opportunities by Korean Government through Various Funding Agencies

Name of Funding Agency	Category of Funding Program	Recipients	Requirement	Grants Amount
National IT Industry Promotion (NIPA)	F/S (Feasibility Study)	Government	Letter OF Intent (LOI) Submission	Up to KRW 990 Mil (Equivalent of USD 79,454)
Korea Information Society Agency (NIA)	F/S (Feasibility Study)	Government	Demand Survey Submission	Up to KRW 100 Mil (Equivalent of USD 88,282)
Korea International Cooperation Agency (KOICA)	F/S (Feasibility Study)	Government	Demand Survey Submission	KRW Millions (Not specified)
	Development	Government	Demand Survey Submission	Up to KRW 10 Bil (Equivalent of USD 8,828,250)
Ministry of SMEs and Startups (SMTECH)	Development	Large Enterprises & Public Sector	Letter OF Intent (LOI) Submission	Up to KRW 400 Mil (Equivalent of USD 353,130)

1. NIA (National Information Society Agency)

NIA is a statutory agency founded by Article 10 of the Framework Act on Informatization Promotion for the purpose of promoting informatization and to support development of related policies for national agencies and local autonomies.

As the core agency of national informatization entrusted by government and the people with providing policies and technical expertise NIA is leading the way in the construction of u-Korea towards a first-class nation in information and communication. Major business is as below:

- Providing expertise in developing and implementing the National Framework Plan on informatization Promotion
- Managing & operating information networks of public organizations
- Supporting Information communication standardization and developing
- maintaining information systems for inter-agency information sharing
- Supporting information resource management in the public sector

- Supporting supervision, standardization and evaluation of public informatization business
- Providing IT consulting services to developing nations

1.1 Global Cooperation

- Strengthening Global ICT cooperation
 - Cooperate with international organizations to carry out ICT consulting projects
 - Expand global online communication channels through Global ICT Leadership
- Foster supportive environment for global market expansion
 - Foster collaboration between ICT SMEs, start-ups and developing countries
 - Support global start-ups through the World Friends IT Volunteer programs
- Expansion of global ICT and e-Government education
 - Cooperate with international organizations such as UN APCICT to develop and operate joint training programs
 - Create a hub for sharing knowledge in the domestic and overseas ICT-e-Government education area

1.2 Feasibility Studies Program

- PURPOSE
 - Foster supportive environment for global market expansion:
 - Foster collaboration between ICT SMEs, start-ups and developing countries
- ELIGIBILITY REQUIREMENTS
 - Applications may be submitted by domestic SW small and medium-sized enterprises (SMEs)
- RESEARCH AREA

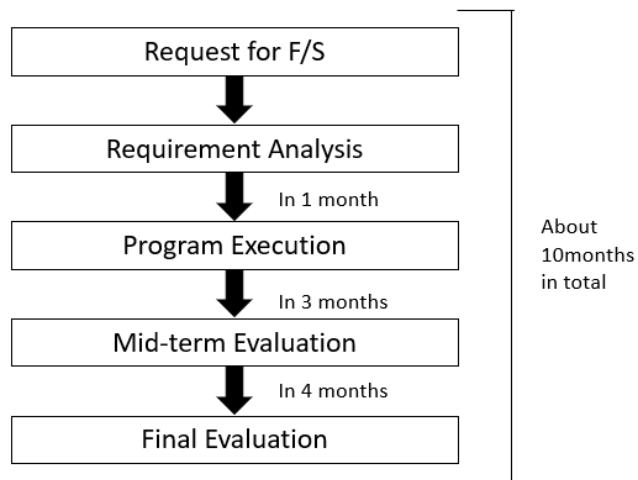
Regular Industries + ICT convergence

SMART SoC

New technology-based Solutions

Beneficiary countries in the needs of ICT Cooperation

Figure 86. Project Operation Framework and Application for F/S Project (NIA Fund)



2. NIPA (National IT Industry Promotion Agency)

NIPA devotes itself to reinforcing the competitiveness of the ICT industry and contributes to the economic growth through the efficient support and laying the groundwork for the industrial technology promotion. Major business is as below:

- Policy research and development support for the ICT industry
- Help establish the foundation of the ICT industry and cultivate its human resources
- Vitalize the distribution market for the development of the ICT industry and support marketing
- Promote businesses related to the convergence and utilization of ICT technology

- Support international exchange, cooperation, and overseas expansion related to the ICT industry

2.1 Global Activities

2.1.1 Promoting International ICT cooperation

- (G2G) Support international cooperation between governments
- (B2B) Support overseas businesses in business-to-business

2.1.2 Supporting born-global and startups

- (Out-Bound) Foster born-global startups to become global players
- (In-Bound) Create a global startup with multi-cultural ICT talents

2.2 Feasibility Studies Program

- **PURPOSE**

Create a global startup with multi-cultural ICT talents
ELIGIBILITY REQUIREMENTS

Applications may be submitted by domestic SW SME and Large Enterprise

- **RESEARCH AREA**

Public administration

education / finance / medical IT convergence

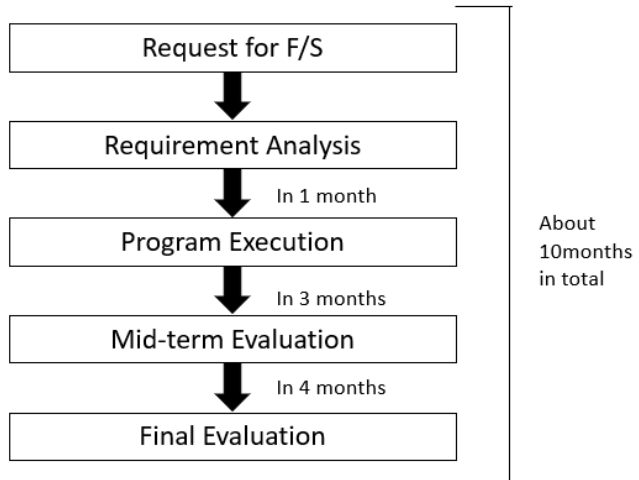
intelligent transportation, and smart city Smart SOC

SW

ICT-related fields

Figure 87. Project Operation Framework and Application for F/S Project (NIPA)

Fund)



VII Conclusion - Lessons from the 120 Dasan Call Center System Introduction

This 120 Dasan Call Center System Introduction attempts to examine the Seoul Metropolitan Government's consistent efforts in achieving what was once only possible on the design board. The introduction has shown that service innovations as the result of smart cities can evidently be put to various uses.

The concept of the smart city as the next stage in the process of urbanization is high on the political agenda throughout the world. Smart Cities are underpinned by an ICT infrastructure and its integration with the services that a city delivers. Weather information could be combined with traffic sensors to anticipate congestion and keep traffic moving. Leaks in water networks would be detected automatically; pumping stations would adapt flexibly to patterns of use detected by smart meters, reducing energy consumption and costs to the consumer. This will call for new ICT standards, infrastructure and solutions to ensure that his vision becomes a reality.

While the scope and style of smart city initiatives vary widely, they all aim to be smarter and greener in order to improve citizens' quality of life and economic opportunities. Smart green initiatives are generally delivered by a range of different ICT-based services (over a technological infrastructure) that connect to either a web device or smart phone apps. Further, these growing developments are also facilitated by open data platforms that allow the deployment of public service apps (e.g. in Barcelona, New York and Amsterdam, Helsinki and San Francisco). Different public and private bodies deliver services to citizens through smart city apps in the context of an information eco-system; this increases the social value of the city's public infrastructure and services and private-sector ventures.

A recent GSMA report suggests that transportation (ticketing applications, intelligent transportation and traffic information systems) accounts for most smart city projects. The next sectors are environment/energy (smart metering, electric vehicles and charging infrastructure and renewable projects) and municipal infrastructure services, including water and waste management.

Lastly, some cities have set out service or application areas specifically to attract entrepreneurs and to stimulate the development of new economic clusters. For instance, the city of Busan in South Korea has established an app development center

jointly partnered with CISCO and KT with the aim of creating new smart city services on a cloud-based smart city app development platform. Within the first year, this initiative has established start-ups, developing 70 apps with a sales revenue of \$42,000. The city's goal is to employ 3500 app developers to drive economic growth and scale up to create business domains; they also hope to expand their business model into other cities.

A review of various smart city definitions and practices around the globe makes clear that most smart cities make extensive use of mobile network infrastructure and services.

More than 100 cities have deployed smart city services, whether web service or apps based. Cities are also looking to deploy new smart services that intelligently connect not just to a wireless network but to a wider range of devices, machines and urban infrastructure. For instance, the smart city in Barcelona has configured outdoor street lighting points, with eco-digital LED technology and multi-purpose sensors, to be used as a network by multiple vendors. Amsterdam's climate street app, meanwhile, has developed infrastructure in conjunction with the community to transform a district into a sustainable shopping area with a much reduced carbon footprint.

As these examples suggest, the availability of service oriented business models, in which urban infrastructures can be integrated with intelligent devices and connected to a mobile wireless network, has become an important component in both the social and technological underpinning of a smart city.

The different smart cities around the globe rely on widely different coordination and control mechanisms to govern their smart developments. A handful of cities take a holistic approach in formulating a long-term master plan (e.g. Seoul, Busan, Amsterdam and Barcelona), putting in place, for instance, test-bed smart city projects prior to the launch of actual commercial services.

These pilot schemes may have city-wide coverage or be limited to certain specific zones (e.g. living-labs). Some city administrations coordinate smart city initiatives through a highly centralized office. The advantage of this arrangement is that it enables access to public funding for ICT related projects. In other administrations, individual departments (such transportation or environmental agencies) may enjoy a high level of autonomy in setting up and running their own smart services.

These different governance structures tend to tap funding for developing and

promoting smart services in different ways. Smart city governance structures have been categorized into a typology, featuring four different classes in two dimensions: asset governance and availability of funding.

