Overcoming Path Dependency for Sustainable Development:

Lessons from the Korean e-Government ODAs

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INTRODUCTION

The main purpose of this paper is to examine why e-Government ODA projects are not lasted long periods of time, although the projects themselves are completed successfully and delivered to the recipient countries.

South Korea has been well-known for its economic development since World War II, and became the one and only country to join in OECD DAC (Development Assistance Committee) among the former recipient countries. Because Korea has achieved a successful economic development, many countries are now asking to share Korea's experiences, especially major industrial policy agenda and how to overcome difficult barriers. One of the most-often requested assistance from developing countries is Korea's e-Government policy because it has been named as having one of the best e-Government services and infrastructure for many years.

In responding to these demands, Korea has actively provided e-Government ODA (Official Development Assistance) in recent years. For example, EDCF (Economic Development Cooperation Fund) of Korea, which is in charge of providing long-term, very low interests loans to developing countries, has provided 28 e-Government ODA projects in 16 countries amounted US$ 870.10 million during 1999-2016.[1] KOICA (Korea International Cooperation Agency) which is in charge of grants also has provided 109 projects in 43 countries amounted US$360.07 million.[2] E-government has been emphasized by the UN as well because it is an important tool to increase transparency in governance, which has been recognized an important factor to increase aid effectiveness and enabling sustainable development.

E-Government ODA can contribute to sustainable development mainly in two ways. First, as already mentioned, e-Government can improve transparency and efficiency in public administration and public services. As such, it can contribute to increase the aid effectiveness and sustainable development in the long run. This is why World Bank has emphasized ICT for Development toward achieving Millennium Development Goals (MDGs).[3] Second, most e-Government ODA projects include manpower training program as a part of specific project

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[1] Selected from **https://edcfkoreago.kr/site/homepage/menu/viewMenu?meneid=004002004001**, **(viewed on June 6, 2017).**

[2] Selected from http://www.oda.go.kr/opo/bsin/bsnsinfoSportRealmBsnsinfo.do (viewed on June 6, 2017).

[3] See World Bank (2003) for the details.

because lack of proper ICT manpower would hinder the recipient country from realizing maximum potential benefits out of the e-Government ODA project. During the implementation process of an e-Government ODA projects, a group of people from the recipient agency are usually invited to Korea for certain period of time, about 4 weeks in general, to be trained and to experience the advanced ICT environment and services in Korea. In addition, various on-the-job training programs are usually provided by dispatching Korean experts to the recipient countries.

But recipient countries often did not have strong ownership in e-Government projects. They may show willingness at the beginning of project implementation, but once started, political leaders do not pay proper attention to the projects. Sometimes, there are many donors that a single module with several projects may be provided by multiple donors, due to which certain projects are completed far ahead of other ones. In this case, the completed project cannot be operated properly because all related projects have to be operated interactively. In addition, empowering ICT/e-Government expertise for local ICT engineers of the recipient agency have not been successfully made, and thereby the effectiveness and impacts of e-Government ODA projects were usually not fully realized. And this might negatively affect sustainability of the project itself.

The purpose of this paper is to establish a test model for building sustainable e-Government ODA projects by analyzing selected Korean e-Government ODA projects. Let's begin with the concept of sustainability as understood in this study. Previous studies on sustainability of e-Government and ICT projects will be reviewed in order to establish a test model for sustainable e-Government projects.

THE CONCEPT OF SUSTAINABILTIY IN E-GOVERNMENT ODA

Perhaps the term 'sustainability' is the most frequently discussed issue in ODA community in these days. In general, sustainability can be defined as "preserving something that has been available for over a period of time without having any external support to continue its operations" (Reynolds & Stinson, 1993; recited from Nawi, et al., 2013: 1). Many ODA projects may be completed in good shape, meaning the deliverables that was originally planned were actually delivered to the recipient. But if it lasts only a limited time period for various reasons and then is abandoned, it would not be a real success. This is why one of the key criteria of ex-post evaluation for ODA projects includes sustainability.

In fact, the term sustainability was first used by a German forester and scientist Hans Carl von Gilinscee (Garde, et al, 2007; recited from Lessa et al. 2011). As such sustainability was mainly used in ecological and environmental issues, rather than socioeconomic ones. But as social issues were viewed from the perspective of sustainability, the term began to increasingly embrace poverty reduction as well as social and economic progresses that inherently related to another term 'development' (Kidd, 1992).

Sustainable development became a key analytical as well as normative concept as the UN set the Sustainable Development Goals (SDGs), 2015-2030 (Sachs, 2015) after the disappointing

results of the Millennium Development Goals (MDGs) were realized in 2015. As an analytical concept, sustainable development pays greater attention to the interactions of three complex systems: the world economy, the global society, and the Earth's physical environment. But it also "envisions four normative side of a good society: economic prosperity; social inclusion and cohesion; environmental sustainability; and **good governance** by major social actors, including governments and business" (Sachs, 2015: 4; bold emphasis added by the author).

Good governance is especially important to increase aid effectiveness due to its potential to reduce corruption in developing countries. Aid effectiveness generally means what and how much development aid has contributed to achieve developmental goals in the recipient countries (Hong and Lee, 2013). Aid to developing countries has been increased over time significantly since the World War II without seeing much progress in reducing poverty.[4] In fact, "after 40 years of development aid, the evidence indicates that aid has not been effective."(Doucouliagos and Paldam, 2010; Rajan and Subramanian, 2008). Since the beginning of the 21st century, improving the quality rather than quantity of aid has been emphasized through evaluating the impacts of aid toward economic growth, poverty reduction, and/or advancing democratic governance. As a consequence, both the Paris Declaration in 2005 and the Accra Agenda for Action in 2008 emphasized five principles and four agendas to increase aid effectiveness.[5] The subsequent 4th High Level Forum on Aid Effectiveness held in Busan in 2011 followed the same track, and most countries agreed upon the document titled, "Busan Partnership for Effective Development Cooperation."[6]

As an instrument of realizing good governance, e-Government has been introduced because adopting e-Government is expected to increase productivity and transparency in providing public services, and thus restore trust toward governments. In the U.S, for instance, about three quarters of Americans said they trusted the federal government in the 1960s, but only a quarter remained in the same group in the 1990s (Nye et al. eds., 1997). At the turn of the century, governments began to find out ways to provide better services with less taxpayers' money. In early 1990s, the Clinton administration began to actively adopt various information and communications technology in providing public services, which became an important momentum in expanding e-Government. As such e-Government ODA has been viewed an important tool to increase transparency in public sector and eventually to reduce poverty and

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[4] Korea is an exception in this regard. Korea's fast economic growth is an outcome of effective ODAs from many advanced countries though people had sacrificed a lot to achieve it. This is why the existence of Korea itself is a sign of hope for many developing countries as mentioned by Paul Wolfowitz, the former President of the World Bank.

[5] Five principles include recipients' ownership, alignment between donors and recipients, harmonization among donors, results-orientation, and mutual accountability among donors and recipients. Four agendas are ownership, inclusive partnership, delivering results, and capacity development. For the details, see http://www.oecd.org/dac/effectiveness/parisdeclarationandaccraagendaforaction.htm (viewed on May 29, 2017).

[6] For the details of this document, see http://www.oecd.org/dac/effectiveness/49650173.pdf (viewed on May 29, 2017).

achieve sustainable development. The World Bank Group (2002) has explained that ICT applications can make government more effective and efficient, and allow better governance, and thereby more and better public services would be available to the people. Yet in another report, IEG World Bank Group (2011) has emphasized the potential effects of growing usages of ICT applications, especially various e-Government applications and sharing and opening information and data would eventually contribute poverty reduction and sustainable development.

Sustainability in IT implies that "the ability to identify and manage risks threatening the long-term viability of IT" (Korpela et al., 1998). Or sustainable IT is "technology that is capable of being maintained over a long span of time independent of shifts in both hardware and software" (Kimaro, 2006). Though sustainability itself is not the same as success, it is a necessary condition for the success of IT project because lack of sustainability is a form of failure (Lessa et al., 2011, 4). As was pointed out by Heeks (2005), only sustainable ICT initiatives can support long-term socio-economic development.[7]

In this context, sustainability of e-Government and/or e-Services has been defined as "the long-term use of the implemented e-Government solutions" (Kumar and Best, 2006; Nurdin et al., 2014; Dias, et al., 2014). More specifically, we define the sustainability of e-Government ODA projects in this paper as "the conditions and ability of the recipient countries/agencies in maintaining and utilizing the completed project and/or solutions as planned for long period of time by providing necessary and timely management and upgrading efforts through appropriate institutions and technical expertise, and thus achieving the development goals accordingly."

DIMENSIONS/FACTORS AFFECTING SUSTAINABILITY FOR E-GOVERNMENT ODA PROJECTS

After the completion of the e-Government ODA project, the final product might be delivered to the recipient countries and/or agencies. Once delivered, the outputs of the ODA projects would be utilized as basic infrastructure (i.e., public administration networks, groupware, and broadband public infrastructure, etc.), for providing public services (i.e., G2C and G2B applications), as well as for intergovernmental works (i.e., G2G applications). However, in order to realize the potential benefits of e-Government ODA projects, the recipient countries/agencies have to take care of the project in the long term perspective, that is, appropriate operational and management services have to be provided regularly and necessary upgrades have to be made at appropriate times. In most developing countries, however, this is not readily available for a variety of reasons, and many e-Government ODA projects turn out to be a short-term success but a long-term failure. Since early 2000s, many studies have tried to explain why this had been the case. We can these previous studies into two groups: Factor-oriented and Actor-oriented studies.

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[7] Most citation in this paragraph came from Lessa et al. (2011: 4).

1. Factor-oriented Approach

This type of previous studies tend to find out a variety of factors that affect sustainable ICT/e-Government projects. They tend to find out critical success factors and/or failure factors, and some of recent works try to re-group those factors into several dimensions in sustainability.

According to Heeks (2003), although we do not have much data about success or failure of e-Government in developing countries, 35% are total failures, 50% are partial failures, and only 15% are viewed as success.[8] Success or failure can be identified through "the amount of change between 'where we are now' and 'where the e-Government project wants to get us'" (Heeks, 2003: 3).This is called 'design-reality gaps.' In the design-reality gap model, seven dimensions are identified to measure, which is called the ITPOSMO model named after the first alphabets of those dimensions: Information, Technology, Processes, Objectives and values, Staffing and skills, Management systems and structures, and Other resources such as time and money.

Kumar and Best (2006), through a multiple regression analysis on the case of an internet access project through kiosk in Tamil Nadu, India, has identified five critical failure factors affecting negatively to the long term sustainability of the project. They are: lack of adequately trained personnel; lack of sustained public leadership, commitment, and institutionalization; lack of consistent evaluation and monitoring; lack of involvement of all stakeholders; and shift in existing power relationships due to the kiosks.

In other study on the critical success factors for the sustainability of ICT projects, Pade et al. (2009) has identified 19 critical success factors through a case study of Dwesa, a rural area located in the former Transkei, along the Wild Coast of the Eastern Cape Province of South Africa.[9] Through analyzing previous studies, Pade et al. (2006) has categorized five types (or categories) of sustainability that affect harmonious development of ICT projects. They are: socio-cultural, institutional, economic, political, and technological sustainability.

Socio-cultural sustainability means "the social and cultural context in which a project is operates, and the response of the ICT project to this context" (Pade et al., 2006: 103). If cultural aspect of the community is properly reflected to the ICT project, people may feel empowered by the project and hence become active in seeking ways in which to keep the project running,

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[8] Total failure means e-Government initiative was never implemented or was implemented but immediately abandoned; partial failure means major goals for the initiative were not attained and/or there were significant undesirable outcomes, and success means most stakeholder groups attained their major goals and did not experience significant undesirable outcomes (Heeks, 2003: 2)..

[9] Dwesa ICT project consists of a collaboration of research projects between the Telkom Centres of Excellence at Rhodes University and the University of Fort Hare. The aim of the project is to develop an open source/standard e-Commerce/telecommunications platform to deploy within rural and semi-rural areas in South Africa. The Dwesa ICT project endeavors to promote e-Commerce in tourism using natural reserves and other rural development activities (Pade et al., 2009: 341).

as it is in their own vital self-interest (Stoll, 2003; recited from Pade et al, 2006: 103). Thus social exclusion should be minimized, and social equity is built on rather than undermined (Batchelor and Norrish, 2002; recited from Pade et al., 2006: 103)

Institutional sustainability is attained when prevailing processes and structures have the capacity to continuously perform over the long term. Factors in this category may include clearly defined ICT related laws and regulations, efficient and effectively structured ICT policy organizations, and public-private relations in policy processes. As Gerster and Zimmerman (2003) points out, ownership of ICT project process by local people forms the basis for institutional sustainability.

Economic/financial sustainability means the level of expenditure that are used in operational and management in utilizing ICT projects. Most ICT projects are provided by donor agencies at the beginning, but the project itself either generate enough income to keep the services provided in the long run, or the recipient agencies should be able to mobilize necessary funding for long-term use of the services provided by the given ICT projects.

Political sustainability implies any political challenges that may hinder the progress or sustainability of the ICT project. It may include any political constraints in the processes of implementing the project itself, or similar ones after the completion of the projects. Frequent changes of political leadership in developing countries or recipient agencies are particularly important.

Technological sustainability means the ability to choose technology in an ICT project that can serve for an extended period of time. Technology is changing quickly and when an ICT project was adopted, the latest available technologies are usually taken. But depending upon the nature of the project, the latest technology may not be a good option such as telecentres in rural areas. Or even though the latest technology was adopted, standardization in global market may not be forecasted precisely, and thus when the project is completed, the selected technology may not be easily available in the market, due to which upgrading to the next level might be difficult. But choosing the latest technology may create other problems as well. In most developing countries, it would be difficult to find local technical experts in the latest technologies. Even though technological training is provided to local technicians, those who are trained many leave the recipient agencies sooner or later. This would provide additional difficulties in technological sustainability.

Harmonious development means that those different categories of sustainability discussed so far need to be in harmony and integrated in order to achieve overall sustainability in ICT projects (Pade et al., 2006: 104).

<Table 1> Critical Success Factors/Categories of Rural ICT Project Sustainability

CSFs \ Categories of sustainability	Social and cultural	Institutional	Economic/financial	Political	Technological	Presence
1. Simple and clear project objectives	*	*	*	*	*	Weak
2. Approaching the project in a holistic way	*	*	*	*	*	Slight
3. Using ICT to enhance existing rural development activities	*	*	*			Slight
4. Cultivating an enthusiastic influential project champion	*	*	*	*	*	Strong
5. Incorporating socially excluded groups	*					Slight
6. Incorporating/awareness of specific ICT policy influencing the project		*		*		Slight
7. A good understanding of the local political context				*		Strong
8. Significant participation of community target groups in the project process	*	*		*		Slight
9. Focusing on local/demand driven needs	*	*				Slight
10. Building on local information and knowledge systems	*					Weak
11. Appropriate training and capacity building		*				Slight
12. Facilitating local content development	*	*				Weak
13. Existing motivation and incentive for ICT job placement in the community	*	*	*			Weak
14. Focus on economic self-sustainability - business development (entrepreneurship)			*			Slight
15. Encouraged local ownership		*				Slight
16. Building local partnerships	*	*	*			Slight
17. Choosing the appropriate or right technology	*		*		*	Strong
18. Building on existing public facilities	*					Strong
19. Ongoing monitoring and evaluation of the project	*	*	*	*	*	Weak

Source: Pade et al., (2009: 349).

The <Table 1> demonstrates 19 critical success factors of the Dwesa project that are classified into five sustainability categories. Critical success factors 1, 2, 4, and 19 are related to all five categories of sustainability, while social and cultural, institutional, and economic/financial sustainability are most commonly affected sustainability dimensions in the Dwesa project.

Similar framework has been applied to analyze failure factors in providing the Malaysian

public e-Service (Nawi et al., 2013). The authors identify four groups of stakeholders in public e-Service provision. They are: Users, mostly citizens actually using e-Service application system; Regulators, policy and process owner who determines institutional administrative policy and procedures; Service provider, organizations that supplies, installs, and maintains the e-Service product and its documentation as soon as the contract is signed; and Implementer, agency that owns and operates the e-Service application system. Nawi et al. (2013) adopts the interview method by using purposeful sampling. A total of eight respondents were interviewed. Five of them were regulators and two were public officials who have more than 10 years of experiences in managing e-Service projects. The last one was the implementer of an e-Service application, who was the Deputy Head of ICT Department.

From intensive interviews with the respondents, the authors have identified 14 failure factors which cross-tabulated with the five sustainability dimensions. <Table 2> shows the results of interviews.

<Table 2> Results of Interviews on Failure Factors and Sustainability Dimensions

No.	Sustainability Failure Factors	Frequency Mentioned in the Interview (%)	Sustainability Dimensions				
			Institutional	Techno-logical	Social & Cultural	Economical / Financial	Political
1.	Lack of proper plan on e-service initiatives	14	√				
2.	Lack of project monitoring and control	11	√				
3.	Not meeting user requirement	11	√				
4.	User resistance	8			√		
5.	Changes in Government leadership	8					√
6.	No budget flexibility	8				√	
7.	No measurement/ standard	8	√				
8.	Integration issues	8	√				
9.	Low number of ICT-competent staffs	6	√				

10.	Inefficiency of back end process	6	√				
11.	Lack of service culture	3			√		
12.	Lack of backup recovery plan	3	√				
13.	Compatibility and reliability	3		√			
14.	Interoperability	3		√			

Source: Nawi et al., (2013).

According to the interview results, lacks of proper plan for e-Services, monitoring and control, and not meeting user requirements are most frequently mentioned, and these factors are all related to institutional dimension.

2. Actor-oriented Approach

Yet a more actor-oriented studies are found in recent years. In analyzing the challenges of local e-Government initiative in Sragen, Indonesia, Furuholt and Wahid (2008) identifies three major challenges affecting the success and/or failure of e-Government: management, infrastructure, and human factors. The management factor includes strategic issues, change management, political leadership, institutionalizing, and continuous monitoring and evaluation of the projects. Infrastructure means ICT infrastructure such as broadband networks, ICT laws and regulations, and/or financial resources. And human factor include ICT expertise, technology level, operation and management skills and competence, and social trust for good governance (Furuholt and Wahid, 2008: 4). Among these factors, the biggest constraint to e-Government is found non-technical, but at management factors such as political opposition, deeply ingrained policies and practices, and internal employee resistance. Thus the critical precondition to overcome these challenges is "political leadership, or a champion role with the vision to put e-Government onto the agenda and make it happen," meaning the human factor, especially leaders who are in charge of the project is critical (Furuholt and Wahid, 2008: 4).

By using Lamb and Kling's notion of social actors, Nurdin et al. (2014) also emphasizes the importance of interactions among various social actors involved in e-Government projects. Social actors are defined as "an organizational entity whose interactions are simultaneously enabled and constrained by the socio technical affiliations and environments of the firms, its members, and its industry" (Lamb and Kling, 2003; recited from Nurdin et al., 2014: 2263). Based upon an in-depth analysis on two Indonesian regencies, Jembrana and Luwu Utara, Nurdin et al. (2014) argues four dimensions of social actors (i.e., environment, affiliation, interaction, and identity) have played significant roles in the sustainability of e-Government systems implementation and use in both regencies. Major roles of main social actors have been summarized in the <Table 3>. But as shown in the table, both regencies are successful cases perhaps due to close interactions among social actors involved in both e-Government projects. One needs to ask what the factors that allow such positive interactions among related social actors are in the first place.

<Table 3> Roles of Social Actors

Actors	Roles and Consequences
Central government	Central government impose and provide support for the sustainability of e-Government within the regencies. Both regencies made interaction with central government through coordination and cooperation.
Other local government	Other local government influence the regencies through cooperation to provide resources and technical supports. Both regencies also mimic other local government in sustaining their e-Government
Local stakeholders	Local citizen and businesses demand better regencies' services through e-Government systems. The regencies responded the demand by implementing and use e-Government. At the same time, both local governments also cooperate with the local actors to access resources.
Politicians	Politicians provide political support for e-Government to ease budget allocation. Collaboration between politician and local government support the sustainability financial allocation and reduce political barriers.
Employees	Employees collaboratively support the implementation and use of e-Government through sharing responsibilities.

Source: Nurdin et al., (2014: 2270-2271)

Another study by Anand et al. (2016) also emphasizes the importance of human factor, especially what they call, "the owner of the project," in their study on a single case of a grievance redressal platform implemented in Jhansi, India. Project owner may be an individual or a group of people who are responsible for initiation, implementation, operation, and/or customization at the local level, if necessary. In some cases, the project may be formally owned by a ministry of the central government, state governments, and/or local governments. At any rate, the project owner is responsible for managing resources (i.e., people, financial resources, and ICT infrastructures, etc.) and is expected to take proactive measures to communicate the potential benefits of the project with the potential beneficiaries, as well as enhance or customize the project according to the specific local requirements (Anand et al., 2016: 200). Different from project sponsors who support the project financially, project owner has strong commitment to the project, and become a conductor as well as a player, and has to play a multi-faceted roles at various stages of project from visioning, conceptualization, implementation and institutionalization. As Luk (2009) has emphasized, among the many factors that influence project sustainability, the role of project owner as a leader is critical.

In analyzing four e-Governments' sustainability in Sri Lanka, two are success and two are failure, Dias et al. (2014) found that bottom-up rather than top-down approach, method of deployment, and user (i.e., stakeholder) involvement are the most critical success factors for sustainability. Using cross case analysis methods (Yin, 2009) through intensive interviews with 7 to 15 people who played different roles such as system developers, users, and consultants, Dias et al. (2014) has emphasized the bottom-up approach and the project lifecycle, and finally draws out the following framework to be used to increase sustainability of e-Government projects.

<Table 4> Reasons for e-Government Project Stoppage and Solutions Through Proposed Framework

Reasons for Project Being Suspended	Solutions by the Proposed Framework
The initiative for e-Government project comes from the top management or the government, the actual end user involvement for the project comes at the later stage, so the acceptance of the system is at stake.	The need for e-Government project should come from the actual beneficiaries. The government bodies can arrange/organize seminars to educate its employs of the e-Government and its uses, thus the need for the system could be identified by them. This ensures the projects' acceptance and contributes to tis sustainability.
The IT department of the government body is responsible for the e-Government project. When the projects are implemented by outside parties they act as the users and the SRS is prepares based on the requirements given by them, they act as intermediaries, but they have ownership of the system to be implemented. Further, training is given to the IT department rather than the actual users.	The role of the IT department has been replaced and enhanced by the role or Consultants. The consultants are outside parties who have not ownership to the process. Thus they take all the requirements from the actual users and beneficiaries. (However IT department might play the role of designer/developer at the implementations and deployment stage or later for maintenance)
The system was deployed to end users after completing implementation. Thus the users find a gap in the actual requirements and the functionality.	The projects should be implemented and deployed module wise. A Module Requirement Specification is prepared by the consultants by gathering requirements from the actual beneficiaries of the system, thus there will be no gap between the requirements and the functionality.
The actual user involvement only comes at the later stages of the project. Mainly after deployment of the project. This leads slowly dying projects as users find it hard to embrace the system.	As the actual users are actively involved in the system design activities they are familiar with the system functionality before being implemented. This leads to thriving systems which achieves sustainability.
The developing body (could be outsourced) is responsible for maintaining the system. Sometimes due to arrangements with the developing body the maintenance is done by the IT department. Even though maintenance plays a key role in a projects' sustainability, maintenance get a low priority in these projects. Having no specific role assigned for this responsibility is a major reason behind this.	With our framework, we introduce a new role, the Module Owner who is responsible for taking necessary action for the module maintenance.

Source: Dias et al. (2014: 11).

As shown in the Table, beneficiaries, consultants, users, and module owners are all human factors, meaning that human factors are the most critical one for increasing sustainability of e-Government projects.

Most of these literature tries to identify either success or failure factors that affects sustainability of ICT or e-Government projects. By adopting both quantitative and qualitative (mostly adopting case study) methods, previous studies in the factor-oriented approach have correctly identified numerous factors affecting different dimensions of sustainability in ICT/e-Government projects. However, they only categorize different types/dimensions of sustainability without much explanatory power. In other word, certain dimension may be more important than other dimensions in affecting long term success or failure of the project, but the factor-oriented approach only describes those success/failure factors plainly without explaining relative importance among them. In addition, some of these factors may be easy to overcome while others more difficult. Yet some factors are structural in nature, while others are institutional and/or behavioral. Different categories of sustainability may provide some hints of the nature of critical success/failure factors, they do not provide how to overcome those factors and thus increase sustainability.

The actor-oriented approach, on the other hand, put much emphasis on human factors as more critical than other factors. They have correctly pointed out human factors such as political leadership, project ownership, complex interactions among stakeholders as well as main social actors in explaining why certain projects have shown more sustainability than others. But these are too specific to be generalized. In addition, the contextual backgrounds of those actors who have contributed to high sustainability and/or low sustainability have to be highlighted as well because the interplay between major actors are occurred within specific political, economic, cultural, as well as technological contexts.

Sustainability should be viewed as context-dependent and dynamic over time and space. This means that any actions effective in making ICT/e-Government projects sustainable may not be automatically effective at different times and in different places. ICT sustainability are affected by complex interplays among diverse variables such as stake-holders, complexities of the systems developed and used, skills and educational levels of users, institutional capabilities of operations and managements, and so on. As Farrell and Twining-Ward (2005) suggest, the concept of sustainability is "forever evolving, adapting to site and regionally specific conditions, and they can never be cast as universal" (recited from Lessa et al., 2011: 5).

Under this consideration, this study will examine two e-Government projects sponsored by the Economic Development Cooperation Fund (EDCF) of Korea to two African countries, Senegal and Angola in order to establish a new framework of the context-oriented approach to explain varying sustainability of different e-Government ODA projects.

CASES REVIEWED AND CONTEXT-ORIENTED ANALYSIS

In this study, I have used two e-Government ODA projects which were implemented by EDCF. They are: Government ICT Infrastructure Project in Senegal 2009~11 and Government ICT

Infrastructure in Angola Project, 2007~12.[10] The two loan projects began to be discussed around 2005 and 2006, and concluded early 2010s. Both were infrastructure-building projects, that is, the Senegalese project was the construction of wireless networks, and the Angolan project was the construction of the National Data Center (NDC) for governments. The author has conducted ex-post evaluation studies of the two projects in 2016. I have interviewed with most of the stakeholders, including PMC (Project Management Company), subcontractors who actually undertook the field works for construction, public officials from the project executing agency and other related government ministries, end users who are actually using them and became main beneficiaries, public employees in the recipient agencies, operation and management personnel, and those who were in charge of the loan processes in the EDCF. I have visited various sites that these projects have been undertaken and actually saw the current status of using the wireless government networks in Senegal and NDC in Angola. The followings are brief summary of each project.

1. Government ICT Infrastructure Project in Senegal, 2009~11

<Table 5> Summary of the Senegalese Project

Title of the Project	Government ICT Infrastructure Project in Senegal
Name of Borrower	Ministry of Economy and Finance, Senegal
Executing Agency	Agence de l'Informatique de l'Etat (ADIE)
Loan Amount	An amount in Korean Won not exceeding the equivalent of 25 Million US Dollars
Terms of Loan	Interest rate: 0.5% per annum Maturity: 30 years including a grace period of 10 years
Goals of the Project	The Project aimed to construct a wireless government network, based upon WiMAX technology, connecting 665 public offices in 35 cities around the country. By doing so, it aimed to increase transparency and productivity in providing public services. It also intended to increase technical expertise of ICT engineers and technicians of Senegal by inviting them to Korea as well as by providing on-the-job training in order to enable them to provide O&M services for the WiMAX system by themselves.
Scope of the Project	The main scope of the Project was to construct wireless public administration network using WiMAX and LAN in 665 public offices in 35 major cities in Senegal. - The WiMAX network was supposed to connect central and local public offices - At first, two LED displays would be provided to advertise government policies to citizens in Dakar, but it was replaced with providing laptop computers - It was planned to provide necessary O&M services for one

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[10] The title of each project in this paper is those appeared in the loan contract with recipient countries.

	year after completion of the Project, along with necessary consulting services for O&M and ex-post management of the system provided

Source: Korea EXIM Bank (2016.12). Government ICT Infrastructure Project in Senegal.

The project was a typical EDCF e-Government loan project aimed to increase efficiency, effectiveness, and transparency in government management and to improve the quality of public services. By improving the public sector first, the government of Senegal expected to provide market opportunity for domestic ICT industry development along with human resource development in related ICT areas, the 4th generation wireless communication technology named WiMAX. This may improve national competitiveness, and thus bring about economic development after all. It was also expected to increase the awareness about ICT and information society development among public employees and later on the general public.

At the time the project was being discussed between EDCF and the Senegalese government, there were very high demands for establishing e-Government infrastructure. Before the project was launched, the Senegalese government did not have its own broadband networks and used commercial lines for all government communications including both central and local. Since the Senegalese government had long-term plan to serve as an e-Government and ICT hub for West African countries, construction of a broadband communication infrastructure had high policy priority within the government. The Senegalese government had invited both China and Korea for the infrastructure construction. Constructing a backbone network using optic fiber was discussed with China, while EDCF of Korea planned to support connecting public offices by using wireless backhaul networks.

At the beginning, the project was a construction of a basic e-Government network which connects all government buildings in 35 different districts in Senegal, through establishing a wireless backhaul network. Among 35 districts, seven districts (427 public offices) already had a backbone network, but the remaining 28 districts in which 238 public facilities were located did not. Backbone networks in these districts were supposed to be provided by the Chinese aid. Before the backbone network was constructed, the Senegalese government planned to lease a commercial backbone line to be connected with the backhaul network that was going to be constructed by the EDCF fund. After all, both Chinese plan and the Senegalese government plan were not realized until the project was completed because the Chinese aid was not started until 2012, and the government of Senegal, ADIE in particular, failed to mobilize the necessary budget. As a result, the Korean PMC had to construct backhaul networks first and wait until the backbone network was constructed.

EDCF and ADIE were very cooperative in accommodating the changed environment of the project. As of August 2016 when the ex-post evaluation was undertaken, the backbone network with optic fiber was not constructed yet, but the project itself was completed and the output is actively used by 427 public offices that have been connected by the project. The remaining 238 public offices in 28 regions are still remained not connected to the backhaul network. These offices are using commercial internet services.

After the construction, ADIE and MEFP were mostly satisfied with the outputs; users in B/S (Base Station) & S/S (Subscriber Station) also expressed overall high satisfaction. As a part of the Project, PMC had provided technical training and education for ADIE engineers, but it turned out that the training program might not be enough to provide necessary technical supports for using and maintaining the WiMAX system. With a very small portion of budget, training for ICT experts were not effective as originally expected.[11]

Based upon the field research, most users expressed high satisfaction of the wireless internet connection. For example, users from local schools and health services stated that the wireless connection to the internet have saved lots of telecom bills, and the quality of services are similar or better than the commercial services that they had used before the government network was available. In addition, students are hanging around schools even after the classes over because free WiFi connection is available at schools. Online use of various educational contents has increased not only the quality of education, but it had also contribute to the reduction of juvenile crime rates because students tended to spend their time nearby schools using internets. At local courthouse, judges have argued that the internet connection and laptop computers provided by the project were great help for them because they could access to various code books and court cases even in the middle of case hearings.

But in most S/S, proper system maintenance was not provided. Most facilities were full of dusts, and numerous wires are switches were left without appropriate maintenance. User manuals were not provided, so did not training and education for local system operators. When the connection were out, they had to call ADIE and have waited until ADIE engineers came out to take care of it. This indicated that those remote areas from Dakar had to wait for days and even weeks to get the ADIE's repair service.

Another issue that some ADIE engineers have complained is related to the inappropriateness of the WiMAX technology. They argue that WiMAX is now obsolete technology, which makes ADIE unable to upgrade the system for better services.

WiMAX was an emerging 4G mobile communication technology when the project was discussed in 2007. At first, mesh WiFi networks were to be deployed. But when the project was agreed upon between ADIE and EDCF, the Senegalese high public officials visited Korea, and saw the fast and reliable services that were provided by WiMAX. At that time, LTE technology was not available on the market. After seeing the WiMAX system, the Senegalese government requested to change the original plan, which was supposed to provide 3G mobile communication technology, mesh WiFi to WiMAX. Later on, LTE was adopted as a standard 4G technology in the world market, while WiMAX was diminishing from the market over time. But parts and components for WiMAX system are still available in the world market, meaning that ADIE can purchase any parts and components for repairing purposes. In addition, those systems provided but not used yet until 2016 due to the lack of the backbone network connection are still existed in 238 public offices. After five to ten years of services, the system has to be upgraded anyway, and ADIE can adopt new technologies, perhaps 5G

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[11] Among US$25 million budget, only US$443 thousands, 1.77% was spent in invited training in this project.

mobile communication technology later in the future. The following table demonstrates main contexts, major actors, and critical factors that affect sustainability of the project, as well as the level of sustainability.

<Table 6> Context-oriented Analysis on the Senegalese Project

Contexts	Actors	Factors
Political/policy - ICT as a means of poverty reduction - High priority on education, 40% of budget in 2006 - Connecting public offices including local was needed - Want to be a e-Govt hub in West Africa	- High political leaders - Director of ADIE	- No major political support from high political leaders - Weak political status of ADIE - No systematic, long-term effort made for ICT/e-Govt
Economic/Financial - US$7M investment promised by Senegalese govt - Additional backbone network construction by the Chinese aid, delayed several years - Strong concern on foreign aid, weak ownership once approved	- Director-level officials of Ministry Economy and Finance	- No major investments in budgets - High concern on ODA, but low actual commitment on ICT - Not enough budget for manpower training
Institutional - ADIE as a main agency on ICT/e-Govt	- Director-level officials of ADIE	- Limited political power of ADIE - No major organization for e-Govt - No local ICT/e-Govt organization - Lack of performance evaluation and management
Technological - 2G/3G technology prevailed - WiMax first introduced by the project	- Technicians of ADIE - Invited trainees	- 4-week invited training for WiMax provided - No regular maintenance - No user manual/training provided
Others - Public admin. network in Dakar constructed in 2005 with World Bank loan - Plan to connect additional 238 local offices in 28 cities after backbone network is available	- Actual users	- High user satisfaction - No major action undertaken to connect 238 local offices far from Dakar - No educational effects

Overall, the project itself had not been completed as originally planned. The areas that were not fully completed were due mainly to the lack of financial commitment which was promised by the Senegalese government. This again, was due to the lack of project ownership on the part of ADIE. To be more exact, political power and influence of ADEI was not enough to exercise project ownership within the Senegalese government. EDCF and PMC should prepare a more careful risk management plan when there is any financial obligation that has to be provided by the recipient country.

2. Government ICT Infrastructure in Angola Project, 2007~12

<Table 7> Summary of the Angolan Project

Title of the Project	Government ICT Infrastructure in Angola Project
Name of Borrower	Ministry of Finance, Angola
Executing Agency	National Commission for Information Technologies
Loan Amount	An amount in Korean Won not exceeding the equivalent of 35 Million US Dollars
Terms of Loan	Interest rate: 0.5% per annum Maturity: 30 years including a grace period of 10 years
Goals of the Project	The Project aimed to construct a National Data Center (NDC), which would serve as an infrastructure for entering the information society. It also aimed to develop ICT manpower and to connect educational and research networks as a pilot network to share knowledge and expertise in Angola.
Scope of the Project	The main scope of the Project was to construct an NDC to collect and manage government information and data in Angola. - NDC was going to provide necessary standards for ICT operations within the government of Angola including SW and guidelines - As a pilot project, it would connect local universities and colleges in Luanda through mesh-WiFi network, and would test the possibility of expanding it to the rest of the country - The Project also included capacity building for ICT engineers and technicians as well as necessary consultations in order to operate NDC properly

Source: Korea EXIM Bank (2016.12). Government ICT Infrastructure in Angola Project.

The project aimed to construct a National Data Center as a hub for e-Government and government network management. The project consisted of three parts: 1) creating NDC, 2) connecting pilot research and education networks, and 3) fostering skilled ICT manpower.

Like the Senegalese project, the project was a typical EDCF e-Government loan project aimed to increase efficiency, effectiveness, and transparency in public administration and to improve the quality of public services. By improving the public sector first, it was expected to increase

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the awareness about ICT and information society development among public employees and later on the general public.

This was the first project undertaken by the government of Angola as part of the "Information Society Implementation Plan" and the "Long-term ICT Infrastructure Development Plan" in order to overcome the vulnerability of the infrastructure of its own ICT sector. The government of Angola was eager to build its own 'National Data Center' in order to accumulate government-level administrative data and establish a knowledge sharing network between universities and research institutes to nurture human resources in ICT sectors.

At the time NDC project was discussed in 2005, the ICT infrastructure in Angola was not developed as planned in the National Strategic Plan for Development of Information Technology and the Information Society Action Plan prepared as early as 2000, when the first legislation of digital Angola was approved (EDCF, 2006: 15). Although there were plenty of plans for developing e-Government services, none of them had been realized. Even the ratio of digital documents out of all government documents was probably less than 20%, according to interviews with four high public officials in the central government. Under this situation, the NDC project was selected as a pioneering project to accelerate similar e-Government projects.

But from the beginning, the project was not implemented smoothly. First and foremost, the location of NDC has been changed twice. At first, it was planned to build within the national university, right beside the CNTI. But later the scale and scope of NDC became much bigger to hold all central and perhaps later local governments' servers. Due to this, one year and half was passed with many construction items were already shipped and delivered to Angola.

In the meantime, the head of CNTI had been changed four times throughout the implementation period, and the jurisdiction over the pilot educational networks was transferred to the Ministry of Education. In addition, the ministry that CNTI was located was changed from Ministry of Science and Technology (MoST) to the Office of the President, and again to the Ministry of Information and Communication (MIC). This organizational and leadership changes simply meant weak political leadership as well as project ownership during most of the project implementation period. In addition, the Director of CNTI is the same level as one of the directors of MCI, meaning that the power and influence of CNTI is relatively weak.

More importantly, the basic Public Administration Network (PAN), which was planned to be constructed by the Chinese aid was postponed until 2010. Thus when NDC was completed in early 2012, PAN was not available, meaning that NDC could not be used until PAN was connected to NDC for proper operation. As a result, NDC was locked and was not used until 2014 when it was connected to PAN, during which facilities of NDC were virtually abandoned without proper maintenance programs. During this period, one extra generators out of two was stolen, and most of PCs were out of order. In addition, one LCD monitor out of two in the control room, and batteries of UPS (Uninterrupted Power Supply) unit were no longer usable.

The construction of NDC and pilot research and education networks were successfully completed as planned. The surface of the three-story NDC building was made of intensified glasses, which looks very nice and modern. But considering the weather condition in Luanda, Angola, glass-surfaced building would not be appropriate. Due to the greenhouse effect, the inside temperature in NDC always skyrocketed, and thus all air-conditioning systems had to be turned on at the maximum capacity for 24 hours for all years. No matter how good the air conditioning systems are, this would create problems. After a year and half of maximum use of air conditioning in the main office, it was out of order and not yet fixed over a year when I visited for the ex-post evaluation study. According to CNTI people, they have contacted local LG services, but they could not fix it because the product model is not used in Angola.

More serious problem lied in developing necessary human resources for proper Operation & Management (O&M) of NDC. Since NDC was not connected to government networks and due in part to the changing leadership and other reasons, CNTI failed to provide necessary manpower to be trained and educated through on-the-job training program by PMC. Although PMC had provided extended warranty services for one and half years more than originally contracted, CNTI could not send their local O&M people to be trained for O&M.

About 40 IT engineers were invited to Korea, and trained by PMC in operating NDC. But about 30 trainees were already left from CNTI, and even the rest 10 trainees did not have sophisticated IT expertise because training for four-week period was simply not enough to acquire necessary technical expertise to fully operate NDC. In addition, there had been no additional training opportunities for upgrading their technical expertise at all after the completion of the project. Among US$35 million budget, only US$1,591 thousands, or 4.0%, were spent on training and education for 40 IT engineers.

<Table 8> Context-oriented Analysis on the Angolan Project

Contexts	Actors	Factors
Political/policy - ICT infrastructure as a means of development - NDC as a base for e-Govt	- High political leaders - Director-level officials of MoST - Director of CNTI	- No major political support from high political leaders - Weak political status of CNTI - Frequent changes of govt organization - Frequent changes of CNTI leadership
Economic/Financial - Govt budget for ICT/e-Govt - PAN construction by the Chinese aid, delayed several years - Strong concern on foreign aid, weak ownership once approved	- Director-level officials of Ministry Finance and MoST	- No major investments in budgets - High concern on ODA, but low actual commitment on ICT - Not enough budget for manpower training
Institutional		

- CNTI as a main agency on ICT/e-Govt	- Director and Deputy Director of CNTI - Section Chief-level officials of CNTI	- Limited political power of CNTI - CNIT began to build up institutional network among ministries of central govt for e-Govt - Just start local ICT/e-Govt organization - Lack of performance evaluation and management
Technological - NDC operation and management - ICT in general	- Engineers of CNTI - Invited trainees	- 4-week invited training for NDC provided - No O&M OJT - Lost most user manuals - Try to upgrade tech expertise - Provide tech training and education to nearby high school students
Others - PAN by Chinese aid provided in 2014, and O&M is being provided in 2016 - Plan to connect additional local governments to NDC	- Actual users - NDC personnel	- Over 90% server space still available - Many facilities and equipment were stolen or out of date - Big display at the control room was out - Air-conditioner in main office area was out

In short, the project itself was well implemented and deliverables were actually delivered as planned, the effectiveness and sustainability of the project had been in big trouble due to political, institutional, and other factors according to the close look at the contexts of the project operated. But when an ex-post evaluation study was undertaken in August 2016, six government ministries and one private organization entrusted their servers to NDC's management. CNTI has recently tried hard to make NDC as the center of e-Government in Angola, but it would take quite a while and require lot more efforts on the part of high political leaders to utilize NDC as was originally designed.

CONCLUSION

Developing countries are encouraged to invest in having e-Government because it is expected to reduce corruption and increase transparency within government and providing public services. Lots of investments have been made in constructing government networks, developing specific applications to provide public services, and for innovating governance. But outcomes of such efforts seem not so satisfactory. In fact, significant number of ICT and e-Government projects were turned out to be a long term failure regardless of combined efforts by developing countries, PMCs, and donor countries.

Researches have been undertaken to explain why this occurred. Two types of previous researches were identified. One is factor-oriented approach, which has tried to find out critical success/failure factors for e-Government ODA projects. The other is actor-oriented approach, which puts more emphasis on complex interplays among stake-holders that affect to the project success/failure. Both of these approaches explain the causes of ICT/e-Government ODA projects case by case, but both of these approaches have to be supplemented by actual contexts in which stake-holders are interacting with each other. Critical success/failure factors are in fact the outcomes of stake-holder interactions, whose actual impacts on success or failure of the project would be varied based upon the contexts in which interactions are taken place.

In this study, I have used two EDCF loan projects in West Africa to explain the causal relationships between the project implementation and its sustainability. Interplays of stake-holders under various contexts, i.e., political/policy, economic/finance, institutional, technological, and others, have been explained to find out specific factors that affect sustainability of the project. Overall, both projects have been problematic in long-term sustainability. From the contextual analysis, we can conclude that project ownership was not enough due to lacks of strong political leadership and institutional capabilities. In addition, technological expertise were not empowered enough to maintain the project outcomes partly due to lack of systematic plans and budget to increase technological expertise.

REFERENCES

Anand, A., P. Seetharaman, and S. Vaidya. (2016). "Role of Project Owner in e-Government Project Sustainability," *Journal of Information Technology Case and Application Research*, 18(4): 200-219.

Batchlor, S. and P. Norrish. (2003). *Sustainable ICT: Sustainability*. Recited from Pade, et al. (2006).

Dias, D., K. Weerasinghe, N. Kodikara, and Y. Ekanayaka. (2014). "Achieving Sustainability of e-Government Projects in Developing Nations," 25th Australasian Conference on Information Systems, Dec. 8th-10th 2014, Auckland, New Zealand.

Doucouliagos, H. and M. Paldam (2009). "The Aid Effectiveness Literature: The Sad Results of 40 Years of Research," *Journal of Economic Surveys* (Online).

EDCF. (2006). *Feasibility Study Report: Implementation of Government ICT Infrastructure in Angola*, Draft. August.

Farrell, B. and L. Twining-Ward. (2005). "Seven Steps Towards Sustainability: Tourism in the Context of New Knowledge," *Journal of Sustainable Tourism* 13(2).

Furuholt, B. and F. Wahid. (2008). "e-Government Challenges and the Role of Political Leadership in Indonesia: the Case of Sragen," 41st Hawaii International Conference on System Sciences.

Gerster, R. and S. Zimmermann. (2003). *Information and Communications Technologies and Poverty Reduction in Sub-Saharan Africa*. Gerster Consulting. Recited from Pade et al. (2006)

Heeks, R. (2005). "Sustainability and the Future of eDevelopment," IDPM Development Informatics Working Paper No. 10, University of Manchester, UK. http://www.manchester.ac.uk/idpm/dig.

Heeks, R. (2003). "Most e-Government-for-Development Prlkjects Fail: How Can Risks Be Reduced?" *i*Government Working Paper Series No.14, IDPM. http://hummedia.manchester.ac.uk/institutes/gdi/publications/workingpapers/igov/igov_wp14.pdf.

Hong, S. and S. Lee. (2013). "Aid Effectiveness in Practice: A Case Study on the National Data Center in Mongolia," *Service Research* 3(2): 1-17.

IEG World Bank. (2011). Capturing Technology for Development: An Evaluation of World Bank Group Activities in Information and Communications Technologies. Volume 1: Evaluation. Washington, D.C.: World Bank Group. Available online, http://documents.banquemondiale.org/curated/fr/803651468340787329/pdf/653750PUB0v10B0BLIC00ict0evaluation.pdf

Kidd, C.V. (1992). "The Evolution of Sustainability," *Journal of Agricultural and Environmental*

Ethics 5(1): 1-26.

Kimaro, H. C. (2006). Decentralization and Sustainability of ICT Based Health Information Systems in Developing Countries: A Case Study from Tanzania, Unpublished Ph.D. Dissertation, University of Oslo, Norway.

Korea EXIM Bank. (2016. 12.) Report on Ex-post Evaluation about the Government ICT Infrastructure Project in Senegal.

Korea EXIM Bank. (2016. 12.) Report on Ex-post Evaluation about the Government ICT Infrastructure in Angola Project.

Korpela, M., H. A. Soriyan, K.C. Olufokunbi, and A. Mursu. (1998). "Blueprint for an African Systems Development Methodology: An Action Research Project in the Health Sector," in C. Avgerou, ed. *Implementation and Evaluation of Information Systems in Developing Countries*, Vienna: International Federation for Information Processing, 273-285.

Kumar, R. and M. Best. (2006). "Impact and Sustainability of e-Government Services in Developing Countries: Lessons Learned from Tamil Nadu, India," *The Information Society* 22: 1-12.

Lamb, R. and R. Kling. (2003). "Reconceptualizing Users as Social Actors in Information Systems Research," MIS Quarterly 27(2): 197-235.

Lessa, Lemma, Mesfin Belachew, and Salehu. (2011), "Sustainability of e-Government Project Success: Cases from Ethiopia," AMCIS 2011 Proceedings. http://aisel.aisnet.org/amcis2011_submissions/411.

Luk, S. (2009). "The Impact of Leadership and Stakeholders on the Success/Failure of e-Government Service: Using the Case of e-Stamping Service in Hong Kong," *Government Information Quarterly* 26(4): 594-604.

Nawi, S., O. Ibrahim, A. Rahman. (2013). "Public e-Service Sustainability Failure Factors: An Exploratory Study," PACIS 2013 Proceedings, 234.

Nurdin, N., R. Stockdale, and H. Scheepers. (2014). "The Role of Social Actors in the Sustainability of e-Government Implementation and Use: Experience from Indonesian Regencies," 47th Hawaii International Conference on System Sciences.

Nye, J., P. Zelikow, and D. King, eds. (1997). *Why People Don't Trust Government?* Boston, M.A.: Harvard University Press.

Pade, C., B. Mallinson, and D. Sewry. (2006). "An Exploration of the Categories Associated with ICT Project Sustainability in Rural Areas of Developing Countries: A Case Study of the Dwesa Project," Proceedings of SAICSIT, 100-106.

Pade, C., B. Mallinson, and D. Sewry. (2009). "An Exploration of the Critical Success Factors for the Sustainability of Rural ICT Projects: The Dwesa Case Study," in C. Barry et al, eds. *Information Systems Development: Challenges in Practice, Theory, and Education*, Vol. 1.

Rajan, R. and A. Subramanian (2008). "Aid and Growth: What Does the Cross-country Evidence Really Show?" *The Review of Economics and Statistics* 90(4): 643-665.

Reynolds, J. & W. Stinson. (1993). "Sustainability Analysis." Paper presented at the Primary Healthcare Management Advancement Programme.

Sachs, Jeffrey D. (2015). *The Age of Sustainable Development*. New York: Columbia University Press.

Stoll, K. (2003). *Telecentres Sustainability: What Does It Mean?* Recited from Pade et al. (2006).

World Bank. (2003). *ICT for Development Contributing to the Millennium Development Goals: Lessons Learnt from Seventeen InfoDev Projects*. Washington, D.C.: The World Bank.

World Bank Group. (2002). Information and Communications Technologies: A World Bank Group Strategy. Washington, D.C.: World Bank Group. Available online, http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/SSPwithAnnexes.pdf (Viewed on May 29, 2017)

Yin, R. (2009). *Case Study Research: Design and Method*. Sage.