Secretary General: Dr. Gunso Kim

Dr. Gunso Kim serves as both the Secretary General of WeGO and the Chief Information Officer (CIO) of the Seoul Metropolitan Government (SMG). Dr. Kim has played an instrumental role in heading the management of ICT for SMG's public administration and strongly aims to enhance e-Governance beyond the boundaries of Seoul through his role as WeGO's Secretary General. Before his appointment as the CIO of Seoul, Dr. Kim was the Chief Executive Officer at Daumsoft, Inc., a leading data mining company that was spun off from Daum Communications, one of Korea's largest web portals -- from 2001 to 2013. Previously, he worked for Daum Communications as a Senior Researcher from 1997 to 2001.

Greetings from the Secretary General

Since its establishment in September 2010 through the leadership of WeGO President in Seoul, the World e-Governments Organization of Cities and Local Governments (WeGO) has been committed to pursuing sustainable urban development based on e-Government with the support of its global network of member cities and international partners, such as the World Bank and the UN. WeGO Regional Offices in Chengdu, China and Ulyanovsk Region, Russia have also been instrumental in fostering discussions and trainings among stakeholders and practitioners in the field of e-Government, successfully promoting WeGO's mission to utilize IT development for openness and efficiency in public administration. The WeGO Secretariat is hosted in Seoul, which has been consistently ranked by surveys as a global leader in e-Government.

The WeGO Secretariat oversees a host of activities and events to promote sharing of ICT skills and knowledge in e-Government. In addition to the WeGO General Assembly and WeGO Awards, WeGO conducts e-Government consulting services and training programs to draw realistic e-Government strategies for member cities and provide opportunities for stakeholders to gain exposure to a diverse array of e-Government facilities and policies. WeGO develops and provides specialized toolkits and standardized software frameworks, such as the WeGO eGovFrame, to help members assess their eGovernment systems and strengthen the foundation of their e-Government development.

In particular, WeGO is pleased to offer exclusively to WeGO members the City e-Government Diagnostic and Solutions Framework (CeDS) Online Data Platform through our website. Please visit the CeDS tab to access the CeDS toolkit and evaluate your city's e-Government maturity level and enjoy many more services and features.

The world is undergoing unprecedented urban expansion at this time. This means that the delivery of quality public services by local governments will become both more difficult and necessary at the same time. E-Government has extensive potential in helping to meet these urban challenges and WeGO is

poised to play a significant part in harnessing and promoting this potential. We hope for your active interest and support of WeGO in pursuing this mission! I invite you to look through WeGO's website to find out more about our organization, and to join WeGO's global network for improving the quality of life of citizens worldwide with IT-led public administration.

Yours truly,

김경서

Gunso Kim

Secretary General of WeGO

Executive Summary (/page_qdLt71)

Overview

Why is City e-government important?

Urbanization of the developing world will be among the 21st century's defining demographic shifts.

Some 90 percent of global urban growth now takes place in developing countries, and between the years 2000 and 2030, the numbers of urban inhabitants in developing countries are projected to triple. The share of the urban poor (about a third of the existing urban population) is also expected to rise continuously in the years ahead, making urban poverty one of the most serious challenges facing governments around the world.[1] At the same time, local governments are expected to provide the majority of daily public services normally required for citizens. In this context, delivering high quality public services becomes both more critical and more difficult.

E-Government offers great potential to help city leaders and administrators meet these growing challenges.

Yet, development and government specialists have not been able to provide cities with adequate tools to optimally implement e-Government systems. Instead, the majority of existing toolkits focus on national e-Government agendas.

The deficiency of city-focused e-Government systems is particularly glaring

in light of new technologies which have the potential to lower costs and increase accessibility to information and government services. The explosive growth of mobile phone subscriptions opens up new opportunities for less developed countries to provide government services to larger numbers of citizens, or to previously under-served populations.

City-specific e-Government initiatives are needed to make the best use of these technological advancements, and to address the particular challenges faced by cities.

In accordance to the World Bank's Urban Strategy priorities, a city e-Government initiative need to focus on: (i) building effective city management, along with adopting the necessary governance and financial strategies; (ii) addressing the issues of urban poverty; (iii) providing strong foundations for local economic growth; (iv) effectively tackling city planning, housing and land management; and (v) proactively managing rising urban environment, climate change and disaster management concerns.

City e-Government implementation will differ from national e-Government implementation because of unique dynamics of city government.

City governments are smaller, interact differently (often, more closely) with citizens, and have their own internal political culture. For example, the types of services that cities offer (e.g. water and sanitation, police) often put city agencies in direct contact with its citizens.

Furthermore, cities often face greater resource constraints than national governments

such as lower human resource capacity and lower budgets. Cities also have limited ability to install basic ICT infrastructure-which is often the national government's domain. Finally, because local issues affect them more directly, and the smaller scale of local government amplifies individual citizens' voices, citizens are often more engaged with local and city politics and decision making than they are with national politics. As a result, local governments must manage and encourage citizen participation on an entirely different level than national governments.

Lastly, the dynamics of local government call for a highly "citizen-centric" understanding of government.

This view treats the value to the citizen or business, and in its interaction with the government. Accordingly, the UN has also emphasized citizen-centrism as a fundamental feature of its e-Government initiatives.[2] In short, a successful e-Government initiative would result where a citizen's interaction with the government, or ability to navigate a bureaucratic process, is made faster or otherwise improved by ICT.

Why was the project proposed?

To date, the literature on e-Government has focused on national implementation.

Furthermore, relatively few have focused on deployment in developing countries. In addition, existing toolkits describe the process of e-Government implementation according to customized "maturity models". Maturity models are methods for conceptualizing the development of various processes, and for identifying practices that are required to facilitate further development. Frequently, maturity models conceptualize development as an evolutionary process, from basic, simple systems to more advanced, complex ones.

Most existing toolkits base e-Government maturity on non-citizen-centric factors.

For example, one toolkit bases its concept of maturity on technological sophistication. According to this model, the more advanced the ICT installed and the more sophisticated its possible applications, the more developed the e-Government. Such a model implies that government administrators will be successful in their e-Government implementation merely where they install the latest hardware or systems integration techniques. Maturity and success does not necessarily correspond to how useful or beneficial systems are in addressing citizens' needs, and what is practical given a government's resource capacity[3]

Existing studies and toolkits exhibit a number of other shortcomings as well.

Many require the assistance of outside experts to assess country-level e-Government, which can undermine a government's sense of ownership of an initiative. The experts must know how to use the often expensive or proprietary software required by the toolkits. Also, because existing toolkits are designed to provide broad, generalized guidelines and similar recommendations to all countries,

government officials cannot exact specific customized solutions or prioritize system development. Experts are required to translate their general parameters into detailed recommendations, and to translate their results into discrete actionable steps governments can take. For these reasons, relatively few existing toolkits enable cheap and easy self-assessment.

How was the project structured?

The project was proposed to address the rising demand of city e-government systems tailored to specific and diverse needs of developing country cities,

while overcoming shortcomings of existing toolkits. The project includes three components: (i) toolkit development - City e-government Diagnostic and Solution framework ("CeDS"), (ii) case studies for pilot cities, and (iii) establishment of a dedicated city e-government knowledge hub.

1. Toolkit Development - City e-government Diagnostic and Solution framework (CeDS)

The goal is to enable city government officials

with limited ICT-related knowledge or experience to be able to evaluate the maturity status of their own city e-Government environment, and to help conceptualize Master Plans for city e-Government without consulting external experts. Hence, the toolkit is intended to:

i) Serve as a rapid diagnostic tool for a city government to assess existing gaps and examine whether the city is providing efficient e-services[4] A straightforward diagnostic tool will help city policy makers identify the overall status and direction of their cities' e-Government development, applying a uniquely developed maturity model for the environmental conditions affecting cities to assess key gaps and identify action items.

ii) Help develop recommendations based on international best practices. The toolkit will also help city e-Government policymakers access the experience and expertise of global technology leaders. The toolkit envisions e-Government as a resource to serve citizens' immediate needs for more effective, efficient, and transparent services, and to help developing cities grow economically and become competitive by considering the lessons learned and best practices.

2. Case studies for Pilot Cities

The toolkit was refined and enhanced through experience gained from pilot case studies in Ulaanbaatar, Dar es Salaam, and Buenos Aires.

Experts from the Seoul Metropolitan Government Feasibility Study Consulting Team (SMG FSCT), in collaboration with the World Bank and WeGO, first conducted the CeDS testing and assessed the cities' current e-Government maturity levels. Assessment in three cities with different maturity levels gave the team a working data set, from which the team could measure the relative importance of various e-Government dimensions. For example, the team used their analysis to assign a certain weight to a city's resource capacity, especially financial capacity, in determining a city's e-Government capability.

After assessing the cities' maturity levels, the team benchmarked their existing systems against similar applications and practices utilized in Seoul.

Comparing and contrasting the cities in this way formed the team's basis for making recommendations for software and hardware implementation. It also served as a starting point for identifying recommended pathways for further e-Government development. Each city then received a final report

from the experts, detailing existing conditions, future needs, and guidance on module implementation.

3. Establishment of a dedicated city e-government knowledge hub

The project was jointly implemented with WeGO (World e-Government Organization of Cities and Local Governments) and Seoul Metropolitan Government (SMG).

WeGO is a leading cooperative body for cities and local governments, created to share and transfer knowledge of sustainable city development through e-government. In addition, SMG is benchmarked as the best e-government practice city. With a relatively short e-government development history-taking place over the past twenty years-has significant implications to developing cities today. Their experience and contributions were invaluable. These two partnerships were instrumental in providing expertise as well as a platform for sharing knowledge and conducting case studies in member cities to enhance the utility and practicality of the toolkit.

The most critical contribution of the project was establishment of a dedicated city e-government knowledge hub,

which will continue to update and disseminate the toolkit as a "living document" and provide advisory support in partnership with the World Bank. For example, toolkit will be uploaded on the WeGo web page and distributed to member cities which will use it for diagnosing and establishing their own a master plan. Also use the toolkit as a training material for invited member city officials to dissemination events and provide TAs on member cities based on the result of toolkit through the knowledge hub. In addition, more modules will be created as the toolkit becomes widely used and likely be showcased and discussed in the WeGo General Assembly.

Project Partners - Roles and Responsibilities

The project is a partnership activity

among the World Bank (the Urban Anchor Unit (UDRUR) and the ICT Sector Unit (TWICT)), World e-Governments Organization of Cities and Local Government (WeGO), Seoul City, and recipient WeGO member cities in developing countries. The project is also aligned with the World Bank's mission to serve as a facilitator of the south-south partnership.

a. World Bank (Urban Anchor Unit, ICT Sector Unit in collaboration with the Bank's Country Offices) served as the project leader, coordinated joint activities among project participants and led the development of the city e-Government toolkit, as well as coordination of case studies, and knowledge sharing and dissemination activities.

b. Seoul City (WeGO Secretariat) served as a co-project leader, coordinated with WeGO member cities, led the case studies for the three pilot cities and knowledge sharing and dissemination tasks.

c. WeGO served as a knowledge sharing, capacity building hub, to further the dissemination of the toolkit and its related advisory services. As more cities utilize this standardize framework, they can collaborate and share their experiences more effectively. Eventually, this shared knowledge will be adapted into an informational guide for the World Bank and its development partners. Cooperation and knowledge sharing will increase a local government's capacity, as it gains experience and technical skills through implementing e-Government.

d. Pilot Case Study Cities[5] participated not only in the testing of the toolkit, but also were active

members of the case study team as project beneficiaries and partners. As integral member cities of WeGO, these cities collaborated with the Seoul Metropolitan Government Feasibility Study Consulting Team in the championing the e-Government initiative, preparing the kick-off meetings, arranging interviews, conducting training and providing support for various activities that led to the successful completion of the pilot projects.

International experience suggests that e-Government systems are best established by adopting an integrated and cross-cutting approach, and by prioritizing in ICT platforms suitable for government (a) needs and (b) capacity. Furthermore, studies on e-Government conducted by the OECD, the UN and the World Bank have shown that the prerequisites for e-Government based development include: providing efficient e-Government solutions, implementing best practices, monitoring the impact of e-Government projects after implementation, and adopting an "ecosystem" approach towards e-Government. It is precisely in these areas, and in its focus on cities, that this toolkit distinguishes itself from past approaches.

Key characteristics of the toolkit

The toolkit has the following key characteristics.

a. Analysis of whole value chains, including production, delivery, and consumption of e-Government services.

At each step, the roles and relationship among key players, resources, technology, systems, and the external environment are examined, and best practices relevant to local conditions and constraints are provided.

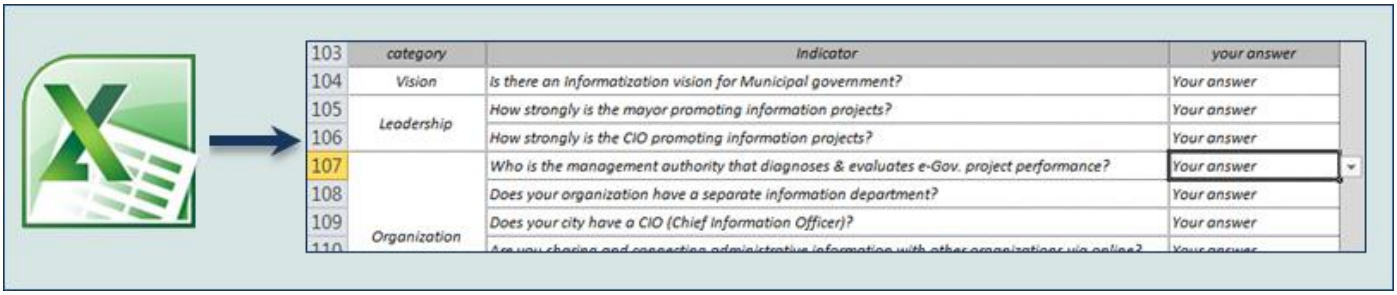
b. A strategic and holistic approach to building a sustainable ecosystem for e-Government.

Many e-Government projects have proved unsustainable, and have failed as a result. In order to reduce the risk of failure, the toolkit goes beyond technology, and considers strategic factors including legal and political issues, human capacity, skills development, and financial sustainability. To enhance ownership and sustainability, the toolkit pays attention to user feedback and participation, creating a stronger sense of commitment to the project.

c. Emphasis on self-assessment, self-identification of solutions, and self-development of e-Government master plans.

To achieve these goals, the toolkit focuses not only on providing best practices and sustainable solutions, but also on ways that city administrators themselves can create their own solutions. As a result, the toolkit describes and addresses various methodologies, comparing expected outcomes with present realities, evaluating the qualitative aspects of e-Government through surveys, training and empowering public officers, and reorganizing departments in running e-Government initiatives and programs. The toolkit can be run directly on widely available and understood software, Microsoft Excel.

[MS excel based Toolkit]



103	category	Indicator	your answer
104	Vision	Is there an informatization vision for Municipal government?	Your answer
105	Leadership	How strongly is the mayor promoting information projects?	Your answer
106		How strongly is the CIO promoting information projects?	Your answer
107	Organization	Who is the management authority that diagnoses & evaluates e-Gov. project performance?	Your answer
108		Does your organization have a separate information department?	Your answer
109		Does your city have a CIO (Chief Information Officer)?	Your answer
110		Are you sharing and connecting administrative information with other organizations via online?	Your answer

d. Defined Scope of City Government.

It is necessary to define what is considered a city. Of course, any attempt at definition is problematic, and bound to result in various exceptions and caveats. Nevertheless, for the purposes of this toolkit, it was determined that the most appropriate definition of a city is a relatively large human settlement with a government controlling the provision of various direct services that tangibly affect the daily lives of its residents. Examples of such services vary by circumstance, but might include garbage collection, police, street cleaning, water and sanitation. However, if there should be any difficulty in determining the physical scope of the city and if leaving out the rural area from the survey was a concern, the city government scope would also cover the municipality head. Municipalities boundaries are normally defined by law and this definition shall be adequate for this toolkit.

Moreover, the term city used in this toolkit is differentiated from nation states, territories, provinces, or state governments in the extent of regular and direct contact.[6] In defining a city nd determining the content of the self-survey and modules, it helped that the developers could look to the characteristics of WeGO member cities. Thus, to create a toolkit that could be applied in a variety of contexts, each of the WeGO member cities were studied, and selected indicators shared by most of them. Moreover, the most general, common, and critical modules utilized by these member cities were chosen for the toolkit.

e. Pilot Testing with WeGO.

To further develop and refine this toolkit, especially with the aim of maximizing its practicality and helpfulness, the toolkit was pilot tested in several WeGO cities with technical support from the Seoul City Government. Pilot testing in led to significant refinements, including the utilization of Microsoft Excel to run the toolkit (as opposed to paper surveys) as well as defining specific indicators for the maturity assessment. Pilot testing also highlighted the importance of knowledge sharing with other WeGO cities, as a basis for toolkit improvement. The Seoul city government was also instrumental in providing technical know-how and guidance in developing the toolkit, using its experience and expertise of e-Government, considered to be an international benchmark.

What are the main lessons of case studies?

The findings of the case studies

for Dar es Salaam, Ulaanbaatar, and Buenos Aires, each of them situated in three different levels of e-government maturity, concluded that the main challenges to advancing city e-government systems were not solely limited to technical and financial capacity, but also the existence of political leadership, institutional coordination, and consensus.

The latter three factors, greatly enhances the sustainability of the project and decreases the possibility of failure.

In the majority of cases, the pilot cities exhibited the lack of vision or "big picture" mentality from the city government. For instance, each city demanded a module to serve a certain area of e-governance they considered as urgent. However, their demands were not driven by the requirement to meet goals that achieved a vision.

Previously, these City governments made decisions without a roadmap to provide guidance for prioritization of activities and without generating consensus from various departments and citizens.

This reality is what compelled the necessity of this toolkit, a resource to assist cities conceptualize the big picture with citizen centrism at its core. This improved comprehension and visualization of areas that are truly urgent, hich in turn can help drive consensus for areas to implement new systems.

Urgent Issues addressed of Pilot Cities

In Ulaanbaatar, underground facility management of the city exhibited low accuracy of facility information and limited information sharing amongst relevant agencies

(such as electricity, heating, water and sewage, and communication). Furthermore, the standards used to manage the facilities varied from one to another, not to mention the lack of application programs for effective management.

One of the major reasons of the limited information sharing was the lack of a single standard tool

applied to underground facility management, prohibiting effective communication throughout the separate agencies. In particular, certain public agencies operated in accordance with a defined business process, but the private sector (construction companies, telecommunication companies) had to report complaints for construction on paper hardcopies with hand-sketched pictures, delaying the process and increasing the work load for city officials as they have to re-enter the information into the system.

The City of Dar es Salaam possessed three major challenges.

One, since 2005, Dar es Salaam implemented a wide range of application systems[8] that were also being utilized by the central government. However, there are many limitations to successful implementation due to the lack of interoperability between the systems of the central government and the city. Moreover, Dar es Salaam did not possess a team of ICT experts that were capable of resolving these problems.[9]

Second, is the lack of an integrated communications network between the Headquarters (HQ), which is the central decision making body and its three autonomous boroughs.[10] Consequently, city officials who prepared documents at HQ needed to deliver the documents to other boroughs by courier for all reviews and approvals. Furthermore, the format of documents varied across departments, preventing the standardization of business processes.

Third is the lack of consistent and sufficient power supply that is common place for many underdeveloped cities around the world.

In Buenos Aires, the Ministry of Modernization oversees their e-Government development.

Its vision is to utilize ICT technology not only to enhance citizens' quality of life, but also for urban development. Buenos Aires has 6 mission statements to further its vision: (i) enhanced information delivery, (ii) increase civic participation, (iii) promote innovation, (iv) improve transparency, (v) develop organizational competitiveness, and (vi) reduce costs.

To improve services to its citizens, the government proposed an all-in-one smart card system

(with built-in IC chip and RFID), to serve as a platform to handle transactions based on a single card

medium. The all-in-one service is part of the city's initiative to enable citizens to transact social, transportation, medical, and financial services through a smart card. Implementing such services requires that the card to have validation, monetary settlement functions, among others. Moreover, affected institutions under the city government should possess the infrastructure for processing transactions and be able to have flexibility for further development and expansion.

In sum, construction of all-in-one smart card system requires innovative financing to cover upfront capital investment, strong leadership and technical capacity to work with multiple stakeholders with different and sometimes conflicting interests.

The Toolkit - City e-government Diagnostic and Solution framework (CeDS)

The toolkit includes three components.

1) A self-assessment and diagnostic results of e-Government systems
based on a citizen-centric maturity model. It consists of a series of questions about the status and existence of various indicators across six "dimensions" which describe categories of government activity necessary for effective, citizen-centric e-Government. Based on the responses to the survey, the toolkit creates a scorecard that visualizes the results, indicating a given city's maturity level for each dimension, as well as an overall maturity score.

2) Ready to install, city e-government modules.
Twelve modules have been selected, each ranging from systems that can be implemented across various levels of maturity; from the simplest application to the most advanced. These modules are also differentiated by each of the four main service delivery and business processes such as e-admin, e-industry, e-life, and e-infra.

3) Guidance for the development of a master plan
utilizing the self-assessment and diagnostic results in the previous stage, to help administrators establish strategy and recommend methods of implementation.

[Main Structures of Toolkit]

Toolkit Structure	
1	Self-assessment and Diagnostic Reports
2	Master Plan Guidelines
3	City e-Gov. Modules

A. Component One: Self-Assessment & Diagnostic Report

The toolkit begins by assessing a particular city's e-Government maturity through a self-administered survey.

This self-assessment is one of the principal features of this toolkit. The survey presents administrators with a series of questions about the status and existence of indicators within various forces and dimensions, which describe categories of government activity necessary for effective, citizen-centric e-Government.

The survey questions are highly specific, asking inquiries, for example, as to whether a city government has an e-mail system.

By asking highly discrete, specific questions, the toolkit is intended to be highly practical and user-friendly. The number of questions also had to be limited to maintain its practicality and reduce the time it takes to complete the survey. Moreover, in developing countries, since some city wide data does not exist or its availability is not certain, such as the rate of traffic flow, more subjective questions were included with pre-determined multiple choice responses. This improved standardization of the survey results.

Lastly, the toolkit is intended for any public servant with knowledge of city government systems to be able to answer the survey questions.

More importantly, the survey and output are designed to be automated using universally available Microsoft Excel software. See Image 15. MS Excel Based Self Diagnostic Tool for a visual illustration. In this example, a government functionary was designated to complete the survey to derive the maturity level of the fictional municipality of New City.

Two kinds of forces affect city e-Government development.

First, internal government forces (e.g. Governance Mechanisms, Policy and Institutions, and Resource Capacity) describe cities' ability to deploy new processes and technologies. Second, external forces (e.g. ICT Network, Citizen Readiness, and Public Service Infrastructure) describe the context within which city administrators operate. Together, the nature and extent of these forces affect administrators' ability to implement e-Government.

Based upon administrators' responses to the survey, cities are classified according to their "maturity levels" of development.

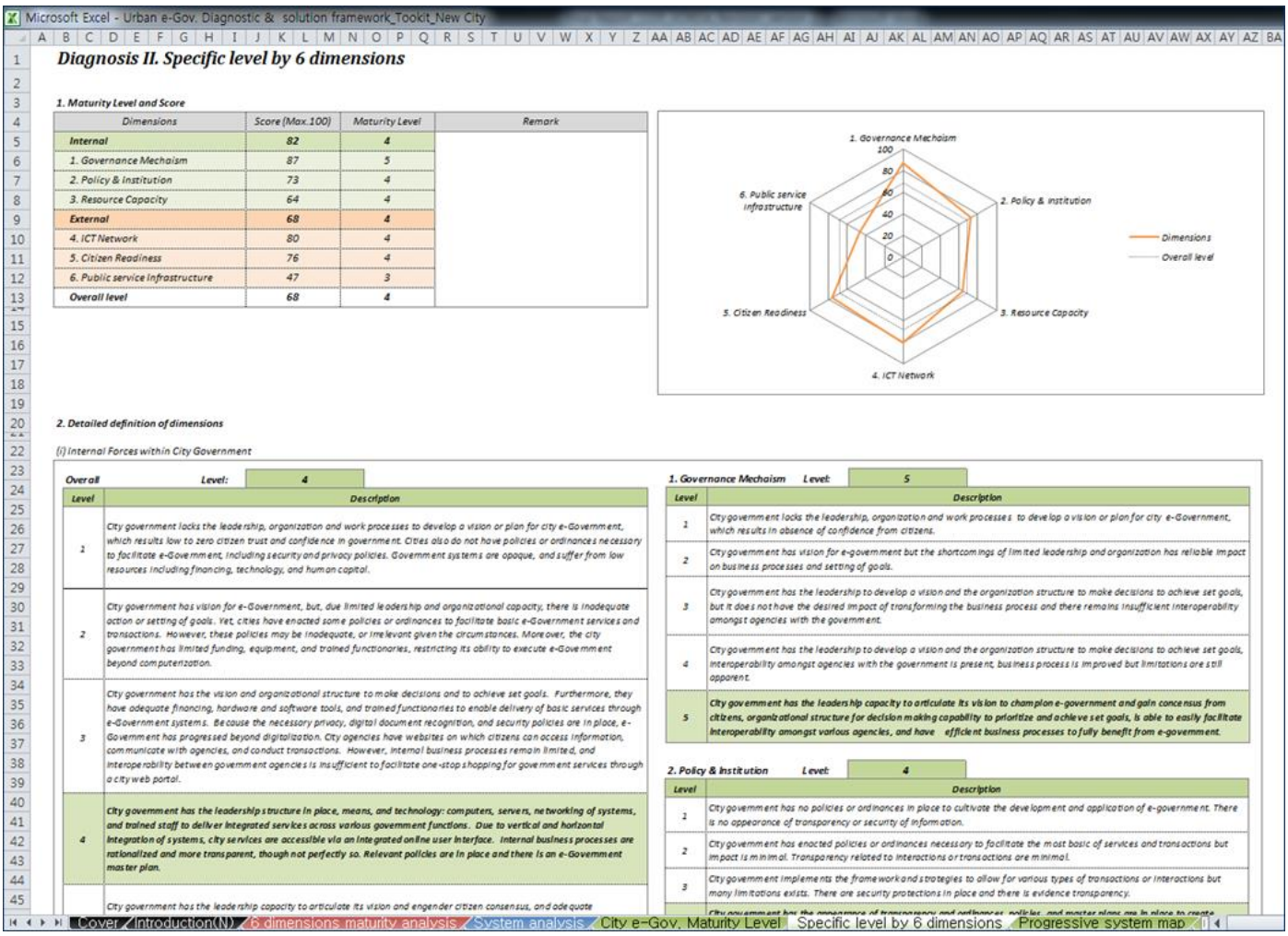
model, which consists of five progressive levels, ranging from "infancy", the most basic, to "converging", the highest level of e-Government capability. Overall, citizen-centrism serves as an underlying factor. The model rates a city's maturity level higher if their systems provide greater value to citizens' experience of government.

[Maturity Levels by Dimension]

Based upon an analysis of the survey responses, the toolkit produces diagnostic reports.

These reports provide a scorecard that visualizes the results of the survey, indicating a given city's maturity level for each dimension, as well as one overall score indicating a city's e-Government maturity.

[Diagnostic Report: Maturity Levels by Dimension]



As an illustration,

in Image 17, the example city displays a high maturity level in Governance Mechanism and ICT Network. On the other hand, it exhibits a low maturity level in the Public Service infrastructure dimension. For example, the cause for the low level might be resulting from insufficiently developed road networks. This

diagnostic report can be then utilized to set prioritized agendas for the city, where is can make a worthy case for initiatives that can improve this area. This would therefore improve consensus building; enhance institutional coordination and project sustainability.

A Progressive Systems Map (PSM) will be provided, allowing city administrators to have a comprehensive picture of the current existing modules

for a city government and which systems need to be implemented to improve their maturity level across the four classifications. The PSM presents the most generally used 110 modules by developed cities. Hence, in the example of New City as shown in image 18, the government currently has a level of four when it comes to existence of e-infra modules. To increase its maturity level in this category, they might prioritize either Traffic information system, Traffic control system, or any system with only a grey bar associated.

B. Component Two: City e-Government Master Plan Development Guideline

The toolkit includes guidelines to establish an e-Government Master Plan.

The distinguishing characteristic that separates this manuscript from the current literature is the application of the CeDS framework as an integral part of the master planning process. Furthermore, as other examples in the literature mostly provide the content of what should be addressed in the process, our document is more focused on the chronological procedures that should be followed. Hence, administrators will be better able to introduce e-Government processes and systems both in ways that are timely and that avoid unnecessary duplication of effort.

In particular, the Master Plan also provides a practical framework for administrators

to help them establish strategy and to recommend methods of implementation. It also provides recommendations for: i. developing a vision and e-development goals, ii. establishing action plans on developing certain e-Government sectors and themes, and iii. Prioritizing projects in light of technical and financial constraints.

The guidelines draw lessons from best practices and the experiences of the other developing cities around the world as well as WeGO member cities.

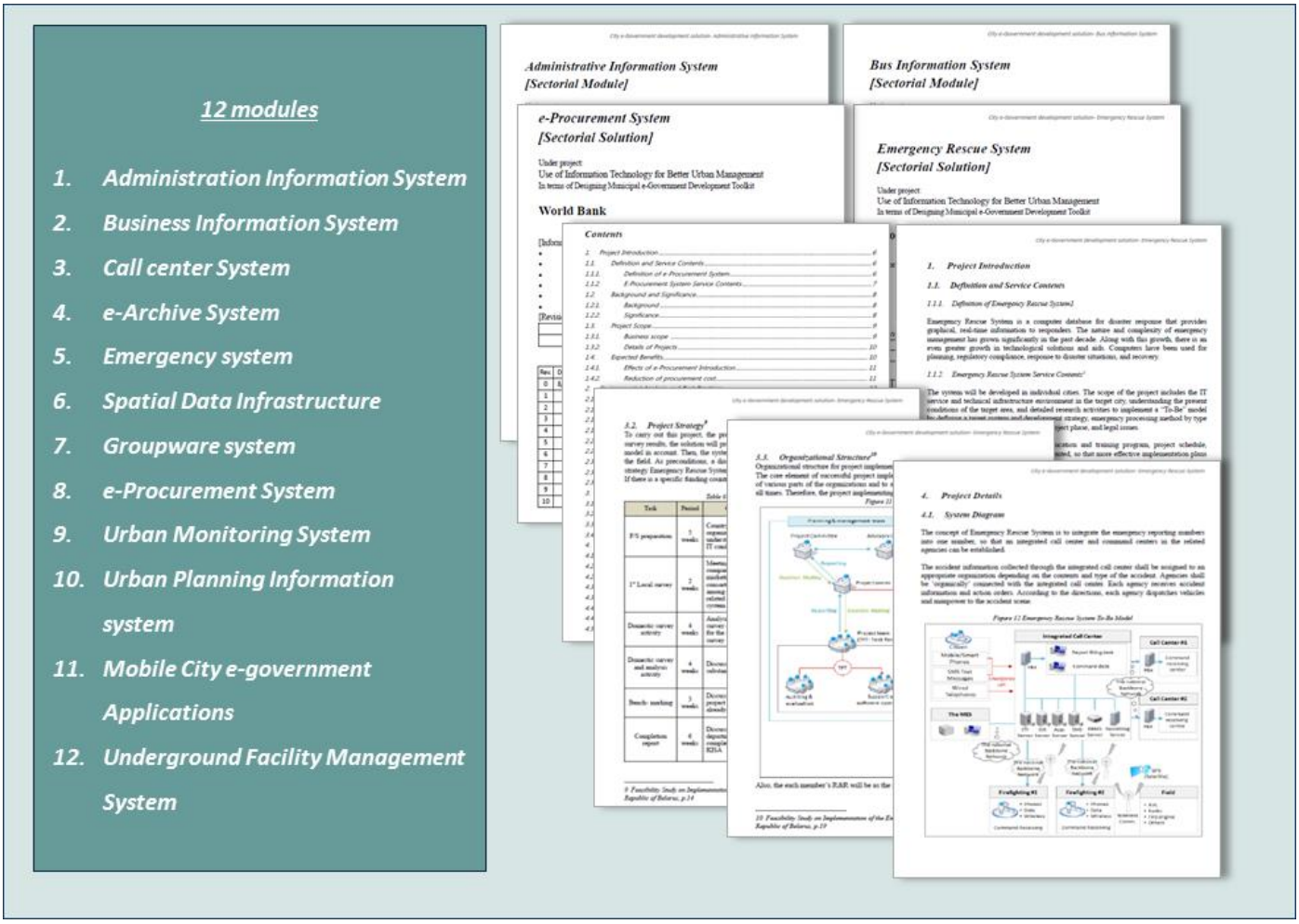
Through such collaboration, city administrators can draw upon the capacity of others and build their own capacity in the process. Furthermore, these efforts, while enabled by this toolkit and WeGO community, are essentially self-led, increasing ownership of e-Government by city leaders.

C. Component Three: e-Government Modules

The toolkit describes modules that can be installed as e-Government systems to support city governments.

Currently, the toolkit has twelve modules, which have been selected based on the experiences of the Seoul City government and feedback of WeGO toolkit pilot cities. (See below Image 19. Modules) these modules will continue to be refined and added to, as more WeGO cities implement the toolkit and share their experiences.

[Twelve Modules]



The toolkit contains modules for administrative informatization, ICT-enabled emergency systems, e-Procurement, and etc.

These modules are the distinctive attributes that separate this toolkit from others in the literature. Other toolkits assess government resources and recommend that administrators install certain types of ICT-enabled systems; however, no other toolkit provides administrators information with fully functional systems for immediate implementation. And none provide recommendations and systems specifically for cities.

Hence, this toolkit provides pragmatic guidance and step-by-step instructions for optimizing the impact of new systems

and is designed from a practitioner's perspective. In this way, modules save city administrators the often heavy cost (in resources and time) of developing their own systems.

Lastly, the level of sophistication of the modules was factored in when determining which to develop first.

Some modules were selected since they are basic systems that can be implemented where the city government has a low maturity level and other modules are advanced whereby it needs a more sustainable environment for successful execution.

Case studies

A. How were case studies implemented?

The case study was implemented to refine and enhance the relevance and practicality of the toolkit.

Through open call for proposals among WeGO member cities and a competitive selection process, Ulaanbaatar in Mongolia, Dar es Salaam in Tanzania, and Buenos Aires in Argentina were selected for the case study. Experts from the Seoul Metropolitan Government Feasibility Study Consulting Team of the Republic of Korea (SMG FSCT), in collaboration with the World Bank and WeGO, first conducted the CeDS testing and assessed the cities' current e-Government maturity levels

Based on the CeDS results and specific demand from case study cities, the study areas of each case study were agreed with the project team, WeGO and case study city officials.

The case study team benchmarked their existing systems against similar systems and practices utilized in Seoul. Comparing and contrasting the cities in this way formed the team's basis for making recommendations for software and hardware implementation. It also served as a starting point for identifying recommended pathways for further e-Government development. Each city then received a final report from the experts, detailing existing conditions, future needs, and guidance on module implementation.

B. Underground Facility Management System (UFMS), Ulaanbaatar

The city of Ulaanbaatar suffers from weak management of its underground facility,

exhibiting low accuracy of facility information and limited information sharing amongst relevant agencies (electricity, heating, water and sewage, and communication). Furthermore, the standards used to manage the facilities varied from one to another, not to mention the lack of application programs for underground facility management.

The inaccuracy of facility information is mainly due to outdated data on CAD outputs and dependency of information on the memory of the field technicians.

Consequently, the errors arising from these issues wasted time and resources, which could have been avoided by implementing an underground facility management module. In addition, limited information sharing was due to the lack of a single standard tool applied to underground facility management, prohibiting effective communication amongst the agencies.

According to the problems mentioned above, the major challenges were as follows:

- Need for measurement methodologies for underground facility information accuracy
- Provide a framework for information sharing
- Suggest a standardized underground facility management module
- Developing applications for information sharing amongst public agencies and develop a civil service/complaint processing system

In regards to information accuracy, there is a specific administrative office authorized to oversee the entire facility. The consultancy concluded that the accuracy of information shall be improved in the following order.

- Phase 1: Select one facility (such as heating pipes) and conduct investigations across the city
- Phase 2: Build a temporary application for information gathering in the form of Web services (real-

time registration, lookup functions) and establish an environment for field technicians to update information of worksites during the site visit

- Phase 3: Once the facility information building is completed, move on to other facilities. The collected information will be integrated with additional information that will be added on

Moreover, the accurate management of underground facility information (focusing on Measurement and Database Implementation) was a main concern for city government officials.

The project team recommended reporting and measurement methodologies to facilitate the use of this module for implementing a project after a case study is conducted. Two survey and measurement methodologies were recommended- the exploration method and real-time measurement method.

The city's construction and planning department has an information sharing system in place, but was limited in terms of its capabilities.

Hence, it was crucial to prepare an institutional arrangement for a special task force to liaise with all stakeholders including -city authorities, relevant agencies and private sector companies (telecommunications/utilities) to reach a consensus as to what is needed. This special task force would be ultimately become a city spatial information management bureau, in charge of integrated operations and management of the system.

Another concern of the city government was managing the constant updating of information in the system.

Information updates for underground facility should be generated at any place and any-time. The updated information must also be shared in real-time with all related users and management authorities. Hence, it was recommended to install 4 web based application systems. Web based system facilitated real-time responses for the system users. Also, it is available to share data between application system in real-time, meaning users can access real-time data and newest information that has been altered the day before.

Realizable benefits can be quantified directly and qualified indirectly.

Indirect benefits are recognized as increased efficiency and convenience resulting from disaster prevention. For instance, due to the increased number facilities under construction in Ulaanbaatar ensuing from urbanization, the number of construction accidents increased, causing damage to underground facilities, traffic congestion, water and power outages.

The quantitative benefits of UFMS in terms of cost savings was $1,909,905 USD per year.**[11]** The total cost of the implementation is estimated to be USD $16,900,000.

In conclusion, since the pilot project has started, Ulaanbaatar began an initiative to develop a Digital Map of the city that is 1:1000 scale, funded by KOICA (Korea International Cooperation Agency). This project, expected to be completed in 2013-2014 shall facilitate the building of underground facilities and prevent any additional overlapped of investment. More projects will be planned after the completion of the digital map.

This case study was a catalyst in supporting the city of Ulaanbaatar

owning their informatization agenda and moving it forward to implement e-government projects to improve services.

C. E-Office, Dar es Salaam

Dar es Salaam recognized the necessity of the strengthening its city administrative management systems.

Hence, a case study was implemented, focusing on e-office implementation to enable a paperless working environment. However, the biggest challenge to its development of these e-Government systems is its limited financial resources.

The City of Dar es Salaam possessed three major challenges.

One, since 2005, Dar es Salaam implemented a wide range of application systems[12] that were also being utilized by the central government. However, there are many limitations to successful implementation due to limitations on interoperability between the systems of the central government compared to those of the city. Moreover, the city government of Dar es Salaam did not possess a team of ICT experts that were capable of resolving these problems[13]

Second, is the lack of an integrated communications network amongst the Headquarter (HQ), which is the central decision making body and its three autonomous boroughs.[14] Consequently, city officials who prepared documents at HQ needed to deliver the documents to other autonomous boroughs by courier for all reviews and approvals. Furthermore, the format of documents varied across departments, limiting the standardization of business processes.

Third is the lack of consistent and sufficient power supply that is common place for many underdeveloped cities around the world. Without a source of electricity to power e-Government applications, the pilot project will be an exercise in futility.

To overcome these obstacles, following were recommended:

i. Building e-Office system for administrative management integration

ii. Connecting the communication network between headquarters and autonomous boroughs

iii. Introducing an uninterruptible power supply in response to power outages

Given the current reality of Dar es Salaam, the most difficult barrier to overcome is the lack of financial resources.

Hence, the World Bank and the African Development Bank (AfDB) were involved from the initial stage of pilot project to provide capital to fund the project. The second recommendation was to address the poor energy situation in the country. This is a common problem in most underdeveloped countries. Hence, this condition was reflected in the recommendations provided in this technical assistance.

The city government of Dar es Salaam's e-Office system

is composed of a document approval, distribution, and management system, online interdepartmental communication channels, message board, and email systems, amongst others. It is designed to perform services through a single window. The technicians working for the city were given the authority to write, approve and return documents, have virtual discussions via online forums, instant messaging services, and bulletin boards. As a result, this significantly reduced working hours, provided real time information, increased accuracy of information, reduced paper documents and improved productivity. To execute this module, training was provided to improve the computer literacy of officials' to be able to utilize the new systems.[15]

A distinguishing characteristic of this module is its scalability, meaning, it has the capability to seamlessly integrate with other government systems

related to accounting, human resources, tax, civil affairs, and etc. In this regard, this feature reduced the need for other communication modules, allowing for the allocation of capital resources to other areas of need.

Moreover, the information requirements and formatting of documents were standardized to improve administrative business processes and applied authentication systems

to improve the security of the documents. To address the disconnection in communication from HQ to the city's autonomous boroughs, the e-office module serves this function as well.

Since an overhaul of the electricity grid is not a feasible recommendation, practical solutions were advised to provide business continuity in case of power blackouts. Laptop computers utilizing less energy were introduced through various key departments.

Since laptop computers can work on battery power, it also was an adequate measure against power outages.

The realizable benefits focused more on enhanced work efficiency.

Three indicators were used for the cost-benefit analysis: (i) annual office supply savings, (ii) DCC internal and external[16] business processes.

The estimated amount of cost savings of office supplies was USD 108,000, based on information obtained from interviews of city government employees, which represented a 70% annual savings rate. The amount of cost saving derived from increased DCC internal and external work efficiency was USD 403,920.

Hence, the total economic benefits derived from the increased efficiency and costs savings from reduction of office supplies and increased efficiency of business process were $512,000 USD. The total cost of the implementation is estimated to be USD 2,182,000.

Based on the recommendations of the case study, which Dar es Salaam has benefited greatly from, the city will continue to develop automation of the public administration management by introducing e-documents.

Further informatization efforts will continue through implementation of internal human resources and accounting systems. Through these efforts, the groundwork will be laid for a large scale e-Office system. In this regard, a component-based structure for the e-Office module was recommended to manage the city's resources more effectively.

In addition, since the completion of pilot project in January 2013, an E-Document building project is under way funded by the World Bank. Efforts for fulfilling administrative computerization are expected to continue after the completion of E-Document building project.

D. Smart Citizen Card, Buenos Aires

Buenos Aires has launched the Ministry of Modernization to oversee its e-Government development.

Its vision is to utilize ICT technology not only to enhance the citizens' quality of life, but also for urban development.

To improve services to its citizens, a case study was implemented to develop a module for an all-in-one smart card system

(with built-in IC chip and RFID), to serve as a platform to handle transactions based on a single card medium. The all-in-one service is part of the city's initiative for citizens to be able to transact social, transportation, medical, and financial services through a smart card.

Implementing such services requires that the smart card to have validation, monetary settlement functions, among others.

Moreover, affected institutions under the city government should possess the infrastructure for processing transactions and be able to have flexibility for further development and expansion.

Due to the high capital investment required for this type of implementation, the city government is pursuing a PPP (public-private partnership) business model to fund this endeavor.

Therefore, main objectives of this project are:

i. Construct all-in-one Smart Card system

ii. Propose public-private partnership business models to raise financing for project

Buenos Aires currently lacks the resource capacity and the knowhow to pursue a project and investment of this size. The AIO smart card system covers public transportation, tourism, finance, recreation, hospital, education, and other public services. Hence, it is crucial that the ICT networks from the various sectors are compatible and integrated when first designing the project. The project team first designed an expandable system architecture at the initial stage and then Implemented a 'Modular Open Platform' system.

The pilot project also involved education for government officials

to acquire the knowledge of raising capital via various business models**[17]**

An indirect benefit of the AIO smart card system is improvement of transparency in monetary transactions of public sector organizations

and entities such as city hospitals. Through the integrated smart citizen card solution, transparent and efficient management process became feasible, improving service as well as preventing of wasteful spending. In terms of estimated cost savings in the medical and education sector, USD 600,000/year can be saved by a total of 300,000 citizen beneficiaries of these services. Specifically, educational services related to school meals, transportation, and textbook costs affected 460,000**[18]** students. The estimated amounts of benefits were calculated at USD 184,000/year.

Through the Smart Citizen Card solution, civil service providers (e.g. Government officials) can improve their business performance and save costs

by reducing man hours, office supplies and reducing other various opportunity costs. A total of 1,973,000 citizens**[19]** are expected to be the beneficiaries of this project. The estimated amount of cost savings is USD 3,551,400/year.**[20]** The total required cost is USD 11,194,000 for the AIO system.

Moving forward

International experience suggests that e-Government systems are best established by

adopting an integrated and cross-cutting approach, and by prioritizing in ICT platforms suitable for government (a) needs and (b) capacity.

Nevertheless, there is a gap in the current e-Government literature for cities and local governments. Since the issues and concerns of a local government are different from those of the national government-whereby the city provides a majority of public services directly to the citizens and greatly influences the quality of their everyday life- there is a necessity for a toolkit designed to support cities in developing countries build efficient e-Government systems at the local levels.

Also, developing a practical self-assessment and diagnostic e-Government toolkit specific to city or local government is critical

since the local governments in developing countries are also constrained by limited resources.**[21]** Thus, there is a need for a city e-Government toolkit that is clearly differentiated from the majority of existing toolkits that only focuses on national e-Government agendas.

While most e-government toolkits are standalone documents that are for instructional purposes only and doesn't provide for practical implementation or follow-up activities. To address this issue, the CeDS toolkit presented as a "living document", pilot tested in several WeGO cities with technical support from Seoul Metropolitan Government to enhance its relevance and practicality.

WeGO and its Secretariat Seoul Metropolitan Government have agreed to maintain the toolkit in partnership with the World Bank and offer training for its member cities on the toolkit on a regular basis.

Each member city will then complete the survey in the CeDS toolkit, whereby the self-assessment maturity results will be data-based and cross examined further. As more cities utilize the toolkit, WeGO network will spearhead the dissemination of the accumulated knowledge and experiences to cities around the world, and make refinements and improvements to the toolkit where necessary.

In sum, the most critical contribution of the project was establishment of a dedicated city e-government knowledge hub

which will continue to update and disseminate the toolkit as a "living document" and provide advisory support in partnership with the World Bank.

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[1] World Bank (2008) Urban Poverty: A global view

[2] See UN Department of Social and Economic Affairs, United Nations E-Government Survey 2012, p. 64, available at http://unpan1.un.org/intradoc/groups/public/documents/un/unpan048065.pdf. (http://unpan1.un.org/intradoc/groups/public/documents/un/unpan048065.pdf.)

[3] Many administrative processes can very well be automatized by improving manual processes to provide answers within a 24 hours period which, in many cases, will be satisfactory for most of the population, particularly if the automization eliminated the need to physically visit the institution (help-desks).

[4] e-services are services normally provided by public administration put on line so citizens may access them from their computer or mobile device.

[5] Ulaanbaatar, Dar es Salaam, and Buenos Aires

[6] Geographically, the city limit is where the local administration does not have authority over direct services. Conceptually, they end where other city governments provide residents the same types of services.

[7] (1) Ulaanbaatar, Mongolia; (2) Buenos Aires, Argentina; and (3) Dar es Salaam, Tanzania

[8] Finance, GIS, Taxation, etc.

[9] The city only had 2 technical experts on staff to manage the information system of the city government.

[10] A type of municipality comparable to a town

[11] Please refer to the Underground Facility System of Ulaanbaatar Feasibility Study for the cost saving calculation and explanation

[12] Finance, GIS, Taxation, etc.

[13] The city only had 2 technical experts on staff to manage the information system of the city government.

[14] A type of municipality comparable to a town

[15] ICT knowhow and capacity of city government employees were assessed and basic ICT education was provided.

[16] Improvements in efficiency between HQ and its three autonomous boroughs, specifically cost savings from not having to deliver documents physically but emailed through the e-office.

[17] Various case studies of Build Operate Transfer (BOT) and Build Lease Transfer (BLT) projects will presented.

[18] Census 2012.

[19] Census 2012.

[20] Buenos Aires AIO Smart Card System Feasibility Study

[21] Financial, Human Capital, Technological and etc.

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