

# A Study on the Contribution Factors and Challenges to the Implementation of E-Government in Cambodia

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**Abstract**—To this point, there have been few studies of e-Government in Cambodia. This study can be considered as a first step in the examination of e-Government in Cambodia<sup>1</sup>. The paper examines the various factors that contribute and challenge the implementation of e-Government. These factors are grouped into three main categories: 1) management, 2) infrastructure, and 3) human factors. In the context of the implementation of the Government Administration Information System (GAIS) in Cambodia, factors that potentially influence and challenge the progress of e-Government are explored. This exploration indicates that the contribution factors are political leadership and will, effective management within a complex and fragile environment, information and communication technology policy, and capacity development. At the same time, challenges critical to implementing e-Government include variations in support among leadership, the lack of high prioritization of (or even need for) e-Government at present, a poor information and communication technology infrastructure, a low rate of literacy, and a high turnover rate among government information technology staff.

**Index Terms**—e-Government, contribution factors, challenges, Government Administration Information System (GAIS), Cambodia

## I. INTRODUCTION

Since the United Nations supervised its elections in May 1993, Cambodia has undergone dramatic changes. Most significant have been the country's transition from conflict to unity (as it finally enjoys peace), from a centrally planned economy to a market economy, and more recently, from one-party rule to a democratic system of governance. However, Cambodia still faces a variety of challenges to effective governance, including corruption, poor public administration, and lack of adequate transparency and accountability in the exercise of public decision making and the delivery of public services. Moreover, after joining the Association of Southeast Asian Nations (ASEAN) in April 1999 [1], Cambodia will face revenue losses due to the ASEAN

Common Effective Preferential Treatment (CEPT) Scheme, which will require lowering Cambodia's import tariffs to 0-5 percent by 2010. The lowering of the import tariffs will definitely affect the government budget, because 16.31 percent of that budget depends entirely on import taxes [2]. These problems have prompted a growing interest in practical reform initiatives. One proposed solution has been to use e-Government to achieve various reform objectives, as the benefits of e-Government can include less corruption, increased transparency, greater convenience, revenue growth, and cost reductions [3]. This proposed solution has led to the adoption of the so-called Government Administration Information System (GAIS).

By now, significant experiences with the GAIS have been accumulated, revealing key contribution factors and challenges. Therefore, the purpose of this study is to examine these factors and their implications for implementing the GAIS in Cambodia.

The remainder of this paper is organized as follows. Section 2 presents the literature review, followed by the description of the e-Government in Cambodia presented in Section 3. Section 4 presents and discusses the contribution factors and challenges in implementing e-Government. Section 5 brings this paper to a conclusion, including implications and suggestions for future research.

## II. LITERATURE REVIEW

### A. Definitions, Benefits, and Costs of E-Government

Simply defined, e-Government is the use of information and communication technologies in general and the utilization of Internet in particular to improve the efficiency, effectiveness, transparency, accountability, and activities of a public sector organization, with the goal of achieving better government [4], [5]. Better government means delivering public services and processing internal works in the government in a much more convenient, customer-oriented, and cost-effective way [5].

A more complex definition of e-Government given by the World Bank [3] considers it "the use by government agencies of information technologies (such as Wide Area

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Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management”.

E-Government is broadly defined because governments themselves serve multiple roles [9]. Though e-Government is variously defined, it essentially embraces the use of information and communication technologies to transform the ways that government works by enhancing administrative efficiency and effectiveness and increasing citizens’ participation in, and the transparency and accountability of, the policy-making process [4], [5]. Successful e-Government is at most 20 percent about technology and at least 80 percent about people, processes, and organizations [22]. Hence, e-Government encompasses more than just technology. It challenges the ways in which public sector services providers and citizens interact.

E-Government can contribute significantly to the process of making the government leaner and more cost-effective. It can facilitate communication and improve the coordination of authorities at different tiers of government, within organizations and even at the departmental level. Furthermore, e-Government can enhance the speed and efficiency of operations by streamlining processes, lowering costs, improving research capabilities, and improving documentation and record-keeping [6].

It is estimated that the potential savings of implementing e-Government could be as much as \$110 billion and £144 billion in the U.S. and Europe, respectively [7]. However, although there have been great benefits and potential savings achieved as a result of e-Government implementation, not all e-Government initiatives have been successful. According to Heeks [8], he analyzed more than 40 e-Government-for-development projects in developing/transitional countries and estimates that 35 percent of these were total failures, while 50 percent partially failed, and only 15 percent were successes. Moreover, the United Nations Report, *e-Government at the Crossroads*, concludes that despite the very limited data on e-Government failures, the number of projects that fail is high [9], [6]. “Some analysts estimate the rate of failure of e-Government projects in countries with developing economies to be very high, at around 60-80% (with the higher rate of failure characteristic of Africa). This can look like a staggering figure – until one reviews data concerning the industrialized countries. Gartner Research puts the rate of failure of e-Government projects at about 60%. The Standish Group estimates that only 28% of all ICT projects in 2000 in the U.S., in both government and industry, were successful with regard to budget, functionality and timeliness. 23 % were cancelled and the remainder succeeded only partially, failing on at least one of the three counts” [6].

The figures above indicate that the failure rate is high particularly in developing countries. Heeks [8] identifies the potential costs of e-Government failure into six categories as follows.

- 1) *Direct Financial Cost*. The money invested in equipment, consultants, new facilities, training programs, etc.
- 2) *Indirect Financial Costs*. The money invested in the time and effort of public servants involved.
- 3) *Opportunity Costs*. The better ways in which that money could have been spent, if it was not spent on the e-government failure.
- 4) *Political Costs*. The loss of “face” and loss of image for individuals, organisations and nations involved in failure.
- 5) *Beneficiary Costs*. The loss of benefits that a successful e-government project would have brought.
- 6) *Future Costs*. An e-government failure increases the barriers for future e-government projects.

#### *B. Contribution Factors and Challenges of e-Government*

Numerous articles available in e-Government literatures deal with the contribution factors and challenges involved in implementing it [4], [5], [9], [10], [11]. Learning from the Korean experiences, Song [5] identified these factors as the top-down approach (implementing the president’s policy agenda and strong empowerment and resource mobilization), the link with government reform (the establishment of an e-Government Committee under the Presidential Committee on Government Innovation and the integration of an e-Government vision into broad policy goals and information society activities), supply-side considerations (identifying the customer’s needs and expectations, along with monitoring and evaluation), public/private partnerships (e-Government Committee operation and system development and maintenance), and finally, legal and budget supports (e-Government acts and budget allocation).

On the other hand, there are many barriers that can impede the success of e-Government, such as legislative and regulatory barriers, financial barriers, technological barriers, and the digital divide [4]. Moreover, institutional weakness and a shortage of qualified personnel or adequate training have also been identified as core factors in the failure of e-Government [11].

According to Heeks [8], the fundamental factor in e-Government success and failure is the degree of change between “where we are now” and “where the e-Government project wants to get us”. “Where we are now” means the current realities of the situation. “Where the e-Government project wants to get us” means the model or conceptions and assumptions built into the project’s design vision. Hence, e-Government success and failure depend on the size of the gap that exists between current realities and the design of the e-Government project [8].

In conclusion, the factors influencing the success or failure of e-Government seem to fall into three

categories: 1) management, 2) infrastructure, and 3) human factors. Management is linked to the supply side, while infrastructure and human factors belong to both the supply and demand sides, i.e., citizen issues. The management factor encompasses strategic issues, change management, political leadership, institutionalization, and the continuous monitoring and evaluation of the projects. Infrastructure means the information and communication technologies infrastructure, along with legislation and financial resources, while human factors include competence and skills, training, and trust [12].

### III. E-GOVERNMENT IN CAMBODIA

As a less-developed country with an emerging economy, Cambodia has struggled to improve its public sector management and land administration by utilizing the e-Government system. The establishment of the National Information Communications Technology Development Authority (NiDA) in 2000 was the starting point for e-Government project implementation in Cambodia. The Authority implemented the GAIS in April 2002 with technical assistance from the Republic of Korea. The GAIS was made possible through a concession loan from the Government of the Republic of Korea, along with the counterpart fund from the Royal Government of Cambodia [13].

Revenue generation, along with better government image and services, was the main objective of the GAIS [13]. It involves four practical applications: an electronic approval system, a vehicle registration system (for cars and motorbikes), a resident registration system, and a real estate registration system. The purpose of the electronic approval system is to allow ministries to exchange documents both internally and externally. It incorporates all traditional manual functions to allow easy use of the system. This application would cut down unnecessary delays and result in better public services. The vehicle registration system is used for managing basic vehicle data such as registration, ownership transfer, safety inspection, identification number, applicable taxes, vehicle certificates, and statistics. The resident registration system is used for managing basic resident data such as family composition, children of school age, change in family status due to marriage, divorce, birth or death, and other statistics, as well as information for ID card issuance, election administration, foreign residents, and applicable taxes. The real estate registration system is used for managing basic land records such as division and merger, ownership transfer, common land, applicable taxes, real estate certificates, and statistics.

Currently, the central government, including 7 districts and 76 communes, is fully connected. The connection allows all government offices to communicate electronically and to access the Internet and email at their convenience. The electronic approval system function has been in operation but is not widely used. The vehicle, resident, and real estate registration functions are in operation and are widely used in most parts of the city because of their convenience [2].

### IV. THE CONTRIBUTION FACTORS AND CHALLENGES IN IMPLEMENTING E-GOVERNMENT IN CAMBODIA

In the subsequent section, the contribution factors and challenges of the GAIS will be discussed in the light of the three categories mentioned in the literature review above, i.e., 1) management, 2) infrastructure, and 3) human factors.

#### A. *The Contribution Factors*

The GAIS has achieved its initial objectives of revenue generation and better government image and services, since the three core applications—the vehicle, resident, and real estate registration systems—have all generated revenue for the government through their respective services [2]. In addition to generating revenue for the government in the form of taxes and fees, the new real estate registration system allows for the storage, retrieval, and printing of all real estate information, eliminating or reducing the potential for land-grabbing in the Phnom Penh municipality. The resident registration system also generates revenue for the government in the form of fees. This new system allows for the storage, retrieval and printing of all resident information, identification cards, and certificates. With proper registration, a person can go to the city hall and have his or her identification card replaced in very little time. This service would have been impossible when the system was not yet in place. Vehicle registration, which includes processing for cars and motorbikes, also generates revenue for the government in the form of fees and road/excise taxes. This new system allows for the storage, retrieval and printing of all vehicle information for safety inspections, proof of ownership, and tax information.

The contributions to the GAIS can be sorted according to the key categories listed below.

#### 1) *Management Factor*

Political leadership and will guided by a clear vision are important to ensuring the successful implementation of the GAIS. These factors can be seen in the establishment of the NiDA in 2000, chaired personally by the Prime Minister. This sent a clear message to the public that the government had the strongest political will to date to implement and promote e-Government in Cambodia [2]. Moreover, the high-priority needs of Cambodia in the ICT sector are clearly stated in the national development plan strategy [13]. The top priority is the “Rehabilitation and Construction of Physical Infrastructure”, as indicated in the Rectangular Strategy<sup>2</sup> of Cambodia. This strategy includes reducing the cost of telecommunications as an immediate priority. Next to infrastructure development is e-Government: the use of ICT in all aspects of governance and government [14].

Besides political leadership and will, effective

<sup>2</sup> The Rectangular Strategy as the economic policy agenda for the third mandate of the Royal Government of Cambodia builds on key elements of Cambodia's Millennium Development Goals, the Cambodia Socio-Economic Development Plan 2001-2005 (SEDP2), the National Poverty Reduction Strategy 2003-2005 (NPRS), and the various policies, strategies, plans and reform programs.

management within a complex and fragile environment has also been one of the main influential factors. The GAIS was designed and implemented with total participation from each individual ministry, the state secretariats, and the Phnom Penh municipality through its representative(s) in the working group, with the NiDA secretariat as the focal point. In addition to these technical working groups, a high-level steering committee was also created at the outset of the project to solve the political issues that might arise along the way [2].

Initial conflicts among stakeholders spanned issues such as design, platform, technology, role, and participation. Most of these conflicts are resolved at the technical working-group level. Some conflicts, such as ministerial interests, were resolved at the steering-committee level. Furthermore, several workshops were conducted during the design and implementation phases to resolve conflicts that had arisen. Conflicts were addressed in the workshop in order to find the best possible resolution acceptable to all [2].

### 2) *Infrastructure Factor*

Recall that the infrastructure category not only deals with the ICT infrastructure but also concerns legislation, regulation, and policy. In the context of Cambodia, the national ICT policy was evident from the Prime Minister's speech at the IT Awareness Seminar in 2001 [15]. Six elements of ICT policy had been raised as important to preparing the long-term vision of ICT development in Cambodia. These elements include: 1) infrastructure development; 2) capacity-building; 3) the expansion of Internet use coverage; 4) Unicode and localized content; 5) incentives to encourage private participation in ICT; and 6) the protection of intellectual property rights. In addition to this, the Prime Minister also emphasized "promoting the use of modern technology in Cambodia's e-mail systems to enable the country to respond to the current needs in all sectors, especially to the development of e-commerce. The top priority in the short run is to use Information Technology (IT) to serve and to meet the day-to-day needs of the people" [13], [15].

### 3) *Human Factor*

With the introduction of new technology into the GAIS, it was revealed that there existed capacity gaps between the NiDA secretariat, all ministries, and the Phnom Penh municipality. The NiDA secretariat has been recruiting its technical staff from a pool of university graduates, preferably those with a Bachelor of Science in computer science or a related field [2]. On the other hand, the ministries and the Phnom Penh municipality continue to retain their legacy workforce with minimal replenishment; the Phnom Penh municipality recruited its district and communal staff from the body of local residents with minimal education.

A training program has been provided through NiDA, to government officials from all ministries and the Phnom Penh municipality in order to help all entities better serve the public. The trainings have focused on basic office

applications and the use of the GAIS applications [2]. The basic office applications are aimed at helping provide officials with general knowledge, and the GAIS applications facilitate officials' daily tasks. Experience has shown that government officials with some English background excelled, while those without training in English appeared to lose interest in the training and sometimes dropped out entirely. Therefore, to make the training more effective, a campaign to localize the content has been introduced. The Khmer language has been used in the trainings for basic office application and GAIS applications. The trainings in the local language have been very popular and have removed the English language knowledge prerequisite barrier for most government officials, particularly women and legacy officials from the districts and the communes [2], [13].

## B. *The Challenge Factors*

### 1) *Management Factor*

Variations in support among leadership are among the most critical challenges to the GAIS. This challenge stems from the fact that even though there is clear ICT support among the leadership in Cambodia, their ICT understanding varies significantly. This has caused different ministries or agencies to set diverse prioritization levels for e-Government-related projects. For instance, the Council for Administrative Reform is considered leadership in terms of e-Government and information as well as communication technology deployment, with its human resource information system identified as a good e-Government application project. On the other hand, some other government ministries, such as the Ministry of Religions and Cults, do not even have their own web sites yet.

In addition to the variations in support among leadership, most government officials claim that e-Government is not a high priority at present for a poor country like Cambodia because, they say, successful e-Government will not be achieved unless the country first fulfills its basic needs. This is understandable given the country's need to satisfy the rural population's basic requirements in health care, education, and transport. Whether to fund an e-Government-related project or build a new hospital or school in a remote area where people need it the most will always be a question.

Moreover, it is argued that e-Government is not urgently needed despite the strong leadership support and understanding of the need to improve the ICT sector in general. Government officials believe that the e-Government project will take time to be implemented and that fast implementation will not do the country much good [13]. They claim that the time e-Government implementation takes will help the government to investigate critical aspects of society, such as computer and Internet literacy rates, which would not be revealed otherwise. This time will also help to direct attention toward the reform and integration of government processes for greater efficiency, they say. Rapid development is seen as infeasible at the moment, as usage levels would be very low.

2) *Infrastructure Factor*

In Cambodia, the telecommunication and ICT infrastructure has remained severely underdeveloped due to financial constraints, lack of technical equipment and expertise, and the fact that the government prioritizes support for other sectors [16]. The United Nations' Global e-Government Readiness Report [6] put Cambodia in 139th place among the 182 countries surveyed in 2008 for the e-Government readiness index, which is a composite index comprised of the web measure index, the telecommunication infrastructure index, and the human capital index. As can be seen in Fig. 1, the e-readiness index trend for Cambodia indicates that the development of the telecommunication and ICT infrastructure there has been slow [6].

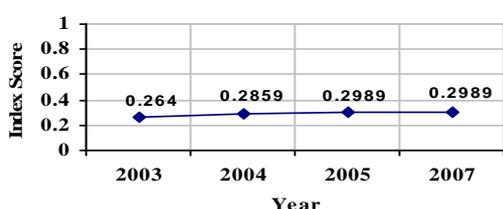


Figure 1. E-Readiness Index Trend for Cambodia

Cambodia received a score of only 0.2989, which is below the world average (0.4267); Cambodia ranked eighth of the 11 countries in Southeast Asia (see Table I) [6].

TABLE I. E-GOVERNMENT READINESS FOR SOUTHEAST ASIA

Country	2008 Index	2005 Index	2008 Ranking	2005 Ranking
Singapore	0.7009	0.8503	23	7
Malaysia	0.6063	0.5706	34	43
Thailand	0.5031	0.5518	64	46
Philippines	0.5001	0.5721	66	41
Brunei	0.4667	0.4475	87	73
Viet Nam	0.4558	0.3640	91	105
Indonesia	0.4107	0.3819	106	96
<b>Cambodia</b>	<b>0.2989</b>	<b>0.2989</b>	<b>139</b>	<b>128</b>
Myanmar	0.2922	0.2959	144	129
Timor-Leste	0.2462	0.2512	155	144
Lao PDR	0.2383	0.2421	156	147
World	0.4514	0.4267		

As shown in Table II, Cambodia received a low score on the infrastructure index (0.0118); such a score is the main technical obstacle to adopting e-Government. The infrastructure index is a composite index of five primary indices relating to a country's infrastructural capacity as they relate to the delivery of e-Government services. These are: 1) Internet Users/100 persons; 2) PCs/100 persons; 3) Main Telephone Lines/100 persons; 4) Cellular Telephones/100 persons; and 5) Broadband/100 persons [6].

TABLE II. E-GOVERNMENT READINESS FOR CAMBODIA

Web measure index	Infrastructure index	Human capital index	e-Government readiness index
0.1973	0.0118	0.6907	0.2989

From the figures above, it can be seen that most of the issues and challenges facing e-Government in Cambodia are due to the limitations in ICT infrastructure. For example, the telecommunication infrastructure consists of local exchanges in the Phnom Penh area, and there is only one optical fiber line from the Poipet border of Thailand to the Bavet border of Vietnam, crossing the country east-to-west, and from Banteay Meanchey to the Siem Riep province [16]. In addition to this, expensive international gateways result in high access costs and narrow bandwidth. The bandwidth connection to places outside Cambodia is limited to 160Mbps for both uploads and downloads [16]. Although Internet connectivity has improved recently in town areas with the introduction of broadband services, the cost of access is still high due to the high connection tariffs of the backbone network. In 2007, the total number of Internet subscribers was around 15,950 (see Table III) [16].

TABLE III. INTERNET SUBSCRIBERS IN CAMBODIA

Internet: Total of around 15,950 subscribers
• Dialup service: 7,500 subscribers
• Broadband services:
- ADSL/Leased internet: 6,500 subscribers (8 companies)
- Wireless broadband: 1,950 subscribers (6 companies)

Along with the infrastructural inadequacy of these pre-act circumstances, most Internet service providers (ISPs) are deploying their own solutions—for example, the xDSL system and wireless broadband systems such as WiFi, WiMAX, and satellite broadband—to provide Internet access for their customers. Until now, those wireless systems have not been reliable or successful for business use [17].

Other barriers connected with poor infrastructure and technologies that affect the GAIS include the fact that the GAIS includes infrastructures for all ministries, state secretariats, and the Phnom Penh municipality, which consists of 7 districts and 76 communes. These infrastructures have been required for connections between the central servers and client computers; but sometimes the resident turns his or her line into an electrical line or uses it for some other personal, practical purpose instead. Investigation into the matter reveals these individuals' ignorance about the system [2]. Moreover, sometimes the line is used for commercial purposes instead. This problem occurs very often in highly dense areas, such as the central Phnom Penh area. Internet cafés use these lines for their establishments on the justification that they belong to the government and should be free for them to use. Because of the high traffic generated by the Internet cafés, this causes the whole system to slow down drastically and puts further pressure on the existing limited bandwidth [2].

Besides ICT infrastructure, it is clear that it is not sufficient simply to add ICT to the government to create e-Government. Fundamental transformations and changes will affect all layers of e-Government, including the basic factor of legal aspects [18]. In Cambodia, there is a lack of clear legal status for government functions,

regulations, and laws for online transactions [16]. In sum, the nation has not yet developed well-defined ICT policies or strategies.

In 2000, NiDA which currently has five divisions: infrastructure, policy, human resource development, enterprise, and content and applications, was formed to promote ICT. Although NiDA was initially intended to formulate ICT policy for short-, medium-, and long-term development, this responsibility clearly overlaps with that of the ministry of posts and telecommunications, resulting in conflict and confusion [19]. This conflict and confusion has impeded the formation of ICT policies, which are crucial to promoting and developing e-Government services.

Compared to those in neighboring countries and most other less-developed countries, Cambodia's ICT sector is developing at a slower rate due to a lack of decisive and progressive government action that would encourage the implementation of modern telecommunications and ICT policy and regulation. This, in turn, stems from a lack of progressive knowledge and expertise in the government teams in this rapidly growing field [20] as well as from the conflict and confusion between the NiDA and the ministry of posts and telecommunications.

### 3) Human Factor

The literacy rate of Cambodia is among the lowest in the region. According to the 2007/08 United Nations Development Program (UNDP) Human Development Report (HDR), the literacy rate for Cambodians age 15 and over is 73.6 percent, a figure which includes 84.7 percent of males and 64.1 percent of females [21]. This literacy rate is a major problem for the implementation of the GAIS.

In addition to the low literacy rate, a common problem associated with the Cambodian public sector is the high turnover rates among government information technology (IT) staff due to uncompetitive payment and employment conditions as compared to those in private sector organizations. This leads to a lack of public sector skills and qualified staff, both of which are needed for the existence of a successful e-Government.

## V. CONCLUSION

In this study, the contribution factors and challenges to the implementation of e-Government can be categorized into three main areas: 1) management, 2) infrastructure, and 3) the human factor. In the context of the GAIS implementation experiences in Cambodia, the findings indicate that political leadership and will, effective management within a complex and fragile environment, information and communication technology policy, and capacity development are significant contribution factors. The variations in support among leaders, the lack of perception of e-Government as a high priority or necessity at present, poor ICT infrastructure, low literacy rates, and high turnover among government IT staff members are emerging challenges to the implementation of the GAIS.

The study has both theoretical and practical implications. It provides a theoretical foundation for seeking the contribution factors and challenges to e-Government implementation, as it synthesizes much of the current research regarding e-Government issues. In addition to this, it may serve as the research foundation for e-Government studies in Cambodia, because there have been few such studies so far.

From a practical point of view, the findings of this study can provide lessons in e-Government implementation to similar less-developed countries.

Based on current resources, there is too little evidence (and the evidence available is too vague) for one to say that e-Government in Cambodia has been a success or a failure. However, it is critical that the government enhance its understanding of those factors above as it continues to invest more in e-Government development. Moreover, an extensive and empirical study will need to be conducted in the future to measure the outcome and to find out the factors influencing the adoption and acceptance of e-Government in Cambodia.

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