

Evolution of ICTs in Peru and Key factors for its Development Under the Korean Model

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Abstract: ICTs are playing a vital role in the effort to alleviate poverty and promote local development. ICTs provide access to information that can create opportunities to generate income, improve access to basic services, or increase the impact of interventions in education and health.

South Korea is a global leader in ICTs. Literature review explains that in the case of this Asian country, short and long term strategies were established with concrete objectives. Political will and leadership, suitable resource distribution, and timely feedback were also key factors in Korea's success.

The review of those elements applied in a Peruvian context show us the feasibility to improve the current situation in the country. The author provides a first look of opportunities, problems, and ways to overcome those challenges, opening discussions for further research.

Keywords: ICTs, local development, success (impact) factor, e-Government, digital gap, information society, connectivity, Peru

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Introduction

Since the beginning of the 21st century, we have witnessed profound changes in our society due to the exponential increase in the creation and dissemination of information in all fields of knowledge, social strata, and places where there is a person available to participate in this flow of content.

Visionaries understood this paradigm as the new information society (Drucker 1993; Dyson et. al. 1994; Toffler 1980). According to CEPAL in the Bavaro Declaration, the information society is defined as:

“The information society is an economic and social system where knowledge and information constitute the fundamental sources of well-being and progress and that it represents an opportunity for our countries and societies, so long as it is understood that the development of that society with in a global and local context requires a deeper appreciation of fundamental principles such as those of respect for human rights within the broader context of fundamental rights, democracy, environmental protection, the advancement of peace, the right to development, fundamental freedoms, economic progress and social equity.”

This broad explanation mentions a series of keywords like wellbeing, progress, development, democracy, and equity. With this vision, most developed countries took quick action to create efficient platforms and promote the flow of information. The use of information and communication technologies has been the main tool in this venture. We can therefore conclude that there is an intrinsic relationship between the use of ICTs as a means of developing societies.

Significance of the Research

In 2009, the Peruvian Government with the cooperation of the Ministry of Knowledge and Economy and the Korean IT Industry

Promotion Agency, created the “Peru e-Government Master Plan” including a broad environment and status analysis, establishment of vision, strategies, and implementation plan.

The objective was to improve the information and communication technologies (ICTs) as well the electronic government of the Andean country, emulating the model that took South Korea to the world leadership position. However, the literature review concerning the Korean model agree that the factor of success was not the only factor in developing a suitable development plan.

The goal of this paper is to identify, through a theoretical review, the key factors of Korean ICT development and make a comparison with Peruvian ICT policies and current state. The paper will conclude with general guidelines to improve Peruvian ICT performance.

Importance of ICTs, Local Development, and Public Sector

ICTs are playing a vital role in the effort to alleviate poverty and promote local development. ICTs provide access to information that can create opportunities to generate income, improve access to basic services, or increase the impact of interventions in education and health. ICTs also give voice to the people to demand government support and reforms. The exchange of information is part of almost all elements of an economy; therefore, the performance of the rest of the economy will depend on the ability to exchange information.

The local development under a sustainable scope must consider economic, social, and environmental dimensions (UN 1992). Therefore the relevance of ICTs includes the following aspects:

- Education: reduce distances, relieve teacher shortages and physical materials, effective in relation to cost, expanding opportunities for distance learning, ICT increases competition and ensures that the population is able to adapt new technologies.
- Health: data storage and transmission, publication and dissemination of

medical research, consultations among medics and patients, collaboration among doctors, especially in remote areas.

- Environment: compiling data and developing databases for public access that can analyze and classify information on the environment, promote communication and knowledge sharing between the public and private sectors to achieve objectives efficiently.
- Economic: access to new sources of income, financial services such as loans and insurance, facilitates trade through virtual sale services and marketing tools, facilitates trade among buyers and sellers from remote areas, reduction of cost and access to economies of scale.
- Social assistance: decentralization of the provision of social services, sorting records, databases and information, information on vacancies and employment opportunities.

Additionally, the relationship among ICTs and the public sector: Electronic government has evolved significantly, providing benefits for society and government itself. A summary of the research did by Aznar (2003), Brown and Brudney(2004), Dawes and Prefontaine(2003), Gant et al. (2002), Holzer and Manoharan(2007), Homburg (2008), IFAD (2003), Naser and Concha (2011), OECD (2005), Wang et al. (2005), West (2005) refer to those benefits:

Benefits to civil society (business and citizens):

- Equal access to information by citizens is an essential right that strengthens the democratic practice.
- More effective communication between citizens and the government, especially those living in remote places or sparsely populated.
- Strengthen the decentralization process.
- Citizens have the right to participate and express their views electronically.
- Attention without time restriction.
- Resolving queries through a single contact with the state, even if they are requirements that involve more than one institution.

- Possibility of financial electronic transactions, saving time and money on travel.
- Citizens are free to inquire about information from public acts of the State that is of their interest.

Benefits to Government (employers and institution):

- Decreased time of the different operations carried out by citizens, thereby increasing attention span.
- Improved collaborative exchange between different areas.
- Reducing costs by sharing resources improving the efficiency and quality of service
- Transparency in public administration, auditing processes, access and continuous flow of information
- Strengthens governance, strengthen participatory and representative democracy
- Agility in budgetary execution
- Encouragement to improve the quality of public servants in terms of skill and professionalism.
- Improvement of the processes of government and procedures of the public sector through new processes, interconnecting them and support systems.

The Republic of Korea, Global Leader on ICTs

According to the United Nations 2012e-Government Survey and the research conduct by ITU (2013), Korea is ranked first on the e-government index and development of ICTs in the world; those rates are the result of the integration of different components, such as online services, telecommunications infrastructure and human capital.

The story of the “Miracle on the Han River”(한강의 기적) has been told many times to describe how Korea, a country devastated by war with the lowest GDP per capita in the world, found away to become

a developed nation in only fifty years due to strong leadership and the unflagging work of its people. However, how Korea reached the top in the particular case of ICTs is explained to us in the analysis on the documents produced by Song (2006, 2009), MOSPA (2008), and NIA (2012).

Korea's short and long term strategies were established with concrete objectives, showing logical sequences of steps leading to the same objective: the delivery of useful services for the whole Korean society. The development stages of e-Government in Korea include:

Table 1. Development Stages of E-Government in Korea

Stages	Major Actions
Inception (mid 1980s~mid 1990s)	-Building 5 National Basic Information Systems (NBIS) -Act on Computer Network Expansion and Usage Promotion (1987)
Foundation (mid 1990s~2000)	-Building foundation for high-speed information and -communications and promoting the Internet -Enacting the Framework Act on Informatization Promotion (1995)
Launch (2001~2002)	-Carrying out 11 major initiatives for e-government -Enacting the Act on E-Government (2001)
Diffusion (2003~2007)	-Carrying out 31 roadmap projects for E-government -Laying the groundwork for linking and integrating multiple -government departments and agencies
Convergence (2008~present)	-Establishing Master Plan for National Informatization (2008) -Carrying out tasks (12) for e-Government based on the principles -of openness, sharing and cooperation
Smart Gov (2011~present)	-Initiating the future e-Government blueprint, Smart Government -(2011~2015)

Source: NIA (2012)

According to Doctor Hee Joon Song (Ewha Womans University), it “is difficult to identify an appropriate model that can explain the agenda formation and implementation to e-government, [...] success determining factors become more complex in both structure and appearance as the e-government evolves”.

In general, the main factors identified by Song are¹:

1. Environment: the IT development project was formed and implemented in mutual interaction of needs and seeds in the political, social, as well as economic and industrial technical environment.
2. Political will and leadership: in Korea's political system, in which presidential political power is so strong, the most important factor for the success in pursuing e-government project was the interest and will of the president.
3. Visions & Goals and Project Priority: as the results of mutual interactions of political, social, economic and industrial, and technological environment factors. Reflects not only environmental conditions but the social needs for overcoming the limitations.
4. Implementation Organization & Resource Distribution: the resources employed during the implementation stage of the project. As well the combination of government group and external group mutually interacting with the interests and leadership.
5. Feedback and Learning: activities for reflecting project achievement assessment results towards improvement of future activities. Each stage was reviewed to identify the success and failure factors and such process minimized the failure risks while maximizing the chances of success in future projects.

The key factors model explained are part of further research aimed to make comparisons with similar experiences in Cambodia (Sinawong et al. 2009), Turkmenistan (Orazbayev 2012), Arab countries (Al-Khoury 2013) and as a part of a strategic framework for developing countries (Mkude and Wimmer 2013); therefore being a reference for the author in the present case study.

¹ The following notes were extracted from Song Hee-Joon (2009). E-Government of Korea, Achievements & Tasks. Ewha Womans University.

Development of ICTs in Peru

Origins and institutionality

In Peru, the driving organization that promotes the public use of the internet was the “Red Científica Peruana” (Peruvian scientific network) in 1994, installing 40 computers in order to ensure that any person can access internet without any restriction. According to the survey of information resources in 1995, the internet presence at public institutions emerged in 1997. The first public sector websites appeared and in 2001 the Peruvian government portal was launched: www.peru.gob.pe (INEI, 2002 a).

According to official statistics of 2001, only 59.6% of institutions in public administration had access to the internet. In the case of local governments, the situation was worst with only 20.9% connected to the internet, a situation reflected in the poor use of ICTs in local governments. At the central government level, the situation was most favorable; around 80.8% had a connection, especially in the minister’s council, and ministries of foreign affairs, economy and energy with their offices completely integrated (INEI 2002 b).

Later in 2003, the Peruvian government created the National Office for e-Government and Informatics (ONGEI) which designed the National Strategy of e-Government 2013 – 2017 (CODESI 2011; ONGEI 2012). Its mission is leading the projects, regulations, and various activities regarding to electronic government. Among its ongoing activities are the regulations related to information technology, information security, development of flagship projects in ICTs, providing technical advice and information to public entities, as well as provide training and dissemination of e-government issues and modernization and decentralization.

A Glance of Peru ICTs in a Global Context

A comparison among South Korea, Peru and four countries with a similar GDP per capita² shows Peru's low rank in the development of ICTs.

Table 2. ICT Development Index (IDI), 2011 and 2012

Economy	Rank 2012	IDI 2012	Rank 2011	IDI 2011	GDP p.c. (ppp) 2012
Korea	1	8.57	1	8.51	31,950
Serbia	56	5.34	51	5.38	10,722
Colombia	77	4.20	78	3.89	10,671
Ecuador	81	4.08	83	3.73	10,215
South Africa	84	3.95	85	3.67	11,281
Peru	92	3.68	91	3.58	10,596

Source: ITU. GDP p.c.: IMF

The disadvantages of Peru are observed in the three sub-components of the overall index: use, access, and skill indicators. Low rate factors are the percentage of households with computers (25.4%) and Internet access (20.2%), active mobile-broadband subscriptions (2.9%) and literacy rates (89.6%). In Appendix 1 attached is a full summary of IDI index, as well as its sub components.

Despite the sustained growth of the Peruvian economy in the last decade, the country still struggles to find a formula to allow a more equitable distribution of income among its population, while the capital and major cities have all the technological advances and access facilities, it is in the provinces and remote areas where the lack of access to ICTs is more palpable. In the next section we will have a closer look at the situation of ICTs in local governments.

² For this comparison was selected South Africa, Serbia, Colombia and Ecuador; according with the IMF the GDP per capita (ppp) among those countries have a difference lower than $\pm 2.5\%$.

ICTs in Peruvian Local Governments

The role of ICTs in the public sector is growing year by year, in the best cases changing paradigms of a heavy bureaucratic machine for an efficient system. The adoption of ICT's in public administration is generally known as e-Government, as a means to deliver information and services to citizens and business. The literature review and the analysis of cases around the world confirms that e-Government can be used as a powerful platform to boost socioeconomic development, establish democratic channels between citizens and government, reduce internal costs, and increase tax collection.

In 2012, 73.8% (1,353) of all districts around the country (1,834) had internet access, whilst 26.2% (481) didn't have a connection. Among the group that had access, 69.8% were connected through satellite connection and analogical modems. The bandwidth of those types of connections were the normal standards in developed countries twenty years ago, and is important because the capacity of data transmission is related with the capability to offer new services to citizens in an e-Government context. Especially in the case of satellite connections, the quality of transmission depends on exogenous variables related with the weather, which causes difficulty in the rainy seasons.

In the case of connections with optical fiber, 30% are located in the city of Lima and the rest in the major cities of each region. The ADSL (Asymmetric Digital Subscriber Line) is a standard that allows a higher average of data transmission compared with analogical modem and satellite. Crossing information between size populations of municipalities and types of connection, there is a clear direct correlation between them. Small size places with populations below 50,000 habitants have mainly satellite and analogical connection; whilst larger cities are characterized by the use of ADSL and optical fiber.

In regards to services delivery (using local government's websites), the author assessed the contents of 149 municipalities finding a lack of quality in information control, usually with broken links or information

not updated. Although ONGEI provides a free service to create websites and the hosting service is free for the first year, usually, municipalities give up payments of the subsequent periods and don't renew the hosting rights. It is important to mention that many of the municipalities despite not having a website have a Facebook account. Some Facebook accounts are official and managed by local government. Others are created by individuals that live outside their hometown and use the social network to gather other individuals from that town or city and for some reason live in other place.

Around 84.6% of municipalities show information about the administration performance. This means that they use websites as "promotional tools" (West, D. 2005: 9) to show the achievements of majors with popularity intentions. On the other hand, tourism and culture is an informative feature that appeared in 68% of cases. From the author's personal observations, inhabitants, especially from regions and rural areas, have an inclination to promote their natural resources and local attractions. Many of them complemented properly with a wide multimedia content in the same range, including gallery of pictures, videos, and also music.

Another aspect of public outreach that was investigated concern requests from ordinary citizens (West, D. 2005:111). West issued the following question: how seriously do government officials take electronic requests for information from citizens? Do they respond to them and if so, how long does it take and which is the level of clarity in those responses? In order to test government responsiveness, messages were sent to 135 municipalities, using mainly the consultation module available on the website, writing an email, or using the Facebook private message option only with official Facebook pages.

West applied the same responsiveness test to public offices in United States in 2001 and obtained a final response of 80% with 52% responding within a single day. In our case, the results were mediocre. Only 5% of messages were replied to, reflecting that local governments in Peru are not engaged with the use of ICTs and don't see or understand

the possibilities it offers for the local development of their regions.

Feasibility to apply the Korean Model in the Peruvian Context

Doing a comparison between the Korean and Peruvian development model, we can conclude that both of them have a strategic short and long term plan. Also, a Peruvian framework has been developed with contributions from the Korean government (ONGEI 2009).

However, planning is not the only success factor, as Professor Song explained; other factors attributable to the Korean model should be analyzed to get a better idea of the feasibility in a Peruvian context:

Table 3. Analysis of Key Factors for the Development of ICTs in a Peruvian Context

Key factor	Opportunities	Problems and Challenges	Solutions
Environment	Social demand for new services and technological solutions	Identify real needs of the population	Improving consultation and feedback with the end customer (individuals, companies)
	Easy access to adopt foreign technology	Dependence on suppliers in the early stages after sales and maintenance	Implement comprehensive technology transfer processes.
	Political leaders agree on the need to modernize the public system	There is no consensus on how to boost ICT	All political parties should adopt the National Strategic Plan
Political Will and Leadership	ICT Development is a national policy	Most local government leaders are indifferent to the development of ICT	Increase the participation of mayors
Vision & Goals and Project Priority	Existence of a long-term strategy	Political parties and civil society do not know or participate in the process	Increase the participation of political leaders and civil society

			representatives
Implementation Organization & Resource Distribution	Peru's economy is strong, has resources and grows steadily	Bureaucratic hurdles, difficult access to more remote areas, corruption in procurement processes	Encourage the development of public-private investment, outsourcing services
Feedback & Learning	There are various channels for citizens and companies to express their opinion regarding the use of ICT	Feedback processes are weak, responsible institutions do not take into account the views.	Regulate the need to include the recommendations of citizens in improving services.

Final Remarks

ICTs are a dynamic element essential to an advanced society. Consequently, those who, individually and collectively, achieve development of infrastructure and capacity will be privileged and will have greater decision-taking power and influence in building the knowledge society.

Peru has resources and facilities to improve its actual stage of ICTs; however, the biggest challenge will be the political will and leadership that usually changes from one government to the next. That factor was crucial in the development of Korea.

To provide e-services, a necessary precondition is to have an adequate infrastructure of communications. According to the data obtained, the actual situation of bandwidth access is not ready to support services like broadcasting and transmission of macro data. We have seen the low indexes in numbers of fixed lines, mobiles, and internet penetration. That issue must be seen as a great opportunity for public-private partnership and promoting investment in far regions.

The official institution related with electronic government ONGEI must improve the quality control of the information content in its database in order to have a real diagnosis of the current situation of ICTs in the country.

There is a big opportunity to establish a close relation between citizens and local governments. Through social networks it will be possible for Peru to promote the outreach of programs, address opinions from citizens, interchange experiences, and publish relevant materials as well as multimedia content.

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APPENDIX 1

ICT Development Index (IDI), 2011 and 2012

Economy	Rank 2012	IDI 2012	Rank 2011	IDI 2011
Korea	1	8.57	1	8.51
Serbia	56	5.34	51	5.38
Colombia	77	4.2	78	3.89
Ecuador	81	4.08	83	3.73
South Africa	84	3.95	85	3.67
Peru	92	3.68	91	3.58

Source: ITU

ICT Sub-component: Access indicators

Economy	Fixed-telephone subscriptions per 100inhabitants		Mobile-cellular subscriptions per 100inhabitants		International Internet bandwidth bit/s per Internet user		Percentage of households with computer		Percentage of households with Internet access	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Peru	11.1	11.5	110.4	98.8	<i>9'448</i>	<i>13'206</i>	25.4	29.9	16.4	20.2
Ecuador	15.1	15.5	104.5	110.7	27'742	33'146	28.8	32.2	16.9	22.5
South Africa	8.2	7.9	<i>126.8</i>	<i>134.8</i>	<i>11'668</i>	<i>18'700</i>	21.5	23.6	23.2	25.5
Colombia	15.2	13.2	98.5	103.2	9'733	12'164	29.9	38.4	23.4	31.1
Serbia	37.3	30.2	125.4	92.8	76'761	70'528	55.8	<i>60.3</i>	<i>43.9</i>	<i>48.0</i>
Korea	60.9	61.9	108.5	110.4	17'170	26'035	81.9	82.3	97.2	97.4

Note: Data in italics refer to ITU estimates

Source: ITU World Communications / ICT indicators database

ICT Sub-component: Use indicators

Economy	Percentage of individuals using the Internet		Fixed (wired) broadband subscriptions per 100 inhabitants		Active mobile-broadband subscriptions per 100 inhabitants	
	2011	2012	2011	2012	2011	2012
Colombia	40.4	49	6.9	8.4	3.8	5.1
Ecuador	31.4	35.1	4.2	5.4	10.6	22.3
Korea	83.8	84.1	36.9	37.6	105.1	106
Peru	36	38.2	4	4.8	1.5	2.9
Serbia	42.2	48.1	11.3	10.2	35.1	40.8
South Africa	34	41	1.8	2.2	19.8	26

Note: Data in italics refer to ITU estimates

Source: ITU World Communications / ICT indicators database

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ICT Sub-component: Skill indicators

Economy	Gross enrolment ratio				Adult literacy rate	
	Secondary		Tertiary			
	2011	2012	2011	2012	2011	2012
Colombia	97.5	97.5	42.9	42.9	93.6	93.6
Ecuador	87.6	87.6	39.8	39.8	91.6	91.6
Korea	97.1	97.1	103.1	103.1	99.0	99.0
Peru	91.2	91.2	43.0	43.0	89.6	89.6
Serbia	91.5	91.5	50.4	50.4	98.0	98.0
South Africa	93.8	93.8	15.8	15.8	93.0	93.0

Note: Data in italics refer to ITU estimates

Source: UIS. Latest available data