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2014

Summary on

Cambodian

ICT Masterplan

2020

KISDI CONSORTIUM ■ Korea Information Society Development Institute | Konkuk University | LG CNS

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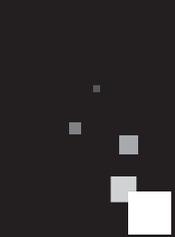




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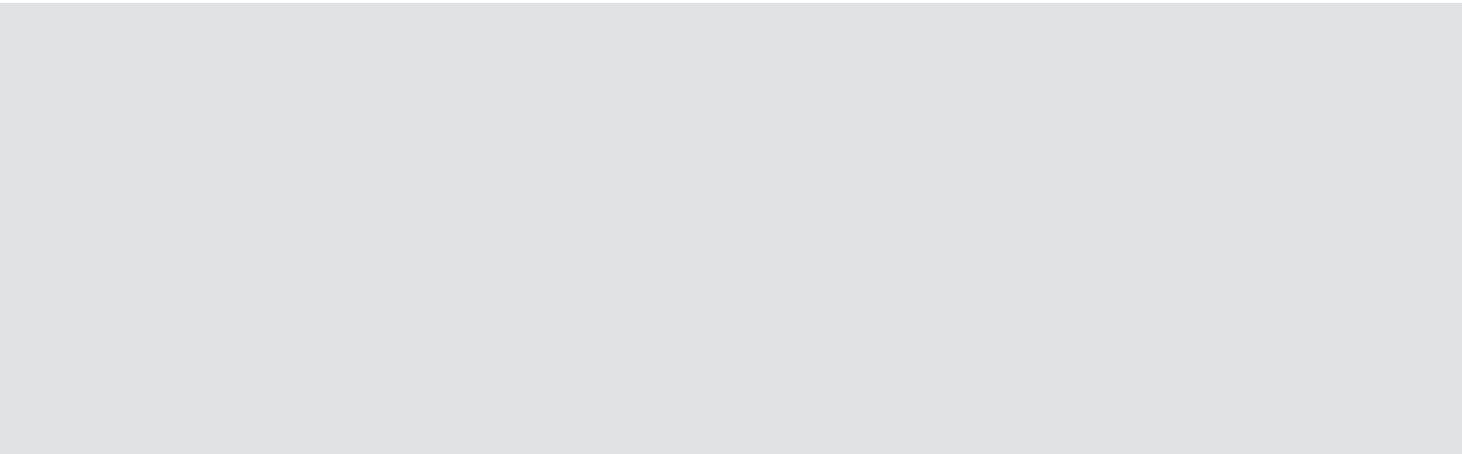
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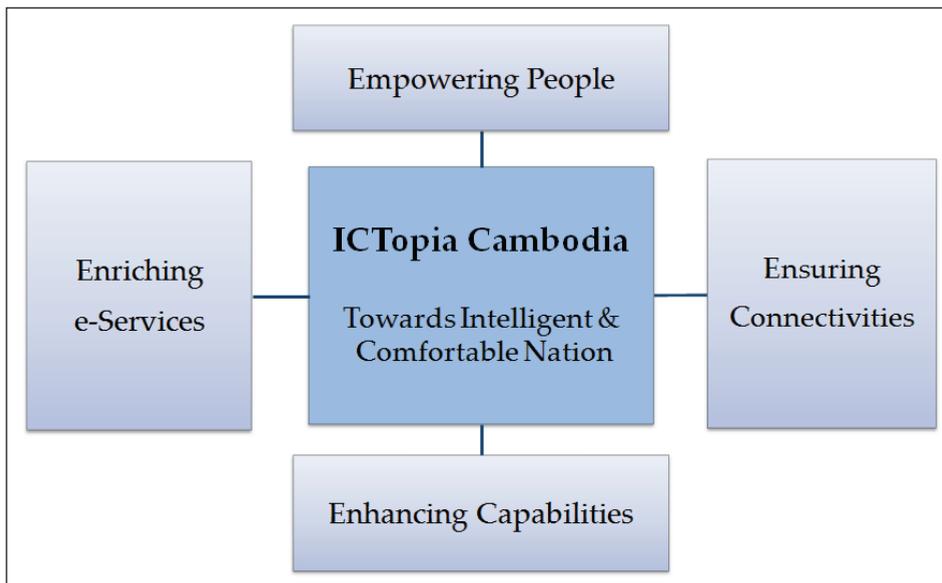




1. Introduction

It is widely recognized that ICT will be a key driving force in all aspects of development in the next few decades, as it always has been since the information revolution. ICT is a well-kwon engine of growth since ICT is one of the key economic sectors as well as an enabler to increase competitiveness of other sectors in economy. ICT is powerful and effective means for achieving social integration and enhancing quality of life. Considering this context, ASEAN has launched 'ASEAN ICT Masterplan 2015,' believing that ICT will be a key enabler for ASEAN's social and economic integration. Moreover, the Connect Asia-Pacific Summit with vision of 'Smartly DIGITAL' as well as NSDP 2014-2018, the Royal Government of Cambodia set objective to develop the information and telecommunication technology sector.

In parallel with the vision of ASEAN, the Connect Asia-Pacific Summit and NSDP, we set up a vision of the Cambodian ICT Masterplan 2020 as an 'ICTopia Cambodia'. 'ICTopia', a combined word with ICT and 'topos', meaning 'place' in Greek, represents a society or community possessing highly desirable and perfect qualities geared by ICT. It means building Cambodia as an intelligent and comfortable nation with intelligent people, intelligent society and intelligent government by ICT. In order to formulate 'ICTopia Cambodia', we set up four strategic thrusts which are Empowering People, Ensuring Connectivities, Enhancing Capabilities and Enriching e-Services.



Empowering People established as a first strategic thrusts comprised of ICT Human Resource Development and e-Awareness. Ensuring Connectivities consists of three sectors: National ICT Infrastructure, Legal Framework and Cyber Security. Enhancing Capabilities formulated with three sectors: ICT Industry, ICT Standards, and Research and Development. Enriching e-Services includes e-Government Services, e-Public Services, e-Economy Services and e-Education Services. These four strategic thrusts are set up as practical and powerful tools people can realize advantages of ICT and eventually bring improved quality of life.

Part 1. Empowering People

2. ICT Human Resource Development

2.1. Introduction

Human resource assets can become an engine for industrial growth even if the tangible infrastructure such as equipment, assets, plants and facilities are not yet available. In particular, recent rapid growth of ICT related companies proved that HRD has established itself as being a core value for industrial development.

ICT technology provides an important influence not only on the ICT industry and also on other industries. The development of ICT technology brings about changes to the methods or forms of existing traditional industries and requires re-education of existing human resources

2.2. Objectives

Based on the current status, we set the vision of ICT HRD as “Top-class Country of ICT HRD in Southeast Asia”. The specific objective is to enter into the top 50 ranking of the ICT-related WEF indexes by 2020 including government usage of ICT, internet access in schools, and ICT skill level.

2.3. Building National ICT HRD System

To achieve the objectives with the three strategic directions, we set up three programs in three areas: building national ICT HRD system, training employees in both public and private sectors, and strengthening ICT education. Ten specific initiatives are planned to realize these programs.

2.3.1 Building Governance for ICT HRD

The Cambodian government should establish the governance for ICT HRD including organizational structure and pertinent policies. In terms of organizational structure, a government can create an organization responsible for establishing, projecting, monitoring, and evaluating plans related to ICT HRD. However, the current governance structure of Cambodia is not complete because now there is not significant organization establishing and implementing the ICT training programs for private sector’s workers. For this reason, the Ministry of Labor and Vocational Training (MOLVT) should have a significant role in training employees in industry to get advanced ICT skills. Also, the MOLVT is to cooperate with the MoEYS in enhancing the link the demand of ICT Industry with university curricular. Moreover, the MOLVT is to collaborate

with the MPTC and the National Institute of Statistics (NIS) in conducting the survey on the demand and supply of ICT human resources and in establishing the statistical database as well as in standardizing ICT skills by the type and level.

2.3.2 Establishing a Statistical Database on Demand and Supply of ICT HR

Statistics on ICT labor market and ICT education and training are prerequisite for establishing effective HRD policies and for balancing the demand and supply of ICT human resources. For the demand survey, the MOLVT would be suitable to conduct the survey. The MOLVT can find out which companies are ICT companies by utilizing the registered business information. For the supply survey, the MoEYS may conduct the survey by sending questionnaires to the ICT departments of universities and ICT training institutions. The questionnaire would ask how many students graduate yearly, what skills does the institutions teach, and what the level of skills the institutions teach is.

2.3.3 Standardizing the Type and Level of ICT Skills

This initiative is to clarify, systemize, and standardize the skills which are necessary for ICT human resources. Through ICT skill standards, ability indexes need to be applied, through which can objectively observe the necessary competence or knowledge for each corresponding job. This can be achieved by classifying ICT services by jobs and job field.

2.3.4 Implementing the National Level of ICT Certification Program

For systematic ICT professional human resource training, it is necessary to implement a national ICT qualification system on a national level. If a qualification certificates system is created, many potential candidates will sit the relevant exam to test ones suitability for the qualification. As the result, training excellent human resources will become possible.

2.4 Training Employees in Government and Industry by MPTC/NIPTICT

2.4.1 Supplying One PC to Each Public Employee

It is important for every public employees working in office to have own PC at work place. The Cambodian government should make efforts to change or upgrade the employees' computers as the technology advances.

2.4.2 Strengthening NIPTICT to Enhance ICT Training for Public Employees

To increase the efficiency and effectiveness of e-Government, the public servant's comprehension of e-Government is required. The MPTC should offer practical and high quality ICT training programs for public employees. The training programs should not be limited to basic training

programs. Some programs should teach intermediate and high skills. Also, the MPTC needs to raise the number of participants of the training programs.

2.4.3 Building ICT Training Centers and Developing Programs for the Industry

In order to expand the supply of ICT human resource quantitatively as well as qualitatively, the government intervene the ICT training system in private sector by providing ICT training opportunities for current workers and job seekers to improve the level of their skills. The Cambodian government should build ICT training centers not only in Phnom Penh but also in provinces. Practical and effective training programs can be developed through cooperate with domestic and foreign ICT companies.

2.5 Strengthening ICT Education

2.5.1 Constructing an ICT Infrastructure in Schools

The Cambodia government, especially the MoEYS, should make efforts to install ICT infrastructure such as electric power, internet broadband, computers, and educational software not only in urban areas but rural areas.

2.5.2 Activating ICT Training Programs for Trainers

In order to offer effective ICT education programs for students at schools, the schools secure enough ICT teachers. The MoEYS should intensively train ICT subject teachers by contracting with ICT institutions such as universities and ICT training centers, and ICT companies at home and abroad. Such ICT training programs are mainly for ICT subject teachers.

2.5.3 Linking University Curricula to the Demand of ICT Industry

Even though changes to education programs are difficult in case of basic sciences, program improvement and changes in various methods are possible in case of ICT related departments because work experience on-site is as important as obtaining knowledge. Considering the low graduation rate in Cambodia, improvement of programs which can guarantee good courses and also future job opportunities in the area ICT can be considered.

2.5.4 MPTC/NIPTICT Should Establish Regional and Sub-National ICT Training Centers Including ICT Academy

In order to expand the supply of ICT human resources quantitatively as well as qualitatively, the government should establish regional and sub-national ICT training centers. It should build ICT training centers not only in Phnom Penh but also in provinces. MPTC/NIPTICT should establish regional and sub-national ICT training centers including ICT academy.

3. e-Awareness

3.1. Introduction

ICT functions as a tool to increase efficiency, transparency, social solidarity, and quality of public service by adopting ICT in delivering public services. In this respect, ICT plays an important role in alleviating poverty.

Current status of e-Awareness in Cambodia can be summarized as 'Very low ICT usage', 'Lack of institutional support for e-Awareness', 'Lack of sufficient resource for e-Awareness', 'Difficulties in promoting e-Awareness in Cambodia', and 'Lack of clear strategy or roadmap for the promotion of e-Awareness'.

3.2. Objectives

Vision of e-Awareness was set to realize the Inclusive e-Cambodia where most of Cambodian people able to access and use of digital (online) information. As a tangible policy goal, it was set to achieve that the 70% of Cambodian people are able to access the Internet by 2020. For achieving this goal, Cambodian government must to establish social environment for the promotion of ICT usage, and promote the ICT use for the better life of Cambodian.

3.3. Building Digital Mind

3.3.1 Institutional and Legal Support for e-Awareness

In order to ensure the institutional and legal support for e-Awareness, the first thing Cambodia has to do is establish a special Division in NiDA for the Promotion of e-Awareness. The roles of this division would be to conduct the survey on Cambodia's informatization awareness status, suggest necessary policies, and implement related projects such as national campaign for the promotion of e-Awareness. These initiatives would be the one of the most urgent tasks; therefore it should be actualized in 2014.

3.3.2 Social Campaign for e-Awareness

One of the best ways to educate the citizens about information revolution is to use mass media such as TV, and radio since mass media is largely distributed, easily accessible and widely seen/watched. Another way to promote the ICT awareness is to designate certain month or week as an information month or week. During this period, award giving, lectures, seminars, and exhibitions may be hosted to show the benefit of ICT to the ordinary citizens. it does not mean to keep events

throughout whole month or week, however, it may run only several days.

3.4. Enhancing Digital Literacy

3.4.1 Institutional and Legal Environment for Digital Literacy

Digital literacy for the all Cambodian citizens also cannot be achieved without the proper institutional, legal support system. Therefore, like the promotion of e-Awareness, Cambodian government has to designate or establish a certain organization in charge for the promotion of digital literacy for all Cambodian citizens. Most feasible solution for the development of organizational support is to create a special Division within NiDA which is in charge of national digital literacy project. The role of this division may include review of current status of digital literacy, training of ICT lectures and management of ICT lecturer DB, development of ICT textbook, cooperation with community organizations for digital literacy, and development of national plan to promote digital literacy.

3.4.2 Cooperation with Community Organization for Digital Literacy

Another challenge in implementing digital literacy program in Cambodia is **the lack of sufficient facilities** to offer digital literacy training program. Construction of new training center requires a substantial amount of money, thus Cambodian government cannot build all necessary training centers by themselves. One solution of this problem is the **cooperation with community organizations** (such as school, social welfare center, religious organization etc.). Community organization can offer space, then, what Government has to do is to provide PC and lectures.

3.4.3 ICT Training for Disadvantaged

The most serious challenge that Cambodia is facing for the promotion of digital literacy, is that most of Cambodian people is rural residents. 80% of Cambodian is rural residents, therefore, if Cambodian Government must develop a certain mechanism to encourage the rural residents to participate in digital literacy program.

3.5 Connecting Universal Access

3.5.1 Operation of Refurbishment Center for Second Hand PC

Demand to use second hand PC is decreasing due to the availability of cheap PC, however high quality second PC is easily available due to the shortened life cycle of PC. The operation of refurbishment center could enable not only the provisions of PC but also utilization of the PC maintenance skills to run refurbishment center and employment opportunity for the youth.

Concerns raised by the provision of second PC is the e-waster issue that unnecessary and harmful electronic products was dumped by developed to developing nations(See Basel convention). Therefore, while operating the refurbishment center of second hand PC, Cambodia has to operate recycling center which collect, and recycle wasted second hand PC environment friendly.

3.5.2 Cooperation with Private Cyber-Café

In order to offer Internet access to Cambodian citizens who do not own PC and Internet access at home, public access centers which equipped with network and PC are required. However, substantial amount of budget is needed to build public access centers, therefore it is not easy to build ICT access center by government budget. Hence, Cambodia must utilize existing facilities at a full scale, including not only public but also private cyber café.

3.5.3 Accessibility for Persons with Disabilities

Final issue is the ensuring accessibility for the People with Disabilities. This issue is not an urgent one; however, in order to achieve inclusive E-Cambodia where all Cambodian are able to access digital information, the people with disabilities must be included as one of policy targets.

Part 2. Ensuring Connectivities

4. National ICT Infrastructure

4.1 Introduction

National ICT infrastructure means basic structures such as facilities and policies for supporting, building and managing the ICT service. To develop the national ICT infrastructure, Cambodia has tried to promote telecommunication industry through opening the market and to enhance internet service base through establishing KHNIC and having plans to secure a national satellite and build up submarine cables. The high mobile penetration rate is one of the fruits of the efforts.

However, there are some limitations such as lack of backbone networks to provide ICT services for public organizations, low coverage and bandwidth of the national backbone network run by state-owned organization and administration network. It is also restricted to access the internet as focused on the main cities, to be lack of the infrastructure for broadband internet service and to have low coverage of fixed-line services for internet and telecommunication.

In order to overcome the limitations and enhance the national ICT infrastructure, it is needed to found national backbone network run by state-owned organization and accelerate national information network for each of the governmental administration, finance and education & research. Moreover, it is important to build up nationwide internet service base and try to bridge the digital divide for increase in accessibility to the networks. It is also necessary to introduce Broadband Convergence Network and digital TV in Cambodia to minimize ICT gap between Cambodia and IT powerhouses.

4.2 Objectives

The Royal Government of Cambodia will achieve the following objectives through enhancing national ICT infrastructure:

- Improve service accessibility of telecom and broadcasting for all the people
- Expand ICT infrastructure through government assistance and activating private investment
- Set the base environment for diverse ICT convergence such as voice & data, wire & wireless, and telecom & broadcasting

And the Royal Government inaugurates the following five strategies in order to successfully enhance the national ICT infrastructure:

- S1: The ICT environment needs to be initiated by Royal Government of Cambodia.
- S2: The opportunity to access ICT for all the people needs to be provided.
- S3: The environment where private sector actively participates for national ICT development needs to be established.
- S4: The circumstance to easily adopt new ICT and create added value needs to be provided.
- S5: The direction for development of ICT infrastructure needs to be decided in consideration with the worldwide ICT trend.

4.3 Founding the National Backbone Network

This program is to upgrade bandwidth of the national backbone network run by state-owned company such as TC and expand service coverage. The objective is building a base environment to provide broadband service with speeds of at least 10Mbps by 2020. To achieve the objective, RGC will upgrade the bandwidth of the current national backbone network in the first stage. Also, RGC will complete coverage expansion plans according to Public Investment Program (PPP) of TC in the second stage.

4.4 Accelerating the National Information Network

This program is to install the separate network according to the national policy purpose such as administration, finance and education & research. Firstly, for the national administration information network, the RGC will strengthen NII network in order to connect all offices of each capital city of 25 provinces. Also, the RGC will set up a base to isolate internet from intranet network. Moreover, the RGC will establish standards and institutional base for the administration network in order to improve usage efficiency of the network. Secondly, for financial network, the RGC will enhance the information connection between banks in 25 provinces with priority. And then, the RGC will establish and operate a single financial network that can be used by banks, security and insurance companies as well as investment firms. Furthermore, the RGC will build an operation environment for a single financial network by formulating national standards and a shared usage structure for financial data. Lastly, for education and research network, the RGC will establish university and school networks within main capital cities. Also, the RGC will build and operate pilot research networks in main cities including Phnom Penh.

4.5 Building-up the Nationwide Internet Service Base

This program is to set up an environment to improve internet services. To do this, the RGC will enhance management systems for IP addresses and internet domains in order to strengthen the national internet management. Also, for improving internet connection, the RGC will enhance national Internet Exchange (IX) and expand countries connected by undersea cables.

4.6 Bridging the Digital Divide

This program is to build an environment to easily access ICT services at affordable price for Cambodia citizens regardless of their income, obstacle and region by minimizing the gap between the information rich and poor person. To do this, the RGC will support establishment of information and communications network in suburban areas. Also, for creating an information access environment, the RGC will build and operate internet use facilities, support supply of ICT and broadcasting equipments and implement internet fee subsidization.

4.7 Enhancing Digital TV

This program is to open high-quality and two-way digital broadcasting communication services anytime and anywhere. At first, the RGC will support establishment of an intelligent broadcasting network and implement the transition plan from analogue to digital broadcasting in order to build a national digital terrestrial broadcasting network. Also, the RGC will promote provision of satellite broadcasting services in difficult, rough and mountainous areas with priority. Lastly, the RGC will support a digital terrestrial DMB network and a digital cable broadcasting network.

4.8 Building-up Broadband Convergence Network (BCN)

This program is to establish an environment to provide seamless and integrated broadband multimedia services anytime and anywhere. To do this, firstly, the RGC will support establishment of the Quality of Service (QoS) guarantee network, introduction of IPv6 for diffusing the network generation internet network, enhancement of security in integrated networks. Also, the RGC will disseminate guidelines for building an Open API. Secondly, in order to enhance local networks (subscriber access networks), the RGC will support broadband for wired/wireless subscriber network and enhance mobile broadband networks. Lastly, for promoting an integrated service environment, the RGC will set up integrated environments for voice & data, wire & wireless and communications & broadcasting convergence services.

5. Legal Framework

5.1 Introduction

Recent achievements in the Cambodian telecommunications market are not the fruits of adequate government policies and regulations backed by powerful systems. They are rather attributable to the extremely intense competition in the market triggered, ironically, by a lack of regulations.

Despite the increased number of subscribers in the telecommunications market, Cambodia is still vulnerable in terms of laws and regulations that have a great impact on long-term market growth and social development. According to the WEF' Global Information Technology Report 2009-2010, Cambodia was ranked at 118th among 133 countries with regard to the index of the laws relating to ICT. Its ranking has steadily moved up and finally reached 89th in 2013. However, the ranking would have been significantly higher, if a number of ICT-related acts such as the Telecommunications Law and Radio Communication Law that the Cambodian government had proposed have been legislated and enacted.

Cambodia currently operates under the law passed in 1996 that mainly deals with postal services. It also operates under Sub-Decree No.5 of 1987, which allows it to be both a regulator and a participant of the market. The following are ICT policies and related laws that are still in draft form or are still pending in the Cambodian legislature or executive agencies:

- National ICT policy by NiDA (MPTC)
- Telecommunications Law by MPTC
- e-Commerce Law by MOC
- Radio Communication Law by MPTC
- Law on the Copyrights and Related Rights by MOC, MoI, and MCFA
- Cybercrime Law by NiDA (MPTC)

In pursuing the informatization of the public sector, the major obstacles include resistance from public officials and conflicts within and between relevant government agencies and public institutions over priorities and implementation processes. To overcome these obstacles, strong leadership that drives government-wide cooperation and supply strategies based on demand are required.

5.2 Objectives

The government's policy function and regulatory authority, which is crucial in laying a long-term foundation based on the fair competition and invigoration of the telecom market should be fully established. Cambodia should enact a series of necessary legislations such as an act on the expansion of socio-cultural information infrastructure as well as on sustainable technology advances and industry promotion.

5.3 Refining Regulatory ICT Laws

The basic directions regulatory bodies should take in exercising its regulatory authority can be categorized as follows:

1. Be competition-oriented and business friendly
2. Make regulatory procedures and standards transparent and objective
3. Exercise regulatory authority in a timely and relevant manner in accordance with prescribed rules and laws.

On top of these directions, regulatory agencies should strike a right balance between competition and earnings stability of telecom carriers that could attract mid- to long-term investment in order to ensure the steady expansion of the nation's telecommunications network infrastructure, which acts as the foundation for informatization initiatives such as e-Government.

5.4 Implementing e-Government Act

It should be recognized that e-Government initiatives are undertaken to efficiently improve government functions rather than for the sake of informatization itself. Also, in pursuing e-Government, not only the government but citizens and businesses need to be identified as customers and co-operators of the service. Secondly, the key elements of implementation strategies should encompass the interconnectivity with other applicable areas, overhaul of relevant systems, and professionals with right expertise in addition to database centers and network facilities. A virtuous improvement cycle needs to be maintained throughout the entire process from planning, design, construction to utilization with appropriate progress management, assessment and feedbacks. In addition, information resource management (IRM) of human, technological and financial resources, information sharing and protection, elimination of digital divide for the underserved population and residents in remote areas are also key to the success of informatization.

First, in pursuing e-Government and public-sector informatization initiatives, a comprehensive framework act that sets out broad outlines and high-level principles should be introduced. This framework act must include key provisions on legal grounds for large-scale, long-term investments, coordination systems among government agencies concerned, policy development to bridge digital divide, informatization planning, progress monitoring and assessment, as well as effective IRM. Second, proactive campaigns and education programs designed to raise awareness of informatization initiatives as collective efforts of the government and citizens should be conducted. To this end, support for such programs and capacity-building activities for government officials and citizens needs to be guaranteed by law, especially in the early stage of informatization. Lastly, in parallel with the high-level principles laid down in the framework act, subsidiary legislations of each relevant government department should be drawn up either simultaneously or sequentially. The good examples of such subsidiary legislations include the Digital Signature Act, Electronic Commerce Act, Personal Information Protection Act, Citizen Registration Act, Customs Act, and Government Procurement Act.

6. Cyber Security

6.1 Introduction

As ICT infrastructure policies are vitalized, information security becomes important issues in Cambodia as well as in the world. However, although Cambodia has tried to establish national cyber security base through CamCERT organization, there are some limitations such as lack of comprehensive cyber security system to ensure ICT service reliability, absence of relevant laws, regulations, policy, standard & norm, low level of knowledge and know-how skill on cyber security, and outdated infrastructure for cyber security (e.g. Information systems, ICT devices).

To overcome these limitations and enhance the nationwide cyber security, it is needed to enhance cyber security system in Cambodia such as enactment completion of relevant legislations and establishment of government-wide leadership & organization. Moreover, it is necessary to expand cyber security activities through enhancing CERT system, protecting major infrastructure and distributing the standard. It is also crucial to build health culture for cyber security through making measures for unhealthy information distribution prevention, implementing illegal spam mail prevention system and executing awareness education & promotion for cyber security.

6.2 Objectives

The RGC will achieve the following objectives through bolstering cyber security:

- Secure safety of cyber space
- Provide basis for ICT progress by improving reliability of ICT service

And the RGC inaugurates the following 5 strategies in order to successfully bolster cyber security:

- S1: Establish basis for national cyber security system
- S2: Spread cyber security system from the public sector to major private sectors
- S3: Setup a system for continuous operation and development architecture for cyber security
- S4: Decide direction of improvement in consideration of the worldwide cyber security trends

6.3 Bolstering Cyber Security

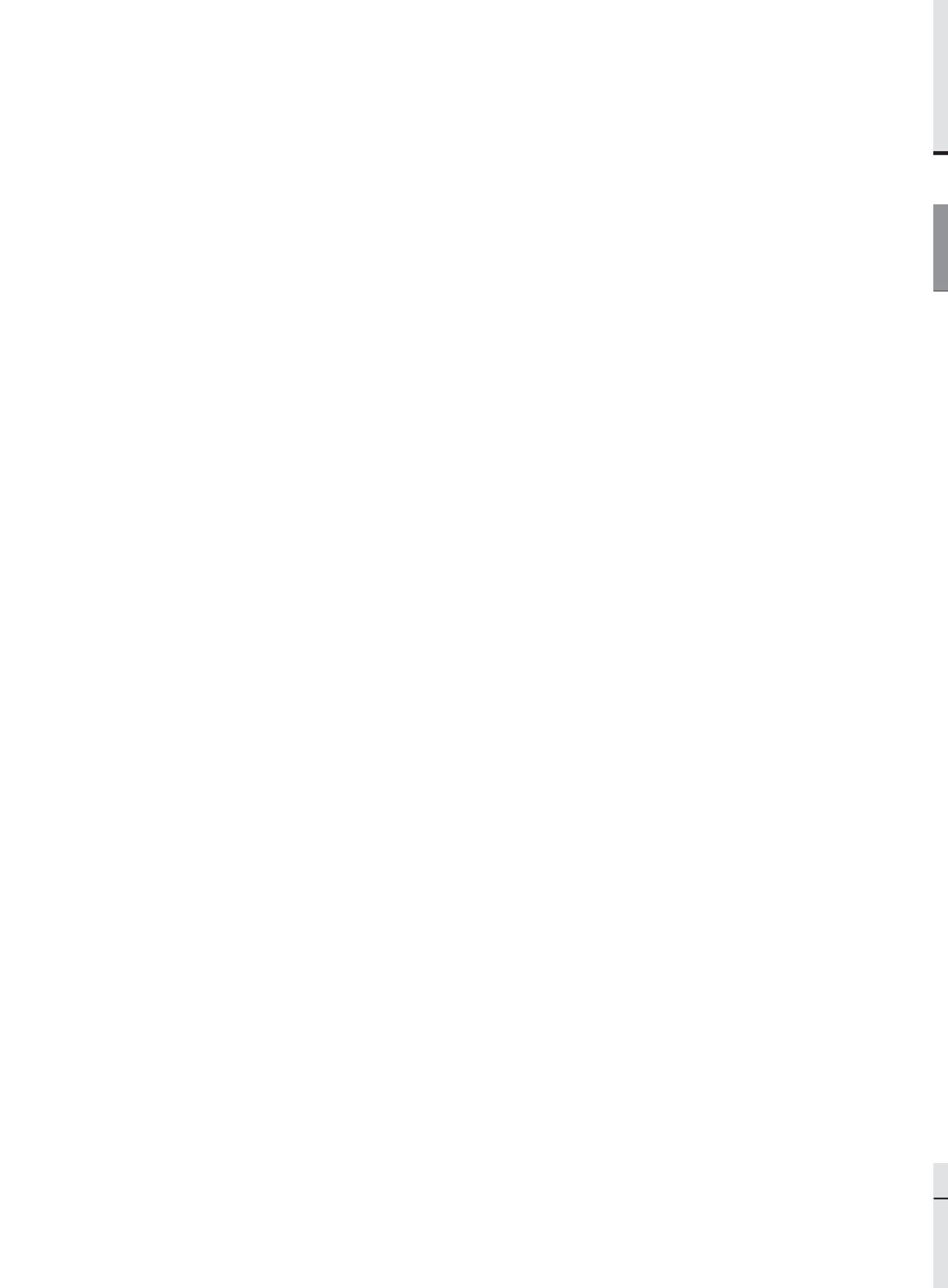
This program means enhancement plans of information security as applied to administrative, technological and physical areas in order to provide reliable and stable ICT services. To successfully implement the program, the RGC will implement the following initiatives.

Firstly, the RGC will establish cyber security base like policy, organization and law. To do this, the RGC will compose relevant government organization, complete enacting cyber security laws and enhance internal & external cooperative network including government and private sector.

Secondly, the RGC will expand activity coverage and targets of cyber security. To do this, the RGC will enhance CERT system, protect major ICT infrastructure and establish & distribute cyber security standard.

Thirdly, the RGC will establish privacy protection system for dealing with infringement of personal information. To do this, the RGC will establish foundation for protecting personal information and set up plans for implementing and expanding the personal information protection system.

Lastly, the RGC will improve awareness on cyber security at the national level for improving cyber security culture continuously. To do this, the RGC will establish measures for unhealthy (harmful and indecent) information, build an illegal spam mail prevention system and execute cyber security awareness education & promotion.



Part 3. Enhancing Capabilities

7. ICT Industry

7.1. Introduction

Development of ICT, especially in terms of technology has brought fundamental and structural changes which deserve to be called as being evolutionary. The core of those evolutionary changes could be depicted with following three aspects: internet, mobile and digitalized contents.

7.2. Objectives

The main direction of promotion policies for Cambodian ICT industries could be summarized to build Cambodian's own ICT ecosystem and to be enrolled into the global ICT ecosystem. Three fundamental strategic directions or three major premises of Cambodian ICT industry promotion policies could be summarized as followed: Select & Focus, Towards Global and Auto-Financing First.

7.3 Establishing Fundamental Basis of ICT Ecosystem

The network is the most expensive to be equipped. But it is indispensable because it is the core sector of ICT ecosystem, so called as 'fundamental basis of ICT ecosystem. So it is important how to gradually complete nationwide network.

7.3.1 Gradual Expansion of Fixed-Line Network for Industrialization

Gradual construction because it is not urgent to complete nationwide network at once. Nevertheless nationwide backbone network should be completed first in that it is very crucial and indispensable basis for further economic development. Selection process for prior region should be totally based on cost/benefit analysis considering the industrialization policies.

7.3.2 Enforcement of Mobile Network for Better Public Welfare

Mobile centric network is firmly recommended because the last 1 mile structure could be more economical and practical due to heavy construction cost of fixed-line network. Maintaining favorable market condition through performing continuous monitor on market situation in that excessive market competition could jeopardize the profitability of operators and then lead to reduction of network investment. Impose institutional obligation for network development including geographical expansion

7.3 Selective and Gradual Industrialization of ICT Ecosystem

From former analysis on Cambodian ICT ecosystem it is easily noted that priority for industrialization might be put on Contents and Device. It is because that Cambodia has lots of advantages in contents with enormous intrinsic potentials in terms of historical mysterious heritages and its nature which has been kept untouched nor undeveloped. And also many global companies producing ICT related devices are looking for competitive foreign manufacturing sites.

7.3.1 Establish Private & Public Collaboration Opportunities

All kinds of idea including not only contents like of tourism but also other all kinds whatever could be commercialized. Public (Cambodia government) supports those ideas in terms of financial, operational and technological. Considering scalability of contents business such as collaboration should be towards being globalized.

7.3.2 Set Institutional Embodiment of Collaboration

It concretizes the public and private collaboration process. It needs to set virtuous circle among public, private and academic experts.

7.3.3 Fix Financial Arrangement

It needs to establish specific funds like 'Yozma Fund' of Israel.

7.3.4 Set Institutional and Other Necessary Arrangements like Tax Redemption

Arrange diverse merit system for foreign global firms to move into Cambodia in terms of tax, administrative procedures and so forth. Impose certain obligation to cooperate with Cambodian local firms for example, electronic parts procurement from local and so on (Buy Cambodian First Obligation). Impose another obligation to hire and educate Cambodian youth (and technology and knowhow transfer).

7.3.5 Meet the Conditions for Global Cooperation

It needs to construct and provide industrial complex specialized for electronics. It securely provides logistics and residence for workers and so on which are inevitably necessary for running business.

8. ICT Standards

8.1. Introduction

Nowadays, Standards become more and more important around the world. It is due to the agreement on technical barriers to trade (TBT) of World Trade Organization (WTO). The TBT agreement recognizes the important contribution that international standards and conformity assessment systems can make in this regard by improving efficiency of production and facilitating the conduct of international trade and also it desires therefore to encourage the development of such international standards and conformity assessment systems

8.2. Objectives

Increasing the number of participation on standardization activity must be considered first: o-member and continuous participation in the plenary meetings, and then p-member and step to participating in the working group meeting. After long run, Editor and Convener for development of standard activity.

8.3 Developing National Standardization Body

For the standardization on ICT are mainly established by JTC1 (ISO) and ITU-T. Cambodia now initiates the standard body by Law on Standards at June 24, 2007. Cambodia is an early stage for the industrialization. The planning for human resource development (HRD) is strongly requested. The other aspect of ICT standardization is accomplished by ITU-T. ITU-T is in general connected to Ministry of Communications or ICT or similar names.

8.3.1 Building-up Independent Standard Body

Standards are important because of its power to penetrate the market. Due to the agreement on TBT of WTO, standard becomes the strong tool against the regulations, technical barriers. After surveys on ISC and MPTC, Cambodia's situation is the beginning stage of understanding the standards and its usefulness. Thus, Cambodia has a white paper to draw all kind of technical forms with minimum trial and errors under the guidance of experienced country like Korea.

8.3.2 Building-up Independent Standard Policy

Most important policy in this time is to plan the training and technical assistant for the officers on standard organizations. Based on Korea's experience on standards teaching, Cambodia will learn the standardization process and will strengthen the human resources.

9. ICT Research and Development

9.1. Introduction

Except for mobile communication, Cambodia has yet to activate its ICT industry; hence the low R&D demands from the industry. In particular, high-ranking government officials and overall society have low awareness of the importance of R&D. MPTC has no distinctive exclusive R&D department; policy means and support functions for fostering R&D are still inadequate, and public R&D institutions are lacking. R&D investment percentage in the science and technology sector constituted only 0.05% of GDP in 2002, suggesting the scanty budget for R&D. There are only 13 R&D workers and 17 researchers per 1 million people (MOST, 2013).

9.2. Objectives

The vision for the Cambodian ICT R&D sector is to boost national competitiveness through ICT R&D. This aims to enhance ICT technological capacity through R&D and to help reinforce national competitiveness. This also seeks to contribute to the development of the ICT industry and economic growth based on national competitiveness strengthened through ICT R&D. The objective of the ICT R&D sector is to secure advanced ICT R&D systems. The three policy directions for achieving the objective are 1) strengthening the ICT R&D system, 2) constructing an efficient ICT R&D management system, and 3) improving capacity of the national ICT R&D center.

9.3 Building-up Governance and Policy for ICT R&D

Cambodia's current R&D environment revealed five factors of difficulties: 1) lack of an R&D mindset: high-ranking government officials and overall research circles lack awareness of the importance of R&D; 2) insufficient R&D systems and policies: the national R&D system is inadequate, and the relevant policy is not clear; 3) lack of HR and cooperation networks in R&D communities: skilled manpower is lacking, and research circle networks are inadequate; 4) lack of R&D facilities for research institutes and the industry: research institutes lack research equipment and materials, and; 5) insufficient funds for R&D activities: the R&D budget is lacking in various areas.

9.3.1 Enhancing ICT R&D Promotion Policy

Expecting a change in the ICT R&D propulsion system according to the reshuffling of government organizations. As such, its function of supervising and coordinating ICT R&D projects has been under responsibility of newly established National Institute of Posts, Telecommunications and ICT. The MPTC currently has e-Government-specific R&D functions, and some telecommunication

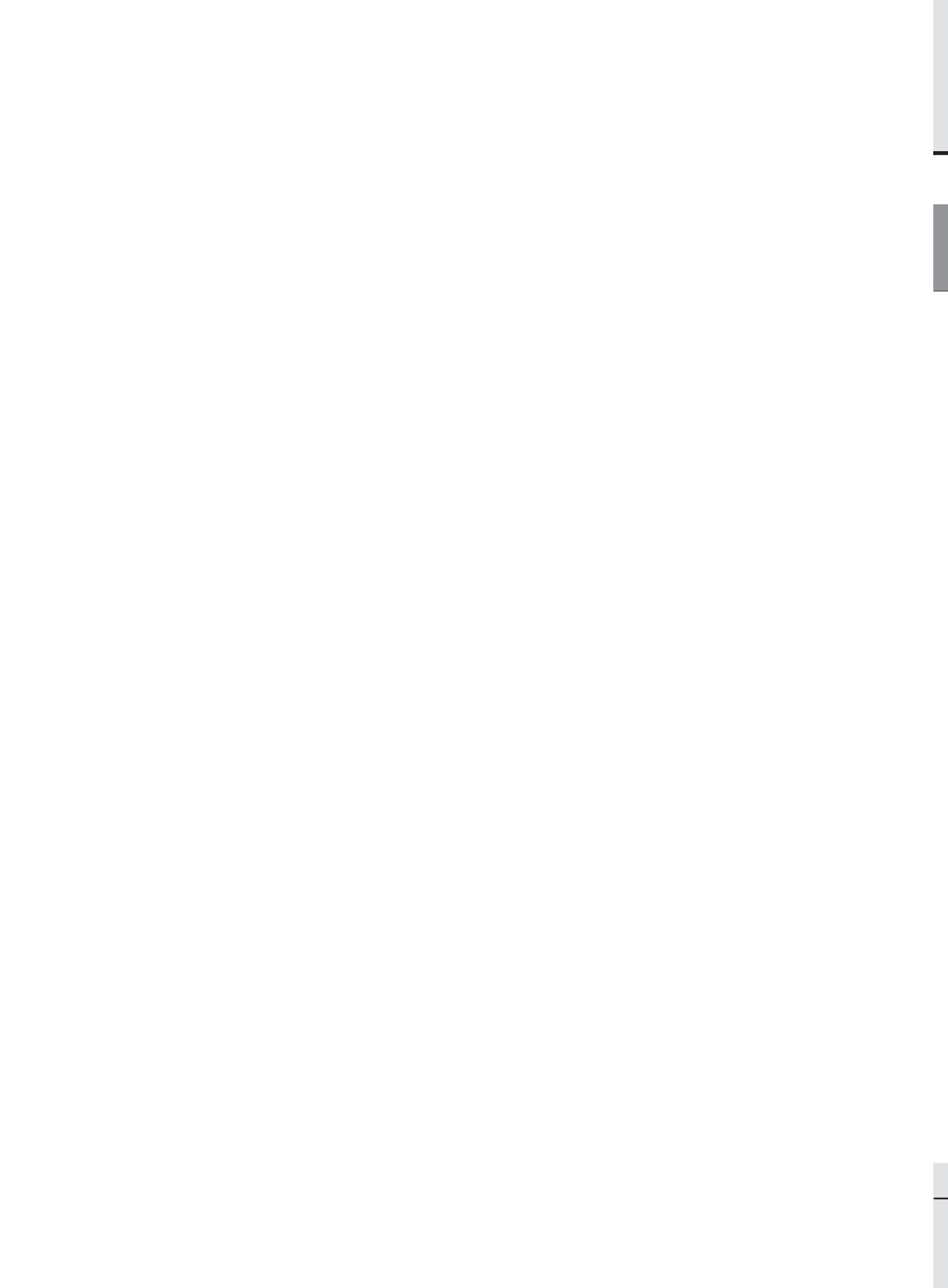
companies and universities are developing software-related technologies. A research institutes specializing in specific technologies like MPTC's ICT R&D center has been newly established.

9.3.2 Constructing a R&D Management System and Funding Mechanism

It needs to construct a combined R&D management and Funding Mechanism system to boost the performance of ICT R&D projects In Cambodia, the government ministries lack R&D budget, the private sector has low trust in the output of R&D, and the output of R&D have inadequate ripple effects on the industries; thus casting significant doubts as to the need for R&D and lowering the overall efficiency of the R&D ecosystem. Such vicious cycle is repeated. ?Thus, starting from the planning stage for R&D projects, a consistent R&D management system and Funding Mechanism needs to be constructed to contribute to the ICT industry.

9.3.3 Boosting the Efficiency of the National ICT R&D Center

The reinforcement of Cambodia's ICT R&D center's capabilities should contribute to the development of Cambodia's IT industry and economic growth. Cambodia should ? through its national ICT R&D center ? construct effective R&D networks with universities and industries as well as an R&D collaboration system in the public and private sectors. The national ICT R&D center should strengthen the IT R&D collaboration system connecting Cambodia, Korea, Japan and major developed nations to operate its R&D management system efficiently. The results of R&D should translate into action to play the role of continued development in ICT industries.



Part 4. Enriching e-Services

10. e-Government Services

10.1 Introduction

The Royal Government of Cambodia (RGC) has been developing e-Government Service projects centered on informatization of government organizations since the beginning of the 2000s. The most representative e-Government Service projects, adopted under the “e-Government Service Deployment Plan” presented in the year 2008 for developing e-Government information systems, include GAIS, PAIS, FMIS, HRMIS, etc.

Through the e-Government Service projects, Cambodia has achieved fruits such as network connection among key institutions and distribution of PCs. Nevertheless, according to the UN’s e-Government Development Index, the level of Cambodia’s e-Government Services remains at a lower level than that of not only advanced but also its neighboring countries. The reasons behind Cambodia’s low evaluation are as follows.

Firstly, it is insufficient to have basic ICT devices & equipments such as PCs that enable public officials to process tasks by using e-Government Services. Secondly, informatization is not enough for key administrative business tasks that most governmental organizations are doing commonly. Thirdly, the key common DB and Data sharing mechanism among governmental organizations have not yet been developed enough. Fourthly, it is not built for the environment (e.g. network, data center) that efficiently operates e-Government Services. Lastly, the Royal Government has not yet enough guidelines that facilitate the systematic establishment of e-Government Services and the execution of its operations.

Therefore, in order to promote e-Government services of Cambodia, it is needed to establish comprehensive and systemic plans for overcoming the limitations.

10.2 Objectives

The RGC will achieve the following objectives through e-Government Services:

- Working environment based on ICT for government officials
- Collaborative and integrated e-Government
- Effective and sound investments on ICT project

- Methodical and disciplined ICT project management

And the RGC inaugurates the following 5 strategies in order to successfully implement the e-Government Service:

- S1: Common task-related factors and technical factors for e-Government must be standardized, co-utilized, and shared among all public organizations.
- S2: Nationally critical ICT resources must to be developed and managed under a centralized plan.
- S3: All services must be designed into the transparent and seamless service.
- S4: Newly introduced technologies must be open, flexible and practical.
- S5: The management of all e-Government projects must be supported with the establishment of the most efficient and well-defined policies and institutions.

10.3 Expanding e-Government Services

This program means the common and fundamental services or environment for the RGC to provide effectively various public services with ICT technology. In other words, it is called as the services for service and the vehicle to promote ICT through Cambodian governmental organizations. Main providers of this program are central government organizations which take responsibilities in common business functions or nation- wide ICT policy. And the customers are all central and local government organizations which have plans to provide their service through ICT or implement ICT to internal parts of themselves. Through this program, the following services will be provided: services for government officials, services for governmental organizations, services for e-Public service and services for officials who take charge of ICT policy and implementation. To successfully implement this program, the RGC will execute the following initiatives.

10.3.1 Promotion of Informatization of the Work Environment (e-Office)

The initiative is to provide an efficient and productive ICT environment for government officials to do their own tasks and co-work with other public worker. To do this, the RGC will expand ICT devices like PC, formulate and increase standard SW. Also the RGC will enhance a platform of intergovernmental collaboration by establishing e-Document standards, digitizing paper documents, building the Electronic Approval System (EAS) and developing e-Seal and e-Signature systems, etc. Lastly, the RGC will expand service coverage of PAIS and enhance the services.

10.3.2 Informatization of Common Governmental Business Function

The initiative is to develop and disseminate standard information systems for common task functions among public organizations. To do this, for financial sector, the RGC will establish

and expand budget/accounting/asset management system, collection systems like tax and e-Procurement system. Secondly, for human resource sector, the RGC will enhance and expand the Human Resource Management Information System (HRMIS), establish a government organizational management system and build a public human resource information portal. Thirdly, for law and legislation sector, the RGC will establish and expand the law information management & legislation support system, the criminal justice system and the auditing system. Lastly, for knowledge and statistics sector, the RGC will enhance and expand the national statistics information system, the national knowledge management system, etc.

10.3.3 Establishment of a Common Database and Sharing System

The initiative is to build database on nationally important resources or common data for public organizations and develop nationwide data sharing system. To do this, firstly, the RGC will enhance the resident information management system, establish and expand the e-Resident card issuance system and a corporate information management system. Secondly, the RGC will establish a national Geographic Information System (GIS) and management system by enhancing the GIS, establishing a land management system, building the postal address management system, etc. Thirdly, the RGC will develop a nature resource management system like forest, underground, biological and water resource. Lastly, the RGC will establish an administrative information usage system and its center, establish open data services and its promotion methods.

10.3.4 Establishment of a Common Service Environment for e-Government

The initiative is to establish a common environment such as a platform, component or infrastructure for developing & operating e-Government systems. To do this, firstly, the RGC will establish an e-Government development framework and promote standardization and utilization of administrative task codes. Secondly, the RGC will establish and disseminate guidelines for the Government-Information Security Management system (G-ISMS), establish e-Government encryption key usage system and set up information security center. Thirdly, the RGC will enhance the existing data center as an integrated central center and construct the second integrated data center for responding to an increasing future demand on information resources. Lastly, the RGC will set up a common base for converged services like mobile and IPTV.

10.3.5 Establishment of Standard Guidelines for ICT Project Management

The initiative is to set up basic and well-defined guidelines on efficient implementation, resource management and maintenance for public informatization projects. To do this, the RGC will set up an ISP standard guideline and support ISP establishment of each government department for constructing an organizational ICT strategy. Also, in order to establish a standard system for e-Government resource management, the RGC will build a government-wide Enterprise

Architecture (EA) and support EA establishment of each government department. Lastly, the RGC will establish a standard guideline for ICT project management, develop an IT service management guideline and disseminate the guidelines to relevant government organizations.

11. e-Public Services

11.1 Introduction

The Royal Government of Cambodia (RGC) has shown progress in its effort to integrate public service with ICT. For example, the promotion of ICT was initiated for administrative reform under the objective 'Serving People Better', as one of major four goals of the 1st phase (2004-2008) of the 'National Program for Administrative Reform'. These improvement efforts have resulted in the provision of several e-Public Services including FSNIS (Food Security and Nutrition Information System) for the public food safety, an immigration control system for secure border controls and an e-VISA to provide convenience for foreigners.

However, as ICT remains being utilized at low level in all areas of public services, there is necessity to select and promote the prioritized criteria for enhancing public services through ICT. The criteria consist of four areas; public safety area related to the safety of citizen's daily lives, infrastructure area that facilitates convenience for citizens, public service area required to pursue economic development and the other public service area that guarantees individualized welfare services through the economic development.

11.2 Objectives

The RGC will achieve the following objectives through e-Public Services:

- Implementation of intelligent public service
- Provision of public services centered on citizens' demands
- Achievement of social objectives and resolving of issues through the use of ICT

And the RGC inaugurates the following 5 strategies in order to successfully implement the e-Public Services:

- S1: All services provided by the government must be combined or converged with ICT.
- S2: e-Public Service does not merely refer to online services that use the internet but also all types of services that the Royal Government of Cambodia can provide using ICT.

- S3: All services must have its basis in citizen demand.
- S4: All services must go beyond mutual relationships between public organizations and the scope of task responsibilities and hence be established from an integrated and coherent perspective.
- S5: ICT utilization begins with the resolution of key national issues.

11.3 Extending e-Public Services

This program means enhancing public services using ICT in order to achieve various goals of the government. Thus, e-Public Service includes not only the provision of ICT-based direct public services such as public safety, public health, etc., but also the use of ICT for establishing social infrastructure such as roads, waterworks, electricity, etc. Main providers of this program are the central government as well as all institutions serving a public purpose (local governments, public enterprises, etc.). Also, the customers are citizens and private enterprises. To successfully implement this program, the RGC will implement the following initiatives

11.3.1 Enforcement of Public Protection

The initiative is to enforce public protection of Cambodia by using ICT. To do this, firstly, the RGC will set up intelligent public security services by strengthening the ICT base of public security organization like the police, promoting their digitization, establishing criminal information system and building an integrated control center including CCTVs for major cities. Secondly, the RGC will establish an integrated emergency rescue system by building a base for accident reporting, supplying ICT devices to relevant organizations, constructing an integrated emergency rescue call center by unifying emergency numbers, etc. Thirdly, for responding to disasters and catastrophes, the RGC will build an intelligent emergency communication network as well as a disaster early warning system and a support system for disaster response duties. Lastly, the RGC will create safe border management system by supplying ICT devices to organizations responsible for border management like a passport issuance, enhancing the immigration border management system, etc.

11.3.2 Assurance of Sound Public Hygiene

The initiative is to build sound environment for public hygiene by using ICT. To do this, firstly, the RGC will establish a food and drug safety service based on ICT by disseminating ICT devices to administrative and supervisory organizations on food and drugs, build a safety management system, etc. Secondly, for effectively managing various diseases, the RGC will establish a database on them and build disease surveillance/prevention/response services. Lastly, the RGC will establish an integrated water and sewage utility management service by building an information

database related to water and sewage, developing metering and billing management system, constructing an integrated control center, etc.

11.3.3 Improvement of Efficiency for Social Infrastructure Management

The initiative is to help reconstruction of social infrastructure by using ICT. To do this, the RGC will establish energy management services based on ICT by building a database on basic information related to energy, developing an energy-related certification management system, etc. Also, the RGC will set up an integrated water resource management system by establishing a database regarding water resource relevant basic information, building a water resource quality management system, developing a water resource usage approval and result management system, etc.

11.3.4 Intellectualization of Transportation and Logistics

The initiative is to use ICT in transportation and logistics sector for reconstruction of social infrastructure. To do this, firstly, the RGC will establish an intelligent transportation management system based on ICT by building a transportation report database, developing an Intelligent Transport System (ITS) through the intelligent use of road resources, establishing a railroad/vessel/air traffic management system, etc. Secondly, the RGC will set up an integrated national logistics service by creating database for basic logistics-related information and establishing logistics process management systems for ports/airports/land transport. Lastly, the RGC will implement informatization of postal services by standardizing postal service information, enhancing relevant databases, automating postal logistics, etc.

11.3.5 Enforcement of Stability of Economic Activities

The initiative is to enforce stability of economic activities by using ICT. To do this, the RGC will establish commercial registration & business support services based on ICT by building a business-supporting task relevant information database, developing company relevant task information systems, etc. Also, the RGC will reinforce property rights protection services by expanding real estate/movable asset/intellectual asset relevant information systems and establishing a government-wide interchange system.

11.3.6 Promotion of Economic Growth

The initiative is to promote economic growth by using ICT. To do this, the RGC will implement informatization for agricultural development by building an agriculture relevant knowledge database, an integrated management system for agriculture promotion business, etc. Also, the RGC will promote trade industry and arrange the customs system by building a primary information database for trade and customs, developing an e-Trade system, expanding the

clearance & customs systems, etc. Lastly, for attracting investment to Cambodia, the RGC will provide the support services by establishing an electronic disclosure system and an integrated Cambodia investment information portal, etc.

11.3.7 Improvement of Personal Life Quality

The initiative is to improve personal life quality by using ICT. To do this, the RGC will set up a job creation system by establishing a technology education-related system necessary for employment, developing a national license management system, building a national integrated job matching services, etc. Also, the RGC will provide an employee rights protection service by establishing an information database regarding current business sites and employee status information, building a business site environment evaluation system, etc. Lastly, the RGC will establish healthcare and welfare systems by enhancing the existing Health Information System (HIS), digitizing all public health information, etc.

11.3.8 Promotion of Social Culture and Arts

The initiative is to promote social culture and arts by using ICT. To do this, the RGC will build cultural asset management systems by establishing a detailed information database regarding cultural assets, developing a cultural asset management system, etc. Also, the RGC will implement informatization of religion management by building religion relevant information database, developing a religious activity supporting system, etc. Lastly, the RGC will provide art assets management services by building a database on detailed information of art assets, developing an art asset management system, etc.

11.3.9 Promotion of Miscellaneous e-Public Services

The initiative is to improve access to public services for the Cambodian citizens. To do this, firstly, the RGC will establish an integrated e-Public service portal, enlarging internet centers into rural areas, constructing information network villages, etc. in order to improve accessibility to various e-Public services. Secondly, for enhancing the public's rights, the RGC will implement informatization of election affairs and establish a public participation portal service. Thirdly, the RGC will execute informatization of national court by promoting intelligent judiciary work based on ICT, establishing an e-Court system, etc. Lastly the RGC will implement informatization of national assembly by promoting ICT-based intelligent business in national assembly, building an electronic national assembly hall, etc.

12. e-Economy Services

12.1 Introduction

Over the decade to 2010, Cambodia's economy developed remarkably, with an average annual growth rate of 8%. Such growth was achieved by implementing an open market economy, based on the country's competitive advantages, and by providing an environment conducive to private sector investment.

e-Economy services as applications in Cambodian ICT Master Plan 2020 are selected because economic development is the most important issue in Cambodia and because e-economy services affect almost all areas of industry as well as directly Cambodia. They must be cornerstone for economic and social growth of Cambodia.

e-Economy promotes ICT in economic activities of private enterprises. It means all efforts of transforming Cambodia economic ecosystem to intelligent economic ecosystem. Enterprises include not only company in ICT industry but also one in traditional industry.

e-Economy services are broad disciplines for services with economic activities. This Masterplan limits their scopes with their definitions. e-Economy is divided into three disciplines which are e-commerce, e-banking and e-tourism.

12.2 Objectives

The objectives to promote the e-Economy in Cambodia are divided into three parts.

First, legislation and policy making for online business are made. Online payment methods are developed for online business. As a prerequisite for e-commerce, a robust nationwide postal system is established. Based on the new postal system, major logistics and retail distribution companies lead the market.

Second, the economic population acknowledges e-banking and its services and holds at least one financial account which realizes e-banking. Thus, the total amount on e-banking transactions exceeds the total amount on over-the-counter transactions.

Third, all organizations in tourism sectors operate own homepages to provide their services such as related information, reservation and issuance of tickets. ICT systems are applied to tour industry to result in doubling the number of the tourists and travelers. As an objective, personally specialized products and services in tourism are developed and served.

12.3 Improving e-Commerce Environment

e-Commerce is defined as conducting digitally enabled business transactions between and among organizations and individuals on the Internet. Although e-business is the broader concept including e-commerce in the popular sense, e-commerce differs from e-business in the sense that no exchange of value across organizational or individual boundaries, takes place in e-business. Thus e-business turns into e-Commerce when an exchange of value between and among organizations and individuals occurs across their boundaries.

12.3.1 Improving e-Commerce Infrastructure

Legislation and policy-making for online business and online security are made to encourage e-commerce and to improve the e-commerce environment. Development of online payment methods is executed.

12.3.2 Support for Logistics and Distribution Companies

It is necessary for e-commerce to be invigorated when related infrastructure such as a robust postal system is established. Logistics and distribution companies and major retail distribution companies must be supported by government.

12.4 Enhancing e-Banking and Financial Network

e-Banking, which stands for electronic banking, makes possible for customers of financial institutions to electronically perform financial transaction process virtually. The virtual forms of e-Banking are ATM (Automatic Teller Machine), Telephone Banking (operator-oriented and automated), and Internet Banking (PC-based, Mobile-based). However, e-banking usually represents the internet banking based on PCs or mobile devices.

It is noted that personal computer (PC) banking, Internet banking, virtual banking, online banking, home banking and remote electronic banking are often used interchangeably. Internet banking enables customers to execute bank transactions from a PC with proprietary financial software provided by financial institutions.

12.4.1 Enhancing Electronic Banks

Legislation and establishment of government policies for e-banking must be preceded. And then, enhancement of bank portal sites and construction of electronic systems in banks should be followed. Meanwhile, internet/mobile/phone banking should be implemented as well.

12.4.2 Enhancing Financial Network

The financial network connecting to all financial institutions must be created, and related automatic payment systems connecting to all financial institutions should be developed.

12.5 Improving e-Tourism Services

e-Tourism is defined as digitization of all the processes in value chains made by entities in all tourism sectors as well as application of ICTs on the tourism industry for the value chain.

Until mid-1990s, over half the world's electronic transactions, which are mainly made by airlines, were in tourism. After ICT technologies have been applied to tourism, e-tourism has evolved dramatically. The typical examples of e-tourism outputs are electronic VISA, electronic tickets, online booking and mobile applications.

As main features of e-tourism, e-tourism enhances competitiveness of the organization in tourism industry. There are lengthy supply chains based on commissions consisting of product suppliers, consolidators, wholesalers, retailers and consumers in tourism sectors that are dominated by small enterprises. Tourism suppliers form a complicated network.

12.5.1 Construction of the Central Travel Information Center

The central travel information center, which is on/off-line information center for tourists and travelers, is constructed. Additionally, digitized information regarding transportation, activities, schedule, dining, accommodations for tourists and travelers, generated in all tourism sectors, is collected in regional travel information centers located in provinces.

12.5.2 Establishment of Tourism Network

The information in each tourism sector is digitized, and the information in tourism industry is centralized. All tourism sectors are integrated creating the tourism network which is on/off-line network. On the tourism network, the centralized information for tourism are shared with all tourism sectors. Application solutions are developed to support the tourism network.

12.5.3 Support for Growth of Gigantic and Major Companies

National support is urgently needed for growth of major tourism companies in which various tour programs are available and partnerships with major foreign travel agencies are made.

13. e-Education Services

13.1 Introduction

Cambodia has various long-term plans for education (e.g., National Strategic Development Plan 2014-2018, Master Plan for ICT in Education 2009-2013, The Education for All National Plan 2003-2015) and well-organized school systems.

However, the school completion rate has dropped down as the educational level goes up due to weak educational infrastructure including weak educational network among schools. E-School is a candidate to improve the educational infrastructure with respect to ICT.

e-Learning may be an alternative to make up the shortfall in current education systems. Low recognition of e-learning, a scarcity of localized education contents, few e-learning courses offered are current obstacles for e-learning to become popular.

Since e-learning, as a supplementary channel to provide education, is a good method for distance learning as well as for enhancing the educational levels of the public, e-learning must be invigorated and supported in a long-term plan.

13.2 Objectives

The objectives to promote Cambodia's e-Education are divided into two parts.

First, the information including personal information (students, teachers, staff), student records, activities, is digitalized. Based on the digitized information, certificates including students' records from educational institutions are able to be issued in any place of Cambodia. All public schools provide school, curriculum, teachers' information on their own website and support two-way communications between schools and parents. Additionally, a library information network within the entire Cambodia is established.

Second, the infrastructure and the environment such as policies, rules and regulations are ready to be used for e-learning. The level of awareness in economic population is improved to above the average of ASEAN countries, and the education level in entire population is improved to above the average of ASEAN countries.

13.3 Enabling e-School Services

The concept of e-school contains e-learning in broad aspect, but the scope of e-school in this plan sets limits to digitalized information at school. Thus e-school represents that all information is

digitized at school and that the information is utilized at school and outside of school.

13.3.1 Provision of School Information and Records in Database

Personal information, student records and library information are digitized and electronically processed through the school portal site. Additionally, library systems are developed in conjunction with the school portal site.

13.3.2 Establishment of School Network

Graduation/records certificates are issued online from educational institutions. School, personal, records and library information is shared on the school network. The educational contents are distributed on the school network.

13.3.3 Enrichment of ICT Education

Computer labs at schools are developed, and ICT curriculum and ICT training courses at schools and in private institutions are provided.

13.4 Implementing e-Learning Services

e-Learning is the applications of ICT to support delivery of educational contents to students and/or learners on the Internet and in distance. In other words, e-learning indicates electronic transfer of skills and knowledge via the Internet, network, mass media materials (e.g., DVD) or satellite.

A number of other terms are also used such as online learning, virtual learning, distributed learning, network and web-based learning. Basically, they all refer to educational processes that utilize ICT to mediate asynchronous as well as synchronous learning and teaching activities.

13.4.1 Government Support for Educational Institutes

As government support for educational institutes, certificates and licenses are issued and a computer lab in each school is constructed by government. Educational programs for students and teachers are developed, and elementary e-learning contents are produced.

13.4.2 Creation and Distribution of Video Contents

Video lectures with various topics are developed, and the video contents are distributed in cyber/open universities and/or on mobile network.

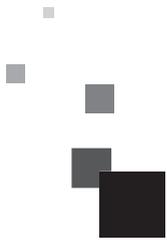
13.4.3 Localization of e-Learning Contents and Solutions

E-Learning contents are localized (i.e., contents are translated into Khmer language), and

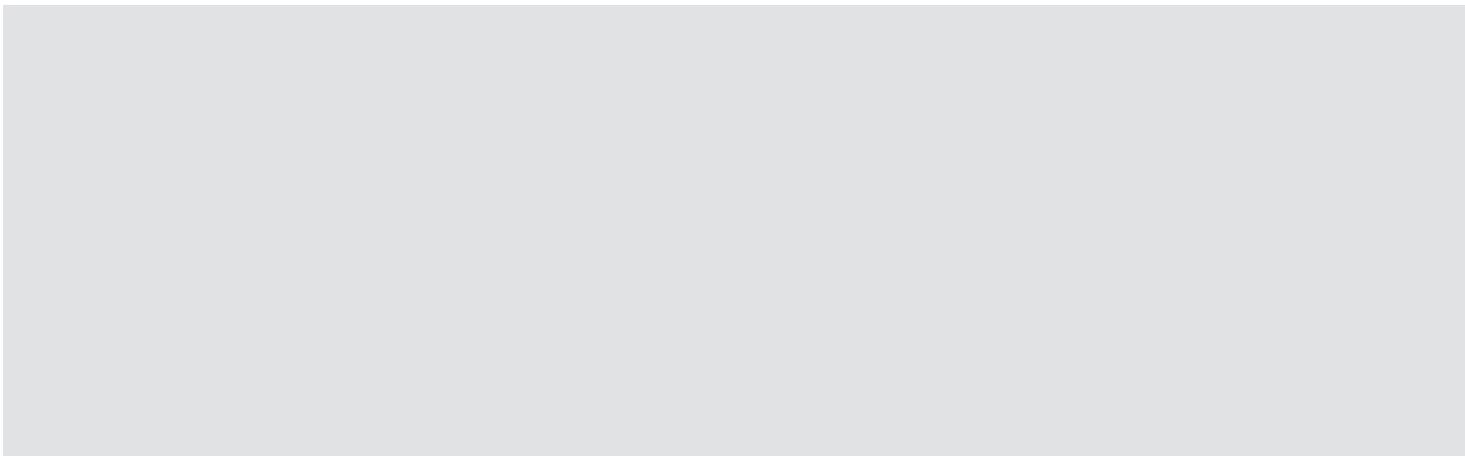
e-learning solutions containing localized contents is developed. Research on u-Learning and m-Learning must be conducted continuously.

13.4.4 Distribution of e-Learning Contents

For distribution of e-learning contents, distribution network for e-learning contents must be established. Useful e-learning contents in each field are selected and procured by government.



Pilot Projects



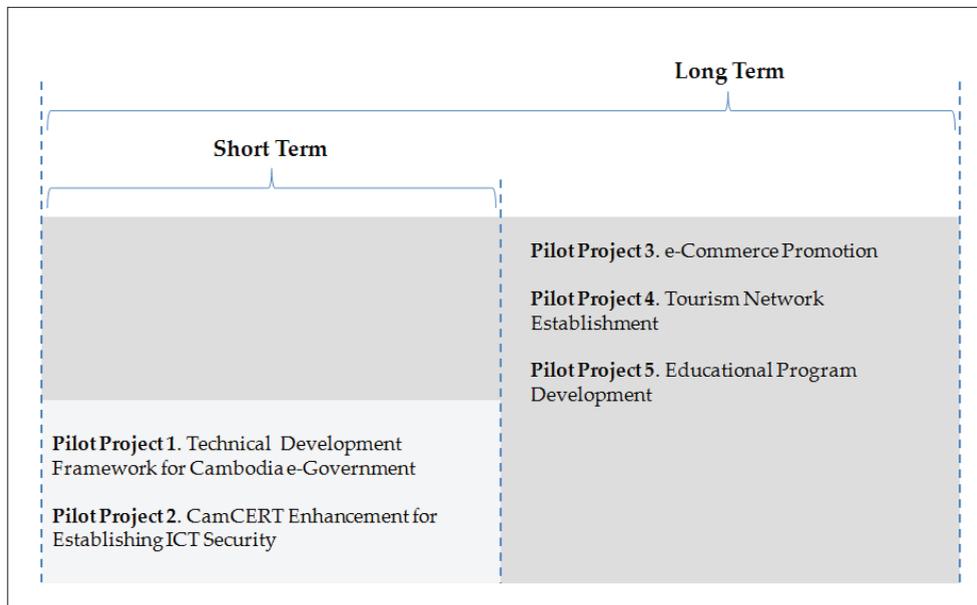


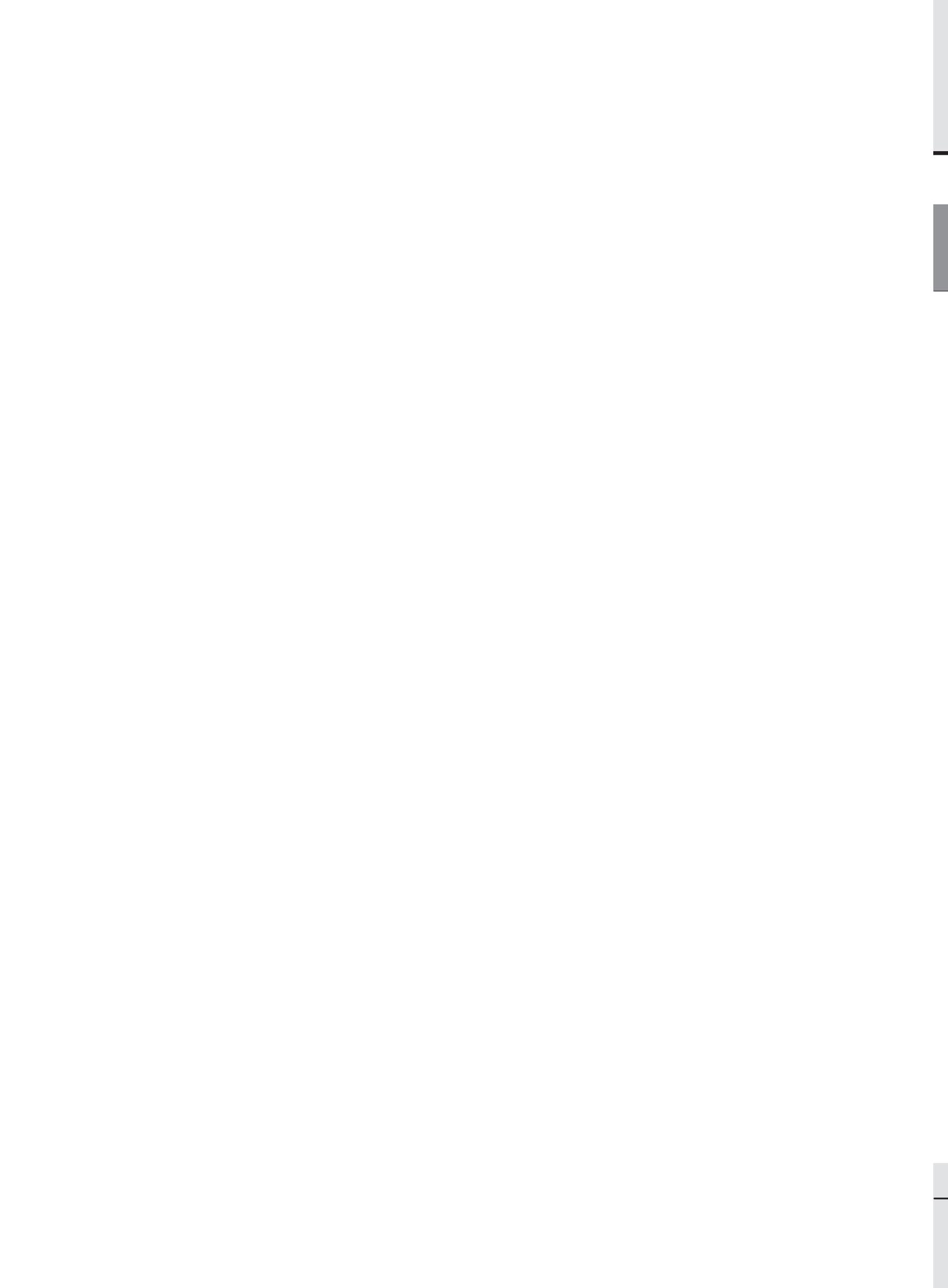
Overview

The Royal Government of Cambodia (RGC) has established “Cambodian ICT Masterplan 2020” for systematic ICT development in Cambodia. And this report aims to provide Pilot Projects for the successful implementation of “Enriching e-Services” among four strategic thrusts of the Masterplan.

In order to achieve the aim, this report proposes five Pilot Projects. And they have been chosen among the approximately two hundred and sixty projects derived from the “Enriching e-Services” Masterplan, on the basis of rational guidelines and the expert’s opinion investigation. Two of the five Pilot Projects are the short-term plan which is comprised of “Technical development framework” and “CamCERT (Cambodia Computer Emergency Response Team)”. The detailed plan proposes project plans which enable each responsible ministry to immediately implement them. The other three plans are the long-term plan which is comprised of “e-Commerce”, “e-Tourism” and “Educational Program Development”. And phased execution plans are provided for each sector’s promotion.

Pilot Project Execution Schedule





1. Technical Development Framework for Cambodia e-Government

1.1 Introduction

The RGC defines Technical Development Framework for Cambodia e-Government (hereinafter referred to as “Cambodia e-Government Development Framework”) as a set of core code (class, interface) for developing the public information system, which is the assortment of tools and guides that supports development and operations of systems in Cambodia. The vision of this project is to build-up a systematic and efficient e-Government service operation. To achieve the vision, the plan aims to standardize the e-Government development, enhance the system quality and prepare low cost/high efficiency operation structure through introduction of the development framework.

1.2 e-Government System in Cambodia

The RGC has been developing e-Government services projects centered on informatization of government organizations since the beginning of the 2000s. The most representative e-Government services projects include GAIS (Government Administrative Information System), PAIS (Provincial Administrative Information System), FMIS (Financial Management Information System), HRMIS (Human Resource Management Information System), and so on. But, according to UN e-Government Development Index in 2012, the total rank of Cambodia is the 155th out of 193 countries. And, it means Cambodia still has low competitiveness in e-Government services.

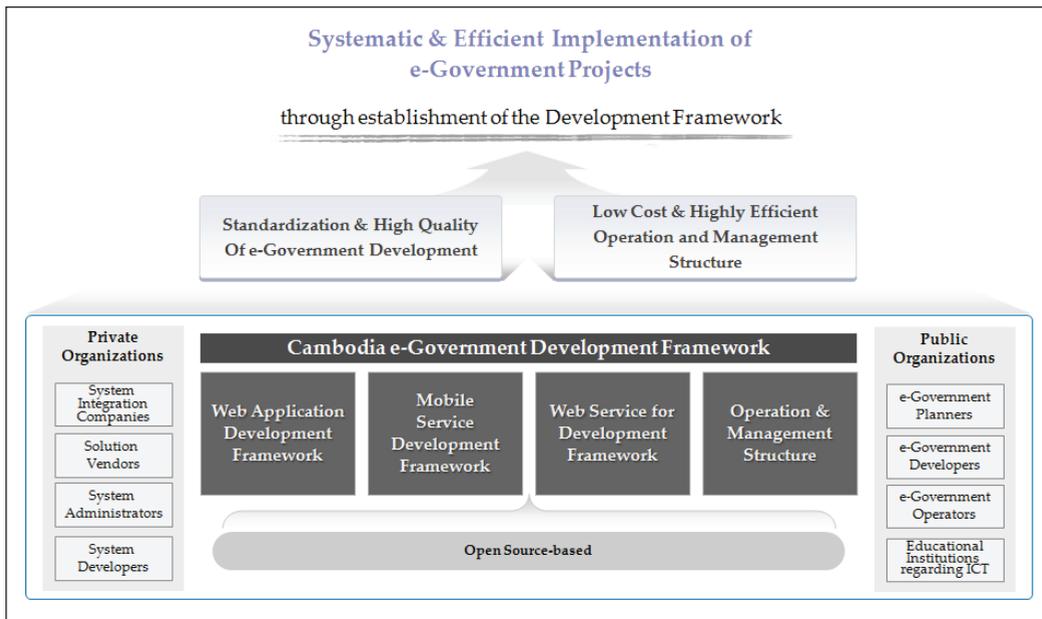
The analysis results on general issues related to developing e-Government information systems of Cambodia are as follows: lack of standardized and comprehensive progress, high dependency on other countries and lack of ICT budgets. The relevant technical issues are as follows: difference of applied technologies, low interoperability, low reusability and inequality of development quality. And in e-Government system operation areas, lack of experts, high dependency on overseas countries and low system stability are obstacles. Also, the technical problems of operating e-Government system are low sustainability, low flexibility and low efficiency.

1.3 Establishment Plan for Cambodia e-Government Development Framework

The RGC will establish Cambodia e-Government Development Framework to be suited for the current state of Cambodia e-Government by modifying the Korean e-Government Standard Framework, which is based on the Spring Framework. That is because the Spring Framework is recognized to be safe and stable by being applied to public information systems in many nations.

To establish this plan for Cambodia e-Government Development Framework, the RGC will promote following four agenda.

Objectives and Agenda of Cambodia e-Government Development Framework



Firstly, Cambodia e-Government Web Application Development Framework is technical development framework for implementing the web-based applications in e-Government services. And this is composed of runtime, development, operation environment and common components. The runtime environment architecture will be composed of six service groups: presentation layer, business logic layer, data processing layer, integration layer, batch layer, and common foundation layer. The development environment architecture is composed of four service toolsets in accordance to the development stage: the implementation toolset, the test toolset, the build toolset and the configuration management toolset. The operation environment includes the monitoring tool and administration tool, enabling the government to monitor each of e-Government systems and respond immediately & accurately to the raised issues. 125 common technological Services and 90 elementary technological services are selected in consideration of the current state of information systems of Cambodia and overseas benchmarking cases.

Secondly, the Mobile Service Development Framework is based on the Web Application Development Framework, including runtime, development environment and mobile common components required for developing mobile web-services. The runtime environment provides fifteen UX components associated with visual, interface and effect experience for improving the usability and convenience of the mobile web to ensure that it is appropriate for mobile devices. And development environment provides mobile web templates, implementation tools for developing mobile websites, initial source codes and verification tools.

Thirdly, the Web Service for the Development Framework will be established with the objectives of setting up the development framework in Cambodia and supporting the effective development of public information systems by offering relevant guides, examples, and so on. And key services include the following functions: information service to assist the understanding of the Cambodia e-Government development framework; download service to provide run/development/operation environments with common components; and support service to provide guides, education and technical supports for assisting the use of the development framework.

Lastly, the RGC will establish a structure to effectively operate and manage the development framework. For this, the RGC will build the Development Framework Center (DFC) responsible for the operation and management of the development framework. Moreover, the DFC will continuously improve the development framework through reflecting the requirements collected by system programmer and operators. And the improved framework will be provided to the system programmers and operators via web service, establishing a virtuous cycle for the framework.

1.4 Execution Plan for the e-Government Development Framework

The E-Government Department under General Department of ICT (GDoICT) in MPTC (Ministry of Post and Telecommunication) is in charge of establishing the Cambodia e-Government Development Framework. And the RGC will establish DFC under the E-Government Department.

Time Schedule and Budget for e-Government Development Framework

	2014				2015				2016~	Budget (in thousand USD, 2014-2015)
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
Developing Web Application Development F/W			Collect requirements		Develop web F/W		Pilot projects		Stability & usage	1,500
Developing Mobile Service Development F/W			Collect requirements			Develop mobile F/W		Pilot projects	Stability & usage	200
Establishing Web Service					Develop website	Install H/W & S/W		Test	Stability	700
Establishing Operation & Management Structure		Set up DFC	Organize business process				Design training programs		External training	550
Responsible Organization	MPTC				MPTC (DFC)				Total	2,950

The time schedule for establishing Cambodia e-Government Development Framework is to complete the establishment by 2015. Also, the schedule includes a plan to introduce the framework into the Cambodia e-Government projects from 2016. For Web Application and Mobile Service Development Framework, it is necessary to finish development of the framework by 2015. Also, the RGC will implement the stabilization of the framework and extend the scope to new developed information systems and government organizations with the framework from 2016. Next, web development for online service will be completed by 2015, and organizing business process for the framework operation & management will be finished by 2014.

The total budget for this Pilot Project will be approximately 2,950,000 USD. And it will be allocated as follows: 1,500,000 USD to Web Application Development Framework; 200,000 USD to Mobile Service Development Framework; 700,000 USD to Web Service Establishment and 550,000 USD to Operation & Management Structure Establishment.

2. CamCERT Enhancement for Establishing ICT Security

2.1 Introduction

The RGC will conduct enhancement plans for the existing CamCERT that has been operated since 2007 as a single national authority for establishing policies related to information security as well as coping with security incidents. Through this project, the RGC will expand business scope of CERT to the international level and enhance proactive response to incidents. Additionally, the RGC will change the CamCERT works from offline to online by implementing CERT-related information systems. Lastly, the RGC will extend the service scope of CamCERT to the whole of government agencies and major private agencies in Cambodia.

2.2 CERT in Cambodia

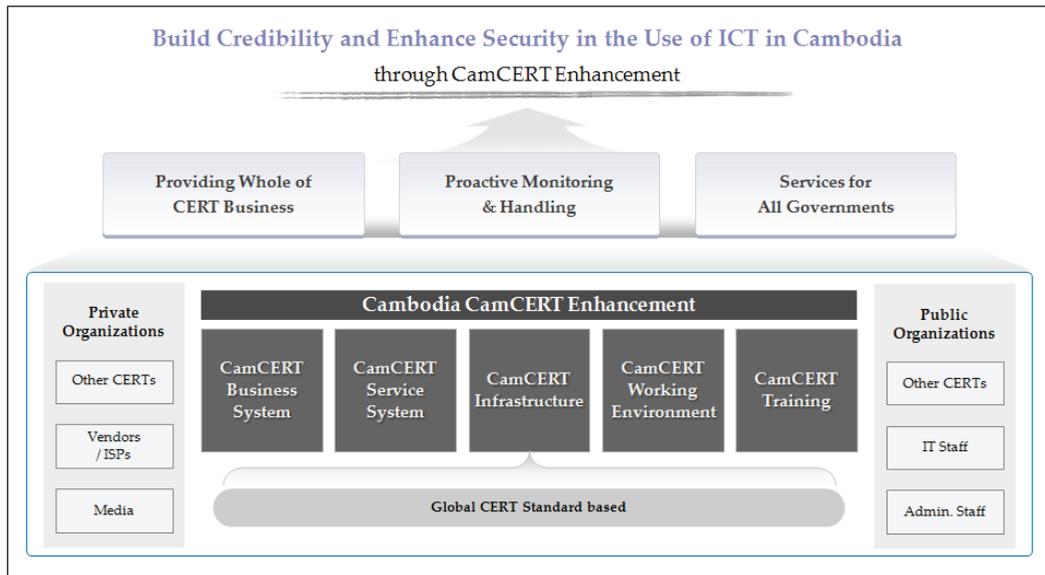
The ICT Security Department under GDoICT of the MPTC is responsible for CamCERT business now. But most of team members had not enough knowledge and experience for operating systems and infrastructure related to CERT. In terms of work status, "Proactive Service", which monitors and prevents incidents before they occur, is insufficient. And CamCERT manages incidents just 2~3 times a month, hence it does not provide enough services to effectively respond to incidents on vulnerability that should be handled in the real time. Additionally, CamCERT is working their tasks with PC by using just worksheet programs such as EXCEL and e-mail without information systems.

Moreover, because CamCERT did not establish information systems for CERT business and services, security infrastructure related to CamCERT is vulnerable. Therefore, the RGC needs systems for CamCERT - such as ESM (Enterprise Security Management), TMS (Traffic Management System), IMS (Incident Management System), VAS (Vulnerability Analysis System)-, security S/W, training appliances and safe infrastructure configuration plans.

2.3 Establishment Plan for CamCERT Enhancement

The RGC will conduct CamCERT enhancement through three phased approaches. Among them, this Pilot Project focuses on first phase in the short term perspective. Specifically, in order to efficiently and safely perform CERT business and service, CamCERT will conduct the following agenda: developing CERT business system, developing CERT service system, improving the working environment of CERT operation staff and strengthening the infrastructure of the CERT office.

Objectives and Agenda of Cambodia CamCERT Enhancement



Firstly, to enhance business systems, the CamCERT will develop the four systems as follows: the Integrated Analysis System for supporting CERT operators identify and manage the security status in certain organization by collecting and analyzing security information; the Incident Management System for supporting incident handling; the Secure Mail System for enhancing security of web mail system; and Security Portal System for supporting active communications between CamCERT and constituency.

Secondly, the CamCERT has a plan to implement five service systems to enhance CERT services as follows: the ESM that helps system administrators easily understand the current status of security event; the TMS that monitors malicious threats in the network; the VMS that checks vulnerability of system and manage their history; the Webpage Forgery Detection System and the Zombie PC Management system that prevents becoming zombie PC due to malicious code infection.

Thirdly, CamCERT business and service systems will be built in the National IT Center, and they will monitor various information systems of government agencies. The network will be connected through NII (National Information Infrastructure) network. And it is also needed to install IPS (Intrusion Prevention Systems) and Anti DDoS appliances in the National IT Center.

Lastly, the performance of PCs for CamCERT staff will be improved to efficiently carry out CERT operations, and various security SWs required for stable business performance will be installed. And, it is important to reinforce system in order to guarantee the stability and performance of the present monitoring environment of CamCERT. Furthermore, CamCERT will provide security training sessions categorized by level and theme to meet the HR development goal. As well, CamCERT will operate training programs of the international professional organizations that have best practices in CERT.

2.4 Execution Plan for CamCERT Enhancement

Time Schedule and Budget for CamCERT Enhancement

	2014				2015				2016~	Budget (in thousand USD, 2014-2015)
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
CamCERT Business			Align CERT organization	Adjust CERT business/process						N/A
CamCERT Business & Service System				Secure budget		Establish systems			Operation Test	2,240
CamCERT Working Environment						Improve working environment			Operation	519
CamCERT Infrastructure				1 st enhancement			2 nd enhancement			1,799
CamCERT Training				Overseas training		Design programs			External training	140
				Internal training			Invite experts			
Responsible Organization	MPTC (General Department of ICT, ICT Security Department, CamCERT Office)									4,698

ICT Security Department under GDoICT of MPTC will take charge of CamCERT enhancement project.

And the RGC is going to secure the required budget by the end of 2014. Also, the RGC will develop nine CamCERT systems and launch the pilot operations by 2015. In addition, the RGC has to get ready to operate CamCERT systems from 2016. Starting with the internal and overseas trainings, the RGC will strengthen the operation capabilities for new CamCERT systems by

designing training programs and inviting overseas experts. And from 2016, CamCERT training will be extended to external agencies along with enhancement plans for Phase 2 & 3.

Furthermore, the total budget for this Pilot Project will be approximately 4,698,000 USD. And it will be allocated as follows: 2,240,000 USD to CamCERT business & service systems; 519,000 USD to CamCERT working environment; 1,799,000 USD to CamCERT infrastructure; and 140,000 USD to CamCERT training.

3. e-Commerce Promotion

3.1 Introduction

The RGC will actively promote e-Commerce as an axis of Cambodia economic development. The RGC defines e-Commerce as “Commercial activities via electronic communication”. Even though e-Commerce is getting generalized in global, Cambodia is still in an early stage of e-Commerce development. Therefore, technical, administrative and legislative fundamentals are necessary for the e-Commerce promotion. Through this, the RGC aims to enhance optimization, efficiency and fairness of economic activities in traditional industries. Moreover, through e-Commerce promotion, the RGC aims to establish dynamic environment in which Cambodia economy can grow comparably faster.

3.2 e-Commerce in Cambodia

As a result of analyzing the current status of Cambodia e-Commerce business, C2C and B2C market is still at an early stage, and only a few marketplace sites are on business. The majority of those sites play a role as another selling channel or an advertisement channel of the company which basically sells electronic goods or clothing offline. However, the fraud is one of the critical issues. Meanwhile, in B2B market, information exchange network among companies through EDI (Electronic Data Interchange) system has not been established yet. And in B2G case, some websites are established or developing in procurement or taxation area. But through such sites, only limited information gathering is available and the core processes are still processed offline.

As, in consumer’s perspective, mobile users are rapidly increasing, the opportunity for e-Commerce growth is increasing. However, still most of the citizens prefer offline purchase methods. And, in company’s perspective, companies in Cambodia have hard time promoting e-Commerce by themselves since most of them are SMEs (Small and Medium Enterprises).

Regarding to the current status of e-Commerce technology, Cambodia does not have safe integrated e-Payment policy and standardized electronic personal identification technology. Moreover, it is lack of ICT infrastructure for e-Commerce.

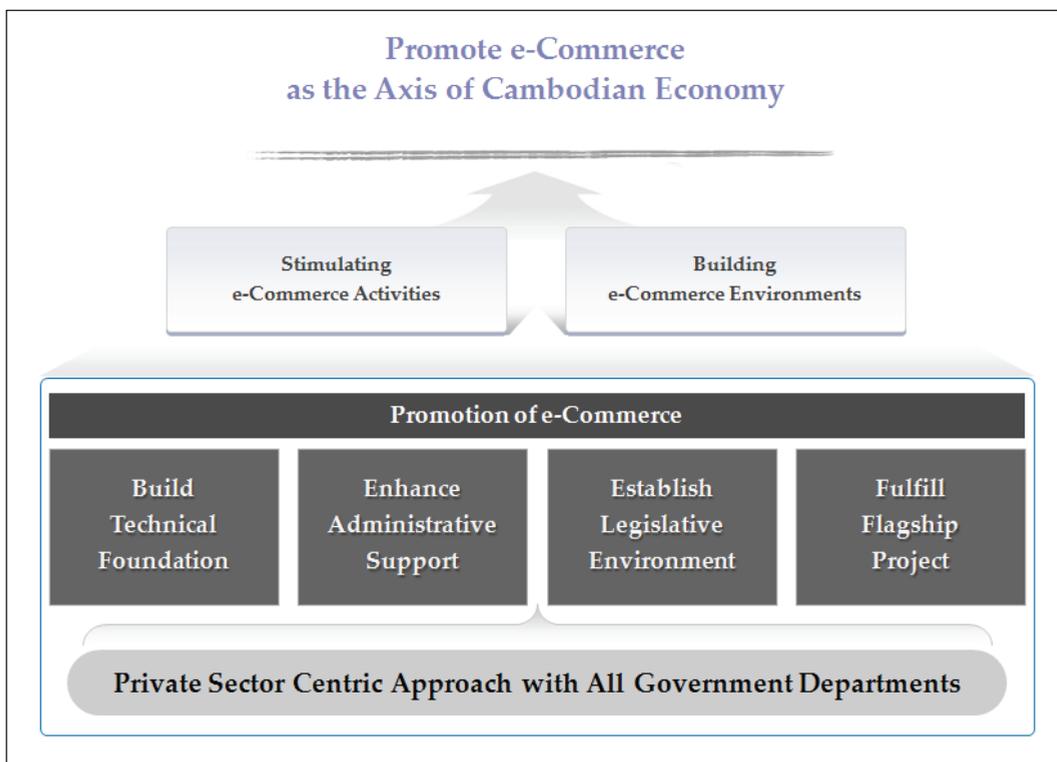
In addition, e-Commerce basic law is currently under legislation, and some of e-Commerce promotion policies are made. However, e-Commerce supporting policies still leave much to be desired.

Likewise, as a result of overall investigation on current status of the business, technology, policy and legislation, the Cambodia is determined to be in an early stage of e-Commerce development.

3.3 Establishment Plan for e-Commerce

The RGC has a vision to promote e-Commerce as an axis of Cambodia economic development. For this, the RGC will execute various e-Commerce promotion plans as follows: building a technical foundation, strengthening the administrative support, establishing a legislation environment and fulfilling flagship projects.

Objectives and Agenda of e-Commerce Promotion



Firstly, the RGC will establish technical foundation for e-Commerce promotion. The core technical elements for e-Commerce are the e-Payment, e-ID and EDI. Therefore, the RGC will prepare post-paid e-Payment methods like credit card along with the current prepaid e-Payment method. Particularly, to enhance the Cambodia citizen's credibility on e-Commerce, the RGC will actively introduce escrow service. Also, the RGC will establish e-ID system in order to support identification in cyber space. Moreover, the RGC will select and disseminate standardized EDI

which will support electronic information exchange in various e-Commerce businesses. Along with those elements, the RGC will operate certified e-Mail service and certified electronic documentation depository service. Also, the RGC is going to strengthen the cyber security policy and continuously secure e-Commerce technology standards.

Secondly, the RGC will implement direct and indirect administrative supports. The RGC will provide direct supports like certification program, various incentive programs, postal and distribution network strengthening, and so on. Moreover, the RGC will indirectly support e-Commerce through taxation policy, telecommunication fare policy, and so on.

Thirdly, the RGC will enhance legislation environment. Above all, the RGC is going to rapidly implement e-Commerce basic law which is currently under legislation. And also, the RGC will legislate or revise the subordinate laws by sectors like consumer protection laws. In addition, the RGC will revise e-Commerce relevant legislations like civil law or tax law, and enact legislation for the new business model as well.

Lastly, the RGC will execute flagship projects for e-Commerce promotion. As in B2G area, flagship projects will be implemented in the areas like e-Customs, e-Procurement or e-Taxation to directly promote e-Commerce between the government and the company. Not only that, B2G promotion will indirectly promote e-Commerce in B2C and B2B as well. Meanwhile, in B2B areas, the RGC will promote flagship projects in Cambodia's five major industries: construction, tourism, clothing, telecommunication and distribution/logistics industry. And in B2C areas, the RGC will directly establish and operate e-Marketplace regarding agriculture goods or exports in which private companies are characteristically hard to establish marketplace.

In addition to those agenda, the RGC will promote e-Commerce through three phased approach in a long term perspective. First, in phase 1, the RGC will build up Cambodia citizen's credibility on e-Commerce under the basis of B2C and B2G until 2016. Especially, the RGC aims to establish safe and reliable e-Commerce environment for both buyer and seller. In phase 2, until 2020 the RGC will actively expand B2B centric e-Commerce on the basis of trust and infrastructures enhanced at phase 1. And the RGC also aims to promote e-Commerce in each industry. The RGC will establish B2B network, localize necessary technologies, foster new business model and strengthen the global cooperation. Last but not least, in phase 3, the RGC will execute promotions which are necessary for the sustainable e-Commerce growth in a long term perspective, and establish creative eco-system for e-Commerce. The promotion will be executed in all industrial areas. Moreover, technical and administrative support will be provided in order to reduce the relative gap in e-Commerce.

3.4 Execution Plan for e-Commerce

The RGC will organize “e-Commerce Promotion Committee (Tentative)” in order to establish and coordinate pan-governmental consistent policies for the phase 1 execution. Moreover, in order to stimulate private sector’s participation, the RGC will organize “e-Commerce Roundtable” which will play a role as an advisory in policy establishment. In addition, through establishing “e-Commerce Support Center” under MPTC, the RGC will provide practical support services on solving e-Commerce relevant technical issues.

Time Schedule for e-Commerce Promotion

	2014				2015				2016			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Technical Foundation			e-ID F/S		Develop e-ID System							
	Establish technical roadmap for e-Commerce						e-Payment F/S		Develop e-Payment System			
					Enforce cyber security for e-Commerce							
Administrative Support		Establish e-Commerce support center			Establish administrative support program for e-Commerce							
					Develop expert resource of e-Commerce							
Legislation		Establish e-Commerce basic law			Establish standard contract terms & Customer Protection Act of e-Commerce				Establish technical standard guideline of e-Commerce			
Flagship Project		Secure budget & prepare for establishment			Implement 1 st Flagship Project				Implement 2 nd Flagship Project			
Preparing Phase 2									F/S for Phase 2		Secure budget	

* F/S : Feasibility Study

The time schedule for establishing phase 1 of Cambodia e-Commerce promotion is to complete the establishment by 2016. And it is comprised of technical foundation preparation, administrative support, legislation, flagship project implementation and the phase 2 preparation. For technical foundation preparation, technical roadmap for e-Commerce promotion will be established by 2014, and cyber security enhancement plan as well as technical fundamental systems like e-ID and e-Payment will be gradually developed until 2016. For administrative support, e-Commerce Support Center will be established by 2014. And then, various administrative support program

preparation and experts fostering will be followed. In legislation perspective, e-Commerce basic law will be prepared by 2014, and standard guideline to establish fundamental environment for secure e-Commerce promotion will be prepared by 2016. In addition, flagship projects will gradually begin from 2Q of 2014. And from 2016, budget for the phase 2 will be prepared and following steps will also be systematically executed.

Lastly, the total expected budget for the phase 1 plan execution will be approximately 60,150,000 USD. And it will be allocated as follows: 24,350,000 USD to technical foundation preparation; 9,150,000 USD to administrative support; 400,000 USD to legislation; 25,000,000 USD to flagship projects and 250,000 USD to the preparation of phase 2.



4. Tourism Network Establishment

4.1 Introduction

The RGC will establish e-Tourism as a pilot project, because expected economic benefits followed by ICT adoption is large. e-Tourism is defined to be application of ICT as well as digitization of all processes at the value chain which are made by all stakeholders in tourism industry. In this pilot project, establishing Tourism Network, which is connecting various tourism sectors, is regarded to be most significant. In addition, this project aims to enhance the level of satisfaction of tourists, share economic benefits among all tourism sectors and sustain economic growth in tourism industry.

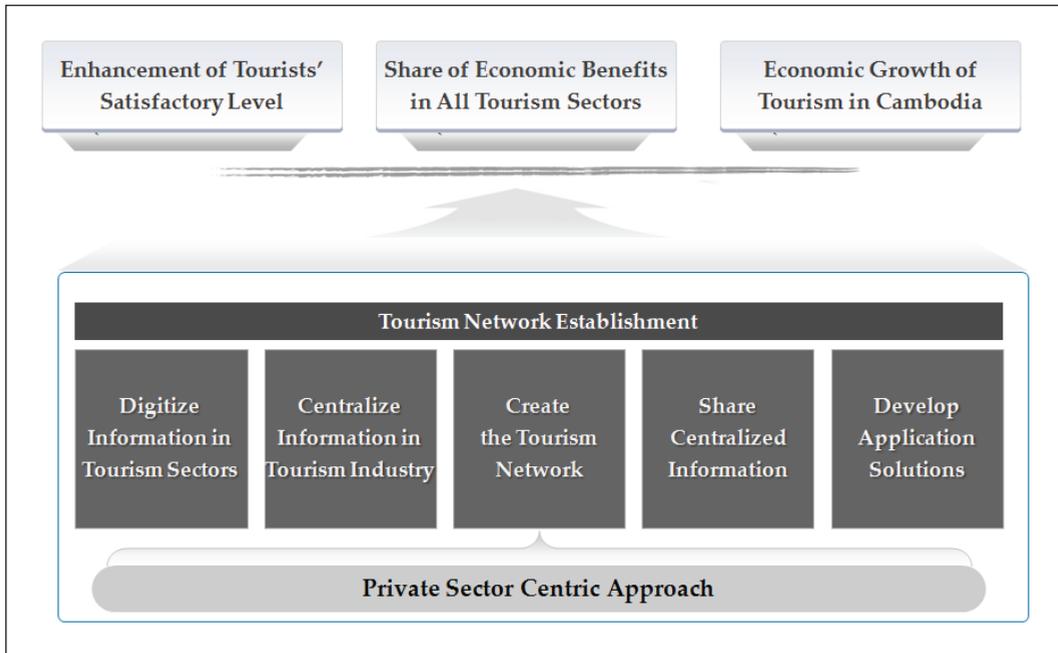
4.2 e-Tourism in Cambodia

In Cambodia, the tourism industry became the second major industry, next to garment manufacturing since the late 1990s. However, as the industry has been recognized to be a traditional industry rather than a value added industry, the efforts has been insufficient to establish ICT infrastructure in tourism industry. For example, even though the regional tourism information offices are operating at each province in Cambodia and they provide tourism information to the Ministry of Tourism (MOT), MOT does not have systems that can accumulate and distribute such information. And the website, the homepage of MOT, is the only ICT system. In addition, even though the central tourism information center gathers tourism information from regional offices, the only communication method between the central center and the regional office is personal cell phone.

4.3 Establishment Plan for Tourism Network

The RGC plans to digitize tourism information for the successful establishment of e-Tourism in Cambodia. And the RGC will centralize the management and share the information through the tourism network. Moreover, the RGC will enhance the accessibility toward the information through online channel like and make various application solutions to support establishment of personal tourism plan. Likewise to establish e-Tourism, the RGC will promote following five agenda.

Objectives and Agenda of Tourism Network Establishment



First of all, the RGC will digitize all information in tourism sectors. That is, the RGC will digitize all information and documentation which are utilized by each tourism sectors like central and regional tourism information centers, hospitalities, carriers, tour operators, and so on. And such information will be made to be compatible among each sector in order to support exchanges. For this, the first agenda is comprised of eight sub agenda.

Secondly, the RGC will centralize the information in tourism industry. All tourism sectors will be connected to the central information center. And especially, the central and regional tourism information center will become a pivot in tourism industry. Therefore, all tourism information will be centralized and accumulated in the central tourism information center. Moreover, the printed materials will be distributed through the central center. For this, the second agenda is comprised of three sub agenda.

Thirdly, the RGC will build up the "Tourism Network". That is, the RGC will construct a tourism network by connecting all tourism sectors including central tourism information center, regional tourism information center, tour operator, tour guide, hospitality, urgent services, and so on

through on/offline network. So, various tourism and tourist information will be shared through the network. In addition, the MOT will establish an organization which will play a role as a central tourism information center, and through the organization, the RGC will manage and monitor all tourism sectors. Moreover, the license management system will be made to operate and manage the issuance of license in tourism sectors. For the central tourism information center, a Special Purpose Company (SPC) will be founded in PPP (Public Private Partnership). It will be owned by public and operated by the experts. Furthermore, central tourism information portal will be newly established. And in the portal, the license management system will be launched as a module. For this, the third agenda is comprised of ten sub agenda.

Fourthly, the RGC will share the centralized information for tourism industry. That is, the RGC will share all tourism information like travel and transportation in tourism network, in order to provide seamless connected service. In addition, the automated license management system will manage the license in tourism sectors and monitor the licensee. When a variety of tourism information are accumulated and distributed in the central tourism information center, the RGC will perform various statistic analyses through ICT systems in order to anticipate future tourist number and the tourism purchase. Furthermore, the RGC will utilize the statistics to determine which sector in tourism industry needs to be enhanced in a long term perspective. For this, the fourth agenda is comprised of three sub agenda.

Lastly, the RGC will develop application solutions for making tour plans. That is, all tourism industry sectors will be made to establish own web site, and especially the organization which needs reservation services will adopt relevant application solutions. These solutions will be made simple in order to support quick installation and easy utilization by small organizations. Moreover, mobile application will be developed to allow reservation and provide information through mobile. For this, the fifth agenda is comprised of two sub agenda.

4.4 Execution Plan for Tourism Network

The RGC will establish “Cambodia Tourism Organization” to successfully establish tourism network through the collaboration and communication among various other relevant governmental organizations.

Time Schedule for Tourism Network Enhancement

	2014	2015	2016	2017	2018	2019	2020	2021~
Digitization of Information in Tourism Sectors	Digitization in CTIC, Carriers & US		Digitization in RTIC, DM, HSPT, TO&TG, FT					
Centralization of Information in Tourism Industry	Connectivity to CTIC, Distribution from CTIC/RTIC		Connection between CTIC and RTIC					
Creation of the Tourism Network	Creation of CTIC& RTIC, LM Carriers, US		DM, HSPT, TO&TG, FT PP					
Sharing of Centralized Information	Automated LM						Sharing of information, Generation of tourism statistics	
Development of Application Solutions	Establishment of portal sites		Development of application solutions					
Responsible Organization	MOT (MPTC)							

In addition, the RGC aims to establish e-Tourism on the basis of above mentioned five agenda by 2020, which are the phase 1 agenda. In a short term, the RGC will digitize and centralize the tourism information as well as establish portal sites in three years. In a mid and long term, the RGC will establish a tourism network by connecting a whole range of tourism industry until 2020. And through the network, centralized information will be shared. Moreover, the RGC will support development of various application solutions until 2018.

5. Educational Program Development

5.1 Introduction

The RGC will focus on developing educational programs including e-Learning which means the applications of ICT to support delivery of educational contents to learners. So until 2020, by introducing e-Learning, the RGC will achieve the objectives as follows: improving Cambodians' education level to above the average level of ASEAN (Association of Southeast Asian Nations) countries, reducing the illiteracy rate by the lowest level among ASEAN countries, and so on. Therefore, the goals for this Pilot Project are providing equal opportunity of high quality education, promoting the investment in education for the future and enhancing the education level of all Cambodians.

5.2 Educational Program Development in Cambodia

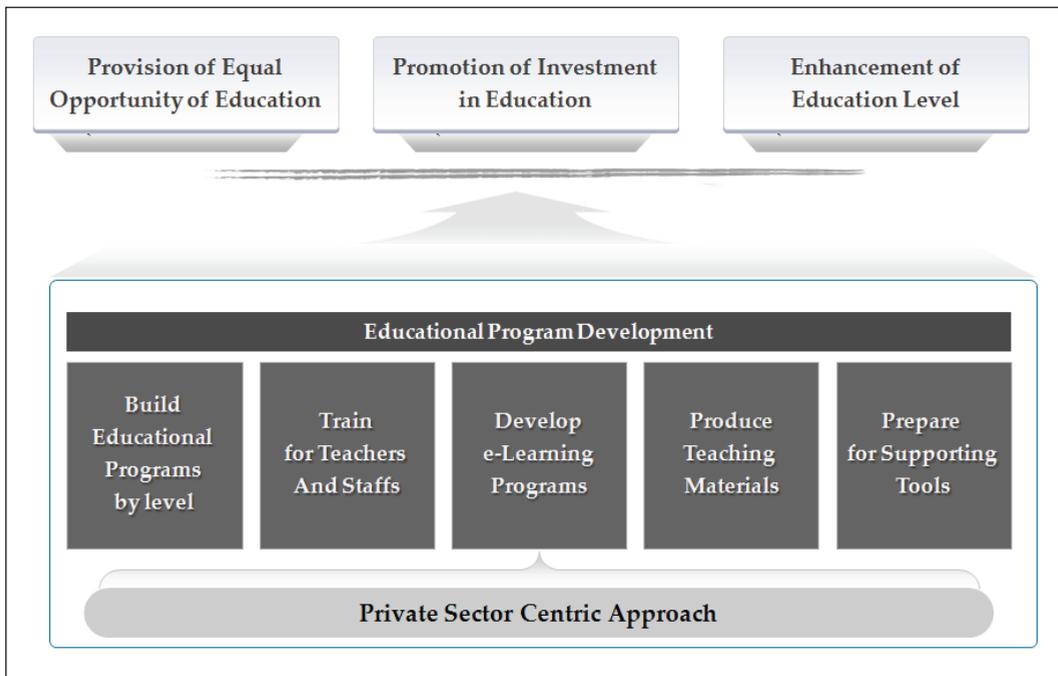
Because the number of students per school is dramatically increased as the level of grade increases, the RGC needs to expand the number of secondary schools. Otherwise the school completion rate is decreased as the level of grade is increased. This is because Cambodians do not feel the need of the secondary education. So, the RGC needs to convince them that they could get economic benefits from the secondary education. Meanwhile, the MoEYS (Ministry of Education, Youth and Sport) developed education-related systems to manage education-related operations and operated ICT training for teachers. However, these activities were not effective due to limited ICT infrastructure. And the main reason for that is a lack of budget, so securing the budget for investment in education is an urgent matter.

In general education, ICT-based professional and pre-university skills courses should be provided to students and teachers in upper secondary schools. And, in higher education, students should have opportunities to receive advanced ICT training courses. Furthermore, for teacher training, there should be the integrated ICT teaching and learning processes to enhance the quality of teaching activities.

5.3 Establishment Plan for Cambodia Educational Program Development

To achieve the long-term vision of the MoEYS, the RGC will promote below five agenda and other future considerations.

Objectives and Agenda of Educational Program Development



Firstly, after analyzing pros and cons on the existing educational programs, the RGC will develop new educational programs by grade-level in general education and higher education. And various ICT training courses on numerous ICT fields - such as computer programming, database, websites and system engineering - will be established to meet the personal demand. But there is no need to restrict students to take ICT training courses for the corresponding grade.

Secondly, MoEYS will train instructors in the central training center and assign them to local training centers in provinces. And it is important to foster instructors consistently educated in universities.

Thirdly, MoEYS will take the lead to create the environment for e-Learning and monitor the implementation of ODL (Open and Distance Learning) programs in Cambodia. And e-Learning programs will be established after conducting a thorough demand survey since e-Learning programs are too various. Therefore, after completing development of e-Learning programs, national license and private certificates could be issued to the learners.

Fourthly, teaching materials will be updated on real time basis and made in various formats such

as supplementary textbook, brochure, video, records and online contents. And these materials are important for learners to understand the lectures. In addition, it is quite important to produce teaching materials and supplementary materials written in Khmer language.

Lastly, in the initial stage, foreign e-Learning solutions would be selected because Cambodia does not have own e-Learning solution. But domestic e-Learning solutions would be developed or foreign e-Learning solutions would be customized. And to enhance the learning efficiency, centralized management systems to monitor learning progress will be established in educational programs. Also, the learners' personal history database will be established to give the feedback of the contents.

Along with above 5 agenda, the considerations for future education programs after 2012 are as follows: digitization in schools, establishment of library system, establishment of school network including student ID card, construction of a computer lab in each school for ICT education, foundation of cyber university, distribution of video contents, and so on.

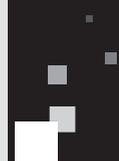
5.4 Execution Plan for the Educational Program Development

Time Schedule for Educational Program Development

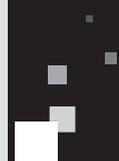
	2014	2015	2016	2017	2018	2019	2020	2021~
Building Programs by Levels	Creation of ICT courses by levels					Development of educational programs		
Training for Teachers and Staffs	Training for teachers and staffs			Regular education and training for teachers and staffs				
Developing e-Learning Programs	Development of e-Learning programs			Issuance of private certificates and licenses				
Production of Teaching Materials	Continuous development of teaching materials					Development of teaching materials		
						Production of supplementary materials		
Preparation for Supporting Tools	Development of e-Learning solutions			Building Central Management System Establishment of learners' database				
Responsible Organization	MoEYS (MPTC)							

MoEYS will manage the execution of plan for developing educational programs. And the ministry will closely communicate and collaborate with other ministries in Cambodia.

Regarding to the time schedule, in the first 2 years, the RGC will conduct creation of ICT courses by grade-level and development of e-Learning solutions and e-Learning programs. Also, the RGC will produce teaching materials by 2016, and supplementary materials by 2017. In addition, the RGC will plan to develop central management system and learners' database by 2016, and continuously conduct both of regular training for teachers and developing of teaching materials.







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