

“Myanmar e-Governance Master Plan”

(1.1) Introduction

- (1) The Union of the Republic of Myanmar has opportunities to be developed in leaps and bounds by the effective management of geographical dispersion and varying socio-economic conditions, via the use of e-Government system.
- (2) In an attempt to achieve rounded development covering administration, social, economic, education and health sectors by Myanmar government, e-Government can be considered as an important component. With this in mind, the government, aiming at the economic development, has included the policy “to establish Data ID Card System, Digital Government Strategy and e-Government system” in the economic policy as a national objective in August, 2016, for the successful implementation of e-Government process.
- (3) The e-Government system enables the government agencies/ organizations to provide effective services through ICT technology as a useful tool. Moreover, the government implementing e-Government process are considered to be a smart government, a government caring sustainability, a government caring the future generations and so on. Indeed, those who actively use the public services of a government are its citizens. What is more, in many countries these days, citizens can participate in the decision making process, which highlight the trend of governments moving towards people-centered approaches.
- (4) On account of innovations and development in e-Government process, the utilization and demand for ICT related hardware and software in public and state-owned sectors can be on the increase. This, in turn, can be able to increase supply of and demand for ICT business in the

country. Then, with the help of laws, bylaws and regulations, ICT business and ICT sector as a whole can be an important economic infrastructure of the country.

(5) Therefore, in order for e-Government system to be successfully implemented under comprehensive strategies and policies, framework and structures, Ministry of communication and information technology (previous) has started the preparation of Myanmar e-Governance Master Plan in 2014, with financial and technological assistance of ADB and Infosys Limited, India, along with the cooperation of government agencies, ministries, businesses, research teams, agencies, local and international ICT/ e-Government specialists plus analytical study on related international experiences.

(1.2) Objectives

(6) The objectives of Myanmar e-Governance Master Plan are as follows.

- (a) To form specific organizations, involved in the implementation of e-Government in Myanmar, and to define their responsibilities.
- (b) To be aware of existing implementation progress of e-Government and the benefits of e-Government in Myanmar.
- (c) To shape the requirements of e-Government implementation based on the information collected from discussion meeting with implementing agencies of e-Government in Myanmar and feasibility studies.

- (d) Based on analytical study of best practices in the world countries with successful e-Government system, to prepare e-Government project and work plan in priority.
- (e) To create better and more comprehensive system by reviewing existing ICT infrastructure and condition of applying e-Government system in Myanmar.
- (f) To identify the foundation/procedures to initiate and the procedures to continue.
- (g) Evaluating the skills and the gaps in skill development to set necessary measures for narrowing these gaps.
- (h) To make arrangement for capacity building and skill development.
- (i) To provide feedback on the required organizational structures, administration and defining responsibilities in forming implementing agency for the effective implementation of e-Government system.
- (j) To constitute policies and standards required for the effective and efficient implementation of e-Government system in Myanmar.
- (k) To ensure the accessibility of the system for the users (government, businesses, citizens and other stakeholders organization)
- (l) To develop a road map
- (m) To specify budget allocations required for project implementations.

(1.3) Guidelines

(7) The necessary guidelines for the implementation of e-Government in Myanmar are as follows.

- (a) It is intended to extend utility based on existing resources. (e.g, e-Government network will be built on existing fiber network along the railway and road)
- (b) It is to ensure that G2G, G2B and G2C services should meet the utility needs of citizens and businesses.

(1.4) Reviewing previous ICT Master Plans

(8) The result findings of reviewing previous ICT Master Plans in Myanmar are as follow;

- (a) Previous ICT Master Plans were developed focusing on the development programs of ICT sector. Rather than specific program of e-Government development, a focus was on the development of (8) sub-sectors programs such as ICT Infrastructure, ICT Industry, e-Government, e-Commerce, e-Education, ICT legal Framework, ICT HRD and Standardization and liberalization.
- (b) Organizational structure, budget allocation and management to be implemented in compliance with National objective, are not clearly defined.
- (c) Reviewing all the previous areas mentioned above and to continue the implementation of e-Government, efforts will be made to seek collaboration with international organizations/development partners for their financial and technological assistance.

(1.5) Summary

- (9) To achieve the successful implementation of e-Government in Myanmar, the draft Myanmar e-Governance Master Plan, with the support of ADB, covering the development of short/long-termed projects, strategies and policies, objectives/goals to be followed and implemented by government organizations involved in administrative mechanisms and ministries, has been completed in 2015. To be in compliance with the current conditions in Myanmar, the draft Master Plan has been revised by the cooperation of international consultants and the responsible persons from the department of information technology and cyber security, Ministry of Transport and Communication.
- (10) The short-termed projects of Master Plan includes strategies and policies aiming for positive impacts in Government's procedures, better dealings with general public, more transparency in business and more investments. In middle-termed projects, online interactive communication procedures between government and public/private sectors, are included. The long-termed projects include procedures allowing citizen users to connect each other online.
- (11) The important points, in order to set up and implement the activities of e- Government in Myanmar, in the Master plan involves the organizational structures needed to form; strategies and laws; policies and Guidelines; the Roadmap to follow; e-Government Conceptual Architecture Framework and programs of different stages – inceptive, short-termed, middle-termed, and long-termed programs to be implemented.

(12) **Section (1) : In the component of reviewing e-Government systems in the other countries,** according to the UN's e- Government Development Index (EGDI) survey, the implementation of e-Government systems in the neighboring countries such as Bangladesh, Vietnam, Laos, India, including the successful e-Government systems in the countries such as Korea, Estonia, Singapore, USA and Japan, are reviewed based on the following (4) components –

- (1) ICT technology
- (2) Change Management
- (3) Government and Organizational
- (4) ICT skill

(13) **Section (2) : Evaluation of the current status of e-Government system in Myanmar.**

The present status and conditions of e – Government system implementation in Myanmar have been evaluated. The results of evaluation in details involves the current conditions of e-Government Infrastructure (e.g. – Hardware, Data Centers and Network) being implemented; e-Government applications; the implementing agencies/organizations of e-Government process; the availability of skilled persons in ICT technology; ICT policies and norms/ criteria prescribed and so on, based on the following (4) components –

- (a) ICT technology
- (b) Change Management
- (c) Government and Organizational
- (d) ICT skill

- (14) **In the component of "ICT technology"**, it is described that although there has been speedy progress in ICT infrastructures in Myanmar, it lacks activities in compliance with the international standards/norms, which is highlighting the need to adopt proper policies and Guidelines in this area.
- (15) **In the component of "Change Management"**, it is stated that reforms will be needed in the prescriptions of rules and regulations as per the existing laws, in order to be adaptable to frequent technological advancements.
- (16) **In the component of "Government and Organizational"**, it involves the importance of setting clear strategies in securing and expending funds, designs and activities to be implemented for e-Government process; preparing arrangements to attract continual attention and cooperation from international organizations; define roles and responsibilities of implementing departments in e –Government process; the current condition of lacking clear roles and responsibilities for the Ministry of Transport and Communications, which is currently acting as a focal Ministry in this regard; and therefore the requirements of necessary policies and guidelines in order to fill the gaps, reforming rules and regulations previously prescribed, setting clear strategies, designs and implementations in receiving and expending funds, forming "Focal Ministry & Leading Organization" to supervise the involving departments and to organize strategic and systematic approaches to define the roles and responsibilities individually.
- (17) **In the component of "ICT skill"**, it is said that necessary trainings should be provided to those from different government agencies, taking the leading roles in the system of e – Government, so as to acquire relevant ICT skills and knowledge.

- (18) **Section (3) : In the section "Targeted approaches for necessary procedures"**, the requirement of e-Government Conceptual Architecture framework, for the successful implementation of e-Government, are described in (7) different steps as follows;
- (a) Governance, Policies and Skills
 - (b) Shared Network and Infrastructure
 - (c) Common data services
 - (d) Shared Applications
 - (e) Ministry Specific Applications
 - (f) Integrated Services
 - (g) Channels
- (19) This section describes the first and foremost activities as a foundation to revise the existing rules and regulations on ICT in order to be more comprehensive and to define IT standards/norms and policies.
- (20) In the second step, it is intended to use shared infrastructures effectively. For example, Data Centers, Servers, Network, Storage, Cloud Computing, Infrastructure as a service (IaaS), Software as a service (SaaS) and Platform as a service (PaaS).
- (21) In order to facilitate sharing data among government agencies/ departments and for the other relevant departments to use specific data of different types of service, compiled by Key Ministry, it is prioritized to provide systematic management to ensure access to common data services. For example, One Map Myanmar Project, Citizen Identity

Information, Company Information, Land Record Information and so on.

- (22) Initially, it is important not to perform separately using different technologies by the departments in undertaking e-Government process across the country for public service delivery but to implement shared Applications by integrating and sharing among the tasks of similar nature. The use of shared Applications for the flow of information at ease among different government agencies can bring about better cooperation among different departments and quicker success in tasks. For example, National Government Portal, Citizen ID Management system, Document Management system, Civil Service Identity Management system, Human Resource Management System.
- (23) Some applications are intended to use in providing specific nature of services in a particular government department as Ministry Specific Applications. For example, Consumer Protection Platform, Custom Electronic Data Interchange, Crime and Criminal tracking Systems, Vehicle Registration Management System.
- (24) When e-government in operation, it is important for people being exposed to government services to be able to access all departments via a single gateway rather than entering gateways of every departments. In order to use e-Government service simply and easily, it should be intended to create integrated services in which systems of similar nature are integrated, allowing wider accessibility for general public. (For example, single window, National Web Portal)
- (25) For simple and fast public service delivery to people online, it is for respective ministry to create main communication channels. For example- e-Government Portal, Citizens Service Centre, Call Center, Mobile Gateways, Automated Teller Machines.

(26) **Regarding law and policy**, despite the development of ICT and application of computer technology in government administrative mechanism in existing law, the principals to support the development of e-Government system are not included yet in these standing laws. Therefore, it is described to revise and include the clear definition of the characteristic and purpose of e-Government in the standing law or to constitute new legislation.

(27) It is also described that the following aspects/sections should be included in the newly constituted or revised ICT law.

(a) The condition of using coded message for dispute and electronic verification signature

(b) Intellectual Property Rights

(c) The Protection of major infrastructure

(d) Cyber security/ Cyber Crime

(e) Ethic and legalities for using social network

(f) e-commerce (eg- electronic payment)

(g) Privacy and data protection

(h) Conflict resolution

(28) There is a description of methods/strategies suggested to provide systematic supervision on the devices used for management and implementation of **ICT related activities** such as creating software, Source Code, Data and Database, main ICT Infrastructure (Servers, Network, Storage, Security Infrastructure and Data centers), design, implementation, intellectual property and rights, methodology, policy and technology, ICT applications and so on.

- (29) **In section (4), the activities initiated in the early stage** such as building ICT infrastructure, developing ICT application software, creating integrated services, policy and standards needed to introduce and proposed organizational structures, are included. The policies are divided into (4) sections _ technological policies; electronic services policies; promoting human resource policies and e-Government management policies.
- (30) **In technological policies section,** the policy of interactivity and open standard adopting policy, integrating of administration sectors policy framework, data/information security policy, shared IT infrastructure (including cloud) policy, digital security and public key infrastructure (PKI)policy, are included.
- (31) **In electronic services policy section,** electronic service policy, various communication channels accessibility policy and electronic payment policy, are included.
- (32) **In promoting human resource policy section,** digital literacy and skills upgrading policy, are included.
- (33) **In e-Government Management Policy Section,** procurement policy, e-Government related budget allocation policy, policy of private sector partnership, quality control and warranty period policy, are included.

(34) **The proposed ICT standards/criteria to be introduced in Myanmar** are also described in this section. It is necessary to integrate each e-Government system, to upgrade in line with changing technology and procedures, to set standard/criteria on intended technology and devices. Regarding necessary standards/criteria, there should be compliance of international standards while a set of local standard/criteria for local requirements are needed. In doing so, it is intended not only to limit technology but to create a linkage between each system for safe and easy interconnection among the systems. The intended standard/criteria will be required for the following areas_

- (a) Information Security
- (b) Technology and Architecture
- (c) Workflow and Document Management
- (d) Standardization of Software Development

(35) It is necessary to set up specific standards on Computerized Myanmar Fonts system, in line with international standards and Myanmar literature orthography guidelines, in order to provide government electronic service in Myanmar language for more public awareness. It is required to follow international standard in technical standard areas while language orthography, specifications, natural shift in perspective and serial/order will be followed in linguistic standards/criteria. Besides Myanmar language, the usage of computerized ethnic language should be implemented at national level, which can bring simplicity and prevalent usage for general public.

(36) **It is described that ICT Council will be required to form for the implementation of e-Government tasks.** The reasons why e-Government undertaking were not achieved include lack of clear and accurate objectives, shortage of technological skills, weakness in cooperation and coordination of existing procedures and policy/rules and regulations as well. Therefore, for the implementation of e-Government system, it is necessary to form an organization with adequate capacity and empowerment. In this section, it is advised to learn international practices and to identify suitable organizational structure for Myanmar. In this organizational structure model, the ICT council, the leading implementing body for e-government process as per the road map, will be formed under direct supervision of president office, initially, and then will be placed under supervision of suitable ministry after a certain period.

(37) It is described that e-Government/IT departments with Chief Information Officers (CIOs) assigned should be established in each ministry for the implementation of e-Government as per the road map. For the development of Human Resource, building and maintenance of technological infrastructures, the development of e-Government services, users' awareness, comprehensive work plans and project management, economic and financial design and management, should be prioritized and implemented.

(38) **In section (5), suggestion on revised management form,** the challenges/ constraints hindering the e-Government process such as of existing e-Government implementation reaching nowhere due to lack of reflecting conditions in reality; lack of particular leading organization and/or persons; weak support from senior officials of the government; changes in procedures and policies; deeply rooted corruption and mismanagement; fear of failure and of increased

responsibility without harms to their status quo; limitation in seeking advice from external organizations due to a big gap in procedures between them; insufficient funding and so on, are described.

(39) The proposed management model to overcome these constraints is provided. It highlights the needs to change management system in parallel with planning for the implementation of a system or an undertaking.

(40) **In section (6), implementation of road map**, the structure of e-Government is defined in the first stage and the activity for implementation initially such as creating shared infrastructure including e-Government network; high-speed network; integrating with central data/information center, which are suggested to be implemented and led by ministry of transport and communication.

(41) The section described the arrangement for the Ministry of Transport and Communication to implement the activities such as video conferencing services, email, document management systems, workflow systems and single login identity across all government systems in order to intercommunicate between departments, facilitating to promote cooperation between departments and departmental procedures, in parallel with building infrastructure.

(42) It is mandatory that all ministries have to use shared applications including infrastructure, for which required policies to seek agreement from respective authority should be developed and facilitated.

(43) It is described that the factors such as e-Government infrastructure, standard criteria, user's experience, operational

requirements, stipulation of right_ should be taken into account in making policies. It highlights the needs to promote users (people), and investment and utilization of government organizations' procedures, in making policy and standards.

(44) It is needed to set up policy for inter activity, following open standard and cooperation between departments, using secure ICT infrastructure, along with necessary supervision to enforce such policy. Moreover, it is intended to provide electronic services with different measures such as Web, Mobile, Citizens Service center, Self-Help Kiosks and so on. Meanwhile, a framework will be needed to collaborate with education sector for promoting information technology knowledge/ proficiency.

(45) For the management and implementation of Myanmar e-Governance Master Plan in government ministries, human resources will be needed. Some projects will be implemented by Third Party. Therefore, it is required to have a national level leading organization to provide policy and supervision on the implementation of the Master Plan as per the road map. Such organization should be formed with national e-Governance Organization, National Cyber Security Center and National ICT Research and Capacity Development, and will be under the direct supervision of president office.

Chapter (1)

Reviewing e-Government systems of other countries

- (46) According to UN's e-Government Development Index (EGDI), the countries with successful e-Government systems such as Korea, Estonia, Singapore, USA, Japan and that of other neighboring countries_ Bangladesh, Vietnam, Lao and India, are reviewed and a suitable implementation procedure of e-Government system in Myanmar has been developed.
- (47) When reviewing e-Government system implementation in neighboring countries and successful e-Government systems in other world countries, by dividing into (4) different areas, for the development of suitable procedures for Myanmar, successful completion were found in the following components.

(1.1) ICT technology

- (48) (a) **ICT infrastructures**; Building ICT basic infrastructures should be managed to be in compliance with standards/criteria. Joint venture efforts with private sectors are advisable since it can bring secure building of ICT infrastructures and enhance protection against Cyber-attacks. As project implementation increases, more cost-effective results will be acquired.
- (c) **Policy standardization and procedures** ; Revising and defining ICT law and standards can support the development of ICT infrastructure, which in turn, bring about the achievement in e-Governance objectives in Myanmar.

(1.2) Change Management

(49) (a) **Implementing simple Governance procedures;** when reviewing successful e-Government system in other countries, it is found out that the contributing factors involved are cause-effectiveness, better time management, and provision of effective services to general public, which all combined to form an implementation in harmony.

(b) **Providing support:** It is observed that IT departments in every government department are formed and undertaking sufficient budget allocation for expenditure.

(c) **Sustainability;** It is intended to develop strategy allowing infrastructure/ industrial development and transformation in economic, administration and social sector via ICT, in priority. It is found out that significant priority was placed on people-centered service delivery by collecting results of feedbacks from general public.

(1.3) Governance and Organizational

(50) (a) **Steady flow of funding resources ;** It is intended to manage and utilize funding resources effectively earned from service provisions of e-Government process. Moreover, reductions in government's fund expenditures were found in some projects.

(b) **Private sector participation ;** Significant priorities were found to be placed on working in partnership with government and private sector in areas such as Education, health, logistics, manufacturing, tourism, transportation, entertainment and finance sectors.

(c) **Department/agency structures** ; Countries with higher e-Government Development Index (EGDI) were able to develop strong organization and organizational structures in order to accomplish the process such as project planning, project management and project implementation. Such organization was found to be able to provide supervision in line with IT standardizations, policies, guidelines and government's regulations and to manage the security of important ICT infrastructures with greater accountability.

(1.4) ICT skill

(51) (a) **Human Resource Framework:** The development and implementation of policies were found in promoting Human Resource development, which allows subjects like information technology and cyber security to be placed on curriculums starting from primary level, for raising awareness of ICT.

(b) Availability of skilled personnel: it is observed that Specific measures and arrangements to fill the present and future gaps in skilled personnel, were developed with great accountability by a department / organization having proper empowerment, in cooperation with business, schools and universities. Moreover, to keep abreast with other countries internationally, measures to nurture skilled and talented persons in the related field, are discovered.

Chapter (2)

Assessment of current e-Government conditions in Myanmar

- (52) Based on experience in the countries with successful e-Government system, it is the evaluation of current e-Government implementation conditions in Myanmar.
- (53) The current conditions of e-Government infrastructure (The status of hardware, Data-Centers and Network), utilization of e-Government application, formation of implementing agency for e-Government process, the availability of ICT skilled personnel, policy and standardization in ICT related area, are divided into four components as follows, on which detailed evaluation has been presented.
- (a) Technology (ICT maturity and assessment of e-Government infrastructure)
 - (b) Person (ICT skills availability and maturity)
 - (c) Procedures (organizational policies, capacity and maturity with respect to e-Government)
 - (d) Transformation in government's management process (governments readiness to change)

(2.1) Specific assessment of current e-Government implementation status in Myanmar

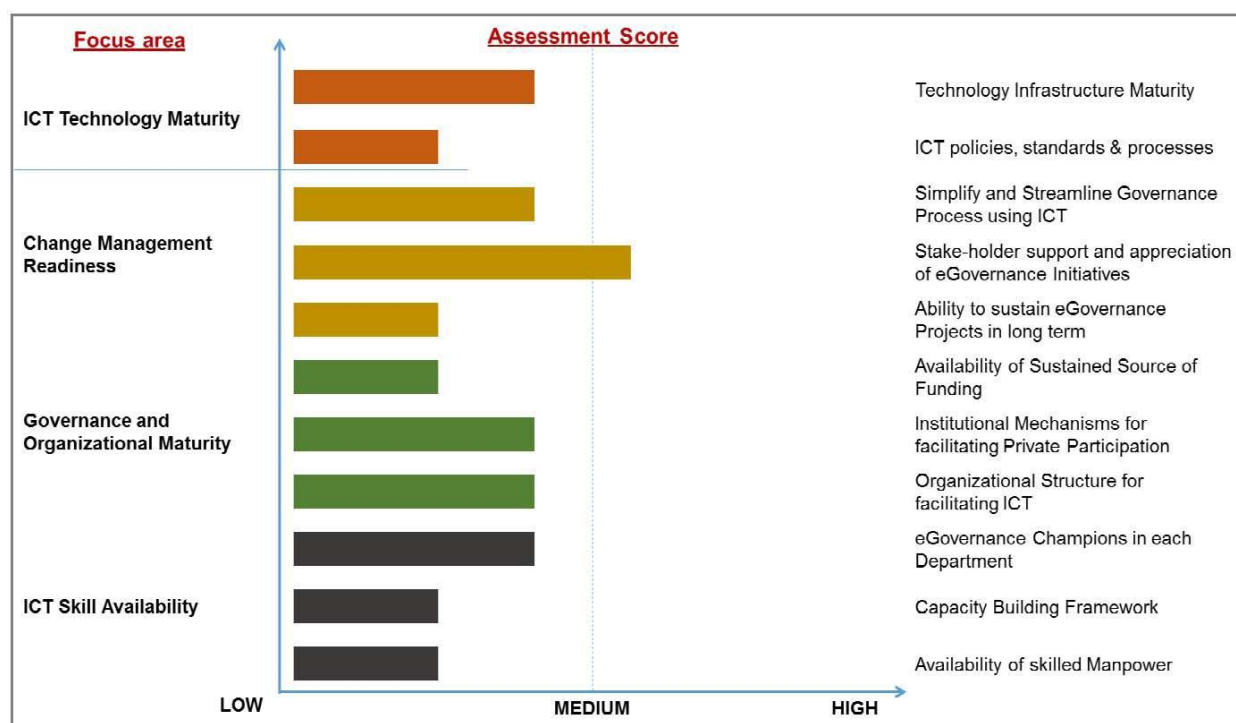


Figure (1) ; Specific assessment of current e-Government implementation status in Myanmar

(2.1.1) ICT Technology Maturity

(54) In line with the objectives to provide 90% of total population in Myanmar with mobile service (voice and information service) in the next five years' time, local/international businesses have been allowed communication license for market competition freely in communication sector. However, it is found that the use of mobile is still less common in rural area. But, for Public and privately owned financial organizations, it is found to develop and use ICT infrastructure in

shorter length of time such as electronic payment system, mobile gateways and so on.

- (55) Nevertheless, the activities and/or structures in compliance with international standard/criteria are not found yet in the process such as technological procedures, services, supporting activities, quality assurance, information security, and software development and so on. Therefore, the specific policies and guidelines will be needed for the implementation compliant with standard/criteria, and a strong department/organization will be needed to take a leading role in such process.

(2.1.2) Change Management Readiness

- (56) In the implementation of e-Government system, it is necessary to revise/reform particular procedures, law and prescription under existing law. It is also described that the new procedures and legal prescription should be facilitating the implementation in line with present condition of the country and protecting the users.

(2.1.3) Governance and organizational maturity

- (57) The government departments, as per their specific purposes, implemented the e-Government process using fund, earned from respective local/international organization. Accordingly, it is known that clear strategy, design, policy and implementation were not developed in receiving and expending fund for e-Government process.
- (58) An Agreement has already been made with international development partners to implement e-Government system in Myanmar.

It is also necessary to organize opportunities for the participation of local businesses. However, necessary arrangements/measures have not been in place to attract continuous attention and cooperation of international organizations.

(59) Although the majority of government departments have started using computers in their functions, it is found that there were no departments assigned and no leading organization to supervise these departments for e-Government implementation.

(60) Moreover, the clear role and responsibility were not defined for the ministry of transport and communication as a focal ministry. Therefore, it is necessary to form an organization with clear responsibility for the implementations such as policy making, setting up quality assurance and standards, building infrastructure and cyber security management and so on.

(2.1.4) ICT skill availability

(61) The skill, experience and capacity of leading persons in respective department are a major driving force in the implementation of e-Government. Therefore, the leading organization should provide these personnel with the trainings specialized in the area such as program management, setting up quality assurance, project planning, selecting and managing suppliers, technological design and road map development, risk management and improving management system and so on.

(62) It is necessary for Myanmar to establish organization which will provide IT development trainings particularly, in corporation with

developed countries. Especially it is required to provide trainings for the skills and awareness in ICT technology of all civil staff.

- (63) Some universities in Myanmar generate advanced IT skilled technicians and graduates. There were less attraction to these graduates to join government departments before and the contribution towards e-Government implementation were very rare. People with different levels (program manager, ICT infrastructure specialist, IT specialist, cyber security specialist and so on) are not found working in both government and private sectors.

(2.2) Assessment of current e-Government infrastructure in Myanmar

- (64) In the assessment of current status of using ICT infrastructure and integration/communication process among different ministries, the followings are discovered.
- (a) Technological infrastructures are outdated and needed upgrading
 - (b) Lack of IT service Management Framework (ITSM) to provide services
 - (c) It is necessary to develop data security for users
 - (d) Too limited accessibility to adequate network connection to outreach remote area.
 - (e) No backup system in place yet for natural disasters
 - (f) No arrangements for ICT related activities such as development, testing pre-production of ICT applications.

(2.3) The assessment of current e-Government applications in Myanmar

(65) In the assessment of current status of e-Government applications and integration/ communication processes among different ministries, the followings are discovered.

- (a) The use of various forms of outdated technologies are found in the implementation of e-Government.
- (b) Most ICT applications in use at government ministries lacked integration for interconnection between each other.
- (c) Limited awareness to assess if ICT application in use can support departmental functions.
- (d) ICT applications used in departments were not implemented through systematic design development.
- (e) Lack of specific policies and guidelines generated by technicians and of steering committee with empowerment.
- (f) Government's departments are found reluctant to use ICT and to change their functions. They preferred conventional procedures.
- (g) Limited activities were found in government procedures to use common application technology platforms.

(2.4) Assessment of current status of forming e-Government departments and capacity

(66) In the assessment of current status of e-Government projects implementing developments and human resource availability, the following weaknesses are found.

- i. It is necessary to extend organizational structure of government agencies/departments to include an e-Government department formed with clear empowerment, adequate number of qualified staff.
- ii. There is a shortage of skilled personnel in government departments.
- iii. There are limitations to recruit skilled personnel relevant to information technology.
- iv. No clear definition of roles and responsibilities of CIOs
- v. Information technology and project management trainings are needed to provide the staff.
- vi. It is necessary to form e-Government departments with skilled/qualified staff in the ministries and to define their rights and responsibilities.
- vii. Need encouragement to implement work plans and strategies.

(67) In brief, there are weaknesses in current structure and implementations for e-Government process in Myanmar. Therefore, it

is necessary to define clear and precise regulations and empowerments for e-Government plans in areas such as fund allocations and controls, structures and recruitment of skilled/qualified staff. Moreover, weaknesses were uncovered in making persevered and concentrative efforts to achieve the goals.

(2.5) Assessment of current ICT skills in Myanmar

(68) Generating sufficient quantity and quality of skilled persons is one of the most important points in implementing extensive e-Government process. Therefore, it is necessary to put an emphasis on nurturing qualified/skilled staff and professionals for the sector. In comparison with the number of graduates generated annually in other countries, 700,000 annually in India and 135,000 annually in Singapore, there are about 10,000 graduates come out annually in Myanmar.

(2.6) Assessment of ICT and e-Government policies

(69) The standing laws related to ICT in Myanmar are as follows.

(a) Computer Science Development law (1996) ; This Computer Science Development Law was enacted on September (20), 1996, with the objectives mentioned below.

- i. to contribute towards the emergence of a modern developed State through computer science;

- ii. to lay down and implement measures necessary for the development and dissemination of computer science and technology;
- iii. to create opportunities for the youth, especially students, to study computer science;
- iv. to study computer science, which is developing internationally and to utilize the same in a manner which is most beneficial for the State;
- v. to cause extensively development in the use of computer science in the respective fields of work;
- vi. to supervise the import and export of computer software or information.

As it was prepared and introduced in 1996, the law does not seem to be compatible with current situations. It is observed that the law cannot cover modern technology, cannot fully provide data security and protection of privacy, cannot fully provide protection against cybercrime and cannot fully contribute to the implementation of government's work plans with the help of information technology. As a consequence, it is necessary to revise this computer Science Development law for the development of information technology.

(b)Electronic Transaction Law (2004), Amended (2014);

The Electronic Transaction Law was first enacted on April 30, 2004 and amended in 2014, with the objectives mentioned below.

- i. to support with electronic transactions technology in building a modern, developed nation;

- ii. to obtain more opportunities for all-round development of sectors including human resources, economic, social and educational sector by electronic transactions technologies;
- iii. to recognize the authenticity and integrity of electronic record and electronic data message and give legal protection thereof in matters of internal and external transactions, making use of computer network;
- iv. to enable transmitting, receiving and storing local and foreign information simultaneously, making use of electronic transactions technologies;
- v. to enable communicating and co-operating effectively and speedily with international organizations, regional organizations, foreign countries, local and foreign government departments and organizations, private organizations and persons, making use of computer network.

This law was developed and enacted to protect electronic transaction related matters_ electronic signature, legality of electronic documents and evidence from any illegal deceptions. In 2014 Amendment, only particular prescriptions of penalties were revised. Hence, it is, now, necessary to revise the law in order to be compatible with changing technology and systems today.

(c)The Telecommunications law (2013) : The telecommunication law was enacted on October 8, 2013, with the following objectives;

- i. to enable to support the modernization and development of the nation with telecommunications technology;

- ii. to enable to bring out Telecommunications Services that will be able to provide high quality and worthy services to the users by allowing fair and transparent competitions from domestic and abroad in the telecommunications sector which is developing;
- iii. to enable to give more opportunities to the general public to use Telecommunications Service by expanding the Telecommunications Official 5 Network in the entire country along with the telecommunications technology which is developing;
- iv. to enable to protect the Telecommunications Service providers and users in accord with law;
- v. to enable to supervise Telecommunications Service, Network Facilities and Telecommunications Equipments which require license for national peace and tranquility and for public security.

(70) Since e-Government process plays an important role in the economic development in Myanmar, it is important to review and revise the existing legal and policy frameworks as needed in order to be better and more comprehensive. It is intended to identify the trend forward, aiming to encourage the use of ICT in the activities such as extension and upgrading of infrastructures; widespread use of applications; developing service providing capacity and so on.

Chapter (3)

Specific tasks needed to implement

(71) The e-Government Conceptual Architecture Framework, needed for the successful implementation of e-Government system in Myanmar, is divided into (7) stages, suggesting specific tasks to be implemented in cost-effective manner by different government agencies/departments.

- (a) Governance, Policies and Skills
- (b) Shared Network and Infrastructure
- (c) Common Data Services
- (d) Shared Applications
- (e) Ministry Specific Applications
- (f) Integrated Services
- (g) Channels

(72) In the road map, the work plan, with different stages for the implementations such as government's management system, policy needed to adopt, needed technological infrastructure, services and applications software needed to initiate, specific tasks to be initiated by respective government agencies/ministries, integrated services, communication channel for public service delivery and so on, is prepared and described.

(73) Moreover, it is suggested that revising current ICT legal framework in Myanmar in order to be better and more comprehensive one, can support the development of e-Government process. Besides, the guidelines for the initiation of e-Government process in Myanmar,

and strategic measure to supervise important ICT related matters, are presented.

- (74) This section described shared applications and ministries specific applications needed to implement and IT standardization and policy needed to define. Moreover, it is suggested that ICT departments should be established in all respective ministries and national level ICT council should be formed to supervise these departments.

(3.1) e-Government Conceptual Architecture Framework

- (75) For the successful implementation of e-Government system in Myanmar, the needed e-Government Conceptual Architecture Framework is described in figure (2). Such framework describes different stages to be implemented for continuing existing activities; avoiding duplication of project activities; and proposed integrated services to be provided for people.

All departments should adopt a Unifying Architecture.

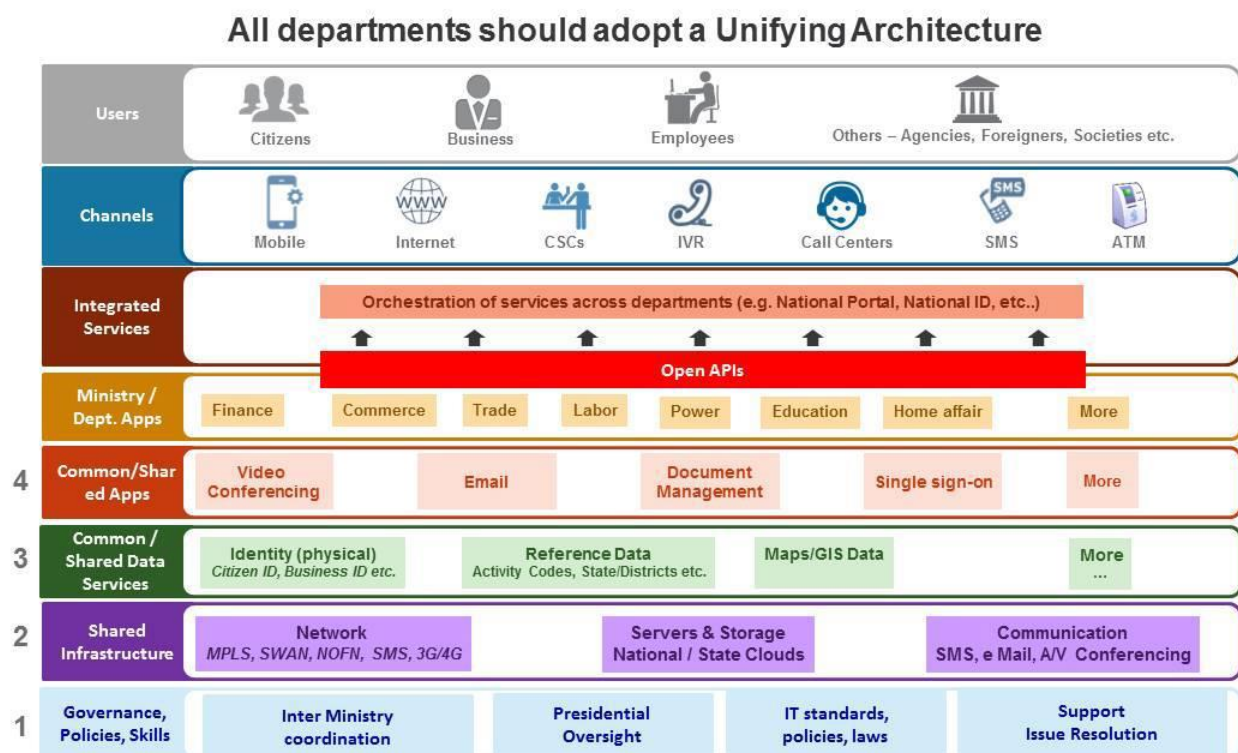


Figure (2) e-Government Conceptual Architecture Framework

(3.1.1) Governance, Policies and Skills

(76) Initially, the organizational structure of central leading department should be established, in priority, to strengthen the implementation of e-Government process at national level in Myanmar. Afterwards, such department takes the leading role in defining and setting up electronic governance system; laws and policies; and standards/criteria to strengthen the government's operating mechanisms. Besides, this leading department has to deal with the stakeholders involved in e-Government process such as Government to Government (G to G), Government to Business (G to B) and

Government to Citizens (G to C). Additionally, such leading department needs to be accountable to president's office and to be provided with necessary rights and empowerment, in line with standing laws, to implement the process, as per the roadmap.

(3.1.2) Standard Network and Infrastructure

(77) It is necessary to adopt the policy of effectively using shared Network and Infrastructures, building of which needs large investment, such as data centers, servers, network equipment, storage, spectrum and so on. The focal ministry, Ministry of Transport and Communication, is responsible for implementation, building, maintenance and operation of these Network and infrastructures, which will then be expanded and upgraded to link among shared Applications and specific applications, going to be used widely in government's departments.

(3.1.3) Common Data Services

(78) In order for the government to provide electronic service delivery, at ease and fast, for its people, it is important to enhance accessibility of sharing data among government's departments. Rather than using data, compiled based on types of service by respective key ministry for a single ministry alone, it is advisable that systematic supervision of enabling access to common data services for other relevant government's departments, can be made more cost-effective by avoiding duplicated projects, and be supportive to the activities such as collecting income tax and other commercial tax.

(79) Therefore, the implementation of common data services should be prioritized in order for other relevant departments to have access to

these services, in process of e-Government in Myanmar. When having access to data by other relevant government's departments, it is, initially, necessary to have systematic control and security measures in place and Application Programming Interfaces (APIs) system should systematically be used in this initial stage.

For example ; One map Myanmar Project, being implemented by ministry of natural resources and environmental conservation; other similar projects – Citizen Identify Information; Company Information; Land Record Information; Roads and Right of Way Information.

(3.1.4) Shared Applications

- (80) In order for the government to provide electronic services to citizens at ease and fast, it is prior to implement common data services, which should be accessed by government's departments, and shared Applications, which should be shared and used among government's departments.
- (81) Firstly, the application software, used for inter-connection between each other and for proper flow of information, such as email, portals, video conferencing, document management system, identity and access management, application-to-application integration frameworks, should be established, shared and used extensively among different departments. Whereby, it can bring about better cooperation between departments and Quick Win. These shared Applications are intended to be implemented by leading focal ministry, Ministry of Transport and Communications.

For example; the systems, implemented by Ministry of Transport and Communications (formerly Ministry of Communication and Information Technology) and currently being used among different agencies of government, such as _ Electronic Document Management system (EDMS)

(3.1.5) Ministry Specific Applications

- (82) For easy and efficient delivery of electronic services to citizens by government, it is intended to create capacitive procedures by using ICT in process and services, and to provide improving services, as a result. Moreover, it is necessary to prioritize widespread use of Application software among departments in electronic service delivery.
- (83) In doing so, initially, the government departments need to define and follow specific policy, open-integration standards and APIs standard. What is more, it is necessary to follow and use of shared applications, shared networks and infrastructure.

(3.1.6) Integrated Services

- (84) In many countries, along with ICT development, the process of e-Government and online services are on the increase. Accordingly, it is necessary to upgrade increasing e-Government process from the stage of being implemented separately by ministries and by services to national level implementation of integrated service with the cooperation of ministries in harmony, in order to provide better online services for citizens.

(85) In dealing with e-Government process, instead of visiting every door/gateway of government's departments, it is important to create opportunities for people to visit a single window/gateway, in which all departments can be accessed. Therefore, the website and online services implemented by respective government agencies in Myanmar should be integrated into a single system such as single portal or single window, which can provide easy and efficient public services for general public. Thereby, it can be transformed from conventional department-centered service system into user-centered system.

For example ; Myanmar National Web Portal Project, being implemented by Ministry of Transport and Communications, the project integrating websites and online services provided online by government's departments.

(3.1.7) Challenges

(86) For easy and quick delivery of public services towards people online, it is intended to build e-Government Portal, in which respective ministries' channels such as Citizens Service Centre, Call Center, Interactive Voice Response Systems (IVRs), Self-Help Kiosks, Mobile Gateways Automated Teller Machines (ATM) and departments' services are integrated in the single place. Thereby, citizens can have access to services via these channels. In doing so, initially the government departments have to define and follow specific policies, open-integration standards, APIs standards and so on.

(3.2) Revising ICT Law

- (87) Currently, the existing ICT law in Myanmar are as follows :
- a) Computer Science Development Law (1996)
 - b) Electronic Transaction Law (2004)(2014)
 - c) Telecommunication Law (2013)
- (88) In these existing laws, despite inclusions of applying computer technology in the government administrative mechanism, the basic principle to support the development of e-Government system has not been included yet.
- (89) The e-Government system includes electronic services, information technology, standard criteria, proper ICT building design, screening and relaxing various levels of government office procedure, budget allocation and seeking investment, tender bids, procurement, implementation, quality assurance and so on. For such reform process, structural and procedural reforms will also be needed. Therefore, proper law and legal prescriptions will be a major support in steady flow of implementation and utilization of e-Government system.
- (90) According to the evaluation above, it is advisable to define characteristics and procedures of e-Government clearly, which could either be included in revised version of existing law or constituting new law in order for administrative procedures to be improved.
- (91) The suggestions to include in revised version of existing laws :

- a) The characteristics of e-Government should be included ideally. Besides, it is advisable to form a strong and concrete organizational structure required for the implementation of e-Government process, cooperation of departments, provision of support for the private sector and education sector. Moreover, clear and precise roles/responsibilities and empowerment should be defined for the implementing agency/organization.
- b) For the process of implementation in full swing, it is necessary to include the requirement to form a ICT council involving the following (3) sectors, under direct supervision of a national level organization, the president office_
 - i. E-Government
 - ii. Cyber Security and Scrutiny
 - iii. Promoting research and human resource development
- c) ICT council, leading all government's ministries, should be led by a person, not lower than Union Minister level, who is responsible directly to the president.
- d) As it is necessary to encourage private sector participation, it is needed to consider taking advices from non-governmental organizations like Myanmar Computer Federation.
- e) It is described that the e-Government leading committee has to supervise the preparation and management of e-Government project by ministries; to supervise the implementations; to manage budget allocation for departmental e-Government

process and to supervise funding allocated by Ministry of Planning and Finance and so on.

- f) It is stated that the e-Government leading committee should be made up of technically know-how persons from education sector, private sector (local/international) and Government's department/agencies, and should be able to re-organize the structure as necessary.

- g) It is advisable that e-Government leading committee should integrate Government's ministries, private sector (local/international) and education sector in harmony, in the implementation of e-Government.

- h) It is described that the following aspects should be included in the revised (or) newly-constituted ICT law-
 - i. The conditions of using coded message for disputes and electronic evidence.
 - ii. Intellectual Property Rights
 - iii. The protection of major infrastructures
 - iv. Cyber Security
 - v. Cyber Crime
 - vi. Ethnic/codes and legalities for using social network
 - vii. E-Commerce (e.g, electronic payment)
 - viii. Privacy and data protection
 - ix. Conflict resolution

(3.3) readily accessible and extended ICT Infrastructures

(92) In the construction of major ICT infrastructures, it is required to foresee and project the conditions and/or activities likely to expand in the future and to apply technologies allowing readily expansion of infrastructures as necessary_

- a) Cloud Computing
 - b) Virtualization
 - c) Infrastructure as a service (IaaS)
 - d) Software as a service(SaaS)
 - e) Platform as a service (PaaS)
 - f) Pay-as-you grow model with transaction/outcome based pay-out
 - g) Charge back model for ministries using the infrastructure
- And so on.

(3.3.1) Usage of open-source systems (open standards)

(93) It is required to use open-source systems initially in the implementation of e-Government systems. As Open-source Based Innovation of e-Government system is the major part of open standards-based system, it is a suitable system in the process of e-Government. Thereby, it is certain to achieve the benefit of cost-effectiveness in the long-term.

(3.3.2) Local-language readiness

(94) The language, going to be used in Applications and e-Government process in Myanmar, should be in both English and Myanmar, bilingually. Hence, it is necessary to set Myanmar Unicode system as the standard Myanmar language system used in e-Government application. Moreover, implementing the process of using other ethnic languages, should also be continued.

(3.4) Recommendations for strategic and effective supervision on ICT process

(95) The implementation of e-Government process involves different ICT-related tasks such as reforming government's procedures, hardware and software, purchasing Network-related infrastructures, cultivating Human Resources, establishing necessary institutions and re-structuring, laws, policy and guidelines development and so on. For these various activities to be implemented, the role of cooperation with local and international private enterprises becomes very important to facilitate the implementation process, due to the shortage of skilled persons and lack of sufficient capacity among civil staff in ICT knowledge in many government's departments.

(96) In an attempt to cooperate with private enterprises in ICT-related activities such as hardware, software and networking infrastructures procurement and maintenance, it is necessary to adopt standard frameworks and strategic supervision.

For example_ Service level agreements (SLAS), CIPS 11
(Chartered Institute of Procurement and Supply)

(97) It is necessary to provide strategic supervision, focusing on the following ICT related activities

- a) Developing software, Source Code, Data and Data base
- b) Major ICT infrastructures (Servers, Network, Shortage, Security Infrastructure and Data Centers)
- c) Designing and Implementations
- d) Intellectual Property Rights, methods, policies and technology
- e) ICT applications, implementations and management tools

(98) Since the government's ministries are in need of human resources for the management and implementations of Myanmar e-Governance Master Plan in ministries, it is required to invite the participation of local/international third party organization and private enterprises in some areas of implementation.

Chapter (4)

Recommended Activities in the initial stage of Implementation

(4.1) Recommended ICT infrastructures

(99) It is intended to initiate and share the foundation part _ Cloud Infrastructure, Cluster of National Data Centre, Data Centers and e-Government Network Backbone and so on for e-Government applications.

(100) The ICT infrastructures as the basic foundation to be implemented by Ministry of Transport and Communications are as follows;

- a) Myanmar Cloud Infrastructure for e-Government
- b) Cluster of National Data Centers for hosting e-Government applications
- c) Quick win service infrastructure platform
- d) e-Government network backbone

(4.2) Recommended ICT application software to be initiated

(101) As the degrees of success in the process of e-Government system can be measured by how well public service delivery can be performed online, it is to prioritize proliferation and sustainability of application software across the country.

(4.2.1) Shared Applications and Common Data Services

(102) It is advisable to implement shared application initially to integrate and share tasks with similar nature rather than implementing e-Government process separately by different departments using different technologies in public service delivery across the country. The recommended centralized shared applications are as well as:

- a) National Government Portal
- b) Citizen ID Management System
- c) Document Management System
- d) Civil Service Identity Management System
- e) E-Government Call Centre
- f) Human Resource Management System (HRMS)

Example : (1) The process involving in the finance sector such as e-Payment Gateway, e-Procurement, e-Tender, Financial Management System, Account Management System, e-Banking, Taxation System should be implemented in the way to share and use among different departments, and led by Ministry of Planning and Finance.

(2) The process involved in natural resource utilization and management sector such as Geographic Information System (GIS), Land/Resident Registration Management System and so on, should be implemented in the way to share and use among different departments, and led by either Ministry of Agriculture, Livestock and Irrigation or Ministry of Natural Resource Environmental Conservation.

(3) The process involved in investment, commerce and industrial sector such as Company/Industries Registration and Management System (Business Hub), e-Trade system should be implemented in the way to share and use among different departments, in which a responsible implementing ministry should be identified.

(103) It is advisable to implement common data service initially by integrating respective ministries led by a focal ministry instead of separate installation/ construction of Common Data Hub by different departments using different technologies. The recommended common data services to be initiated are as follows:

- a) National Data Base /National Data Hub
- b) National Map/GIS
- c) Citizen ID information
- d) Company Registration information
- e) Centralized Human Resource

For example: As National Data Hub such as National ID Registration Information are the most basic information for common use in e-Government applications and e-Services; it should be implemented in the way to share and use among departments, organizations, private sector and general public, and led by a focal ministry in cooperation with the concerned ministry, Ministry of Labor, Immigration and Population.

(4.2.2) Ministry Specific Applications

(104) It is intended that some application software are to develop as ministry specific applications in order to provide particular services depending on the nature of tasks, related to specific departments. Initially, the following table describes the specific departments to be prioritized and examples of specific applications, depending on their nature of specific tasks.

No	Prioritized Tasks/Project	Implementing department/Agency	Remark
1.	(1)Track Maintenance System (2)Passenger Reservation System (3)Control Room Automation System (4)Freight Operations Management System (5)Vehicle Registration Management System (6)Driver License Management System (7)Multi-modal Transport System (8)Smart Transport Management System (9)Terminal operating system	Ministry of Transport and Communication	
2.	(1)Consumer Services	Ministry of	

	<p>(Billing, Grievance Redressal)</p> <p>(2)Automatic Data Logging</p> <p>(3)Energy Accounting and Auditing</p>	electricity and energy	
3.	<p>(1)Land Acquisition Management</p> <p>(2)Asset management System</p> <p>(3)Core ERP (Material Management)</p> <p>(4)Housing Allotment Management system</p> <p>(5)GIS system</p>	Ministry of Construction	
4.	<p>(1)Business Promotion Portal</p> <p>(2)Establishment of an e-commerce platform</p> <p>(3)Consumer Protection Platform</p>	Ministry of Commerce	
5.	<p>(1)Customs Electronic Data Interchange</p> <p>(2)Central Budgeting & Financial Management System</p> <p>(3)Commercial Tax System</p> <p>(4)Income Tax Management system</p> <p>(5)Social Welfare Scheme Development and Tracking</p>	Ministry of Planning and Finance	

	(6)Aid information Management system (AIMs)		
6.	(1)Crime and Criminal Tracking system (2)Missing Personal and most wanted list portal (3)Online Registration of Associations (4)Prison Case Management	Ministry of Home Affairs	
7.	(1)National ID for citizens (2)Census Data Management (3)Visa Management system	Ministry of Labor, Immigration and population	
8.	(1)E-Payment system (2)Online Banking system	Central Bank of Myanmar	

Table (1) The departments and Applications examples to be prioritized, initially, as Ministry specific applications, depending on the nature of tasks in specific departments.

(105) For easier, quicker and better electronic service delivery provided by the government towards its citizens, it is intended to change process, procedures and services of government's ministries to be more capable procedures with ICT technology and to provide better services. Hence, it is necessary to prioritize the process of using Applications software extensively in delivering electronic services of the departments.

(106) In doing so, it is necessary for the government' departments, initially, to follow specific policy and standards such as Open-Integration Standards, APIs standard and so on, systematically. Moreover, it is also necessary to follow the use of shared applications, shared network and infrastructures.

(4.2.3) Integrated Services

(107) When implementing e-Government process, it is preferable for people to access through a single window to all departments, instead of accessing to different gateways of various government's departments in dealing with government's services. Thereby, it will be clearer and more user-friendly for people to use the services and more widespread use as a result. In providing online services to citizens, it is advisable to develop integrated services allowing easier accessibility, instead of implementing/using different technologies separately by departments with different technologies, especially in the system of similar work nature.

(108) It is necessary to prepare policy and procedures to identify standards in electronic service platform solution, and unified interfaces system. Accordingly, with the supervision of leading organization, it is required to implement the tasks involved in e-Government process, along with the cooperation of key ministries, as a national level. The recommended integrated services initially are Single Windows Orchestration across Organization National Web Portal.

(109) Strategic supervision and implementation of e-Government process can bring about cost-effectiveness and higher positive impacts. Indeed, it will be more effective and having better chance of success if the implementation of e-Government can be performed in a way of

setting a particular standard form/ a suitable system, as a national level, for the equal accessibility of all citizens.

(4.3) Recommended policy on information technology to be initiated

(110) Since some parts of e-Government process has to be implemented with proper procedures, stakeholders, technologies, multi-sectors approaches over time, it is necessary to prepare machinery/equivalent to be used, software, relaxation of procedures in networking and management change, systematically. It is also described that good examples/lessons from world countries with successful system can be learnt or quoted/applied in developing common goals and strategies.

(111) In e-Government framework, it is necessary to include suitable basic principles and objectives, reflecting the cooperation of government ministries in the matters of development, implementation, adoption, monitoring, assessment and utilization. It is also described that the government of Myanmar either can introduce new structural framework or revise / improve the existing policy for more effectiveness.

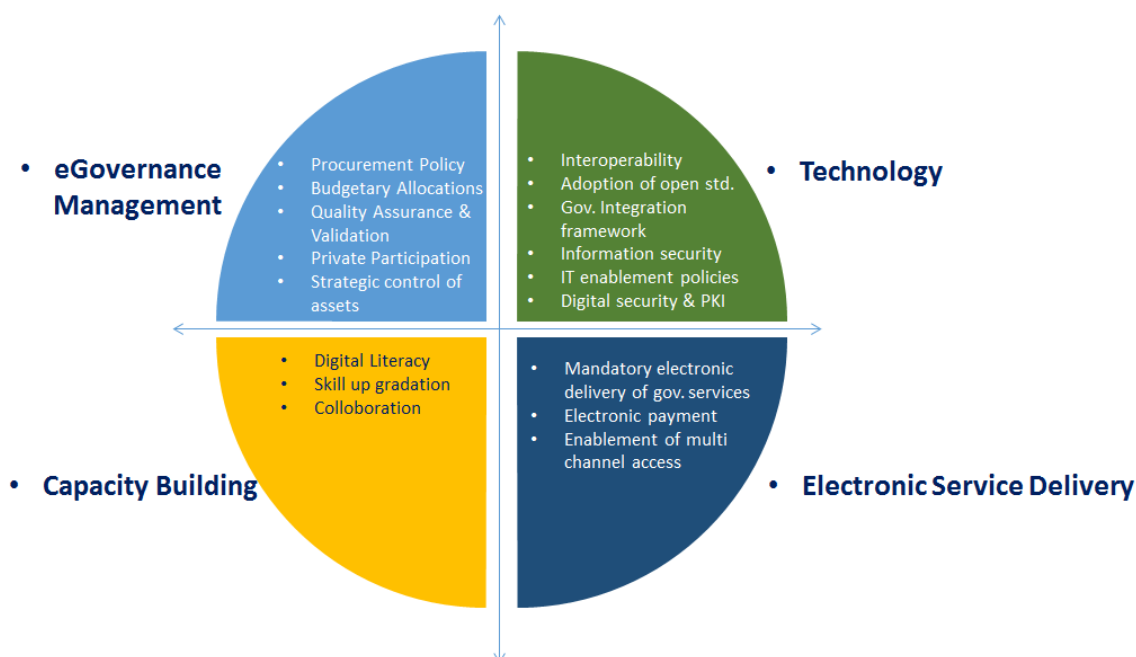


Figure (3) Policy of information technology

(4.3.1) Policy on Technology

(112) Interconnection and open standard policy

It is intended that the information/data should be exchanged at low-cost among government's ministries, between parts of e-Government system. One advantage of open standard's current technology is allowing exchange of data/information. It is described that adopting of open standard can bring about the benefits such as good quality, trustworthy, flexibility and low-cost for the government. Therefore, the policy that can develop clear guidelines using open standard is important.

(113) Policy Framework on Integration of Administration Sector

In order to provide people with comprehensive and effective services, it is important for Union Government and State/Regional government departments to be able to integrate as well as exchange information. For the reason above, it is necessary to practice e-Government system as there is a mix of different technologies by different departments, it is anticipated that there will be difficulties in integration and electronic information exchange among them. Therefore, it is necessary to set up a backbone policy to integrate/exchange information among many different systems.

(114) Policy on Information/Data Security

Indeed, e-Government system is a system to provide services through the integration of different technologies (Independent Software Vendors (ISVs), Data Center Facility Providers, Network Service Providers, Original Equipment Manufacturers (OEMs), IT services providers and etc..) and to provide services from different departments and different areas. Therefore, it is necessary for the security of e-Government system to set up clear framework allowing specific standards of security for services.

(115) Policy on shared IT infrastructures (including Cloud)

It is described to identify a clear set of guidelines stating the facts; Network linking, Data Center developing, operation and maintenance and collective storage of applications implemented by government's ministries at Data Center. Moreover, it is advisable to prepare for the

implementation of cloud computing technology, which enables e-services provision at ease and effective expenditure of government's budget.

(116) Policy on Digital Security and Public Key Infrastructure (PKI)

the requirement of policy is stated to allow transmitting and receiving of information using PKI system and the security of digital information in transmitting and sharing of electronic information on the Network between different departments of the government.

- a) Encouraging the use of Digital Signature in e-Government system to resolve conflicts/disputes and evidence/verification.
- b) Changing structure and issuing bylaws and directives to encourage the implementation of Certification Authorities (CA).
- c) Implementing digital signature to be able to achieve mutual-recognition among CA.
- d) Issuing clear and precise guidelines for the use of digital signature in e-Government system.

(4.3.2) Policy on electronic services

(117) Policy on electronic services: In order for government's departments/agencies to provide electronic services, it is necessary to issue precise guidelines and the other policy guidelines for the activities such as relaxing government's departmental procedures; clarifying them; submission of forms online and online-payment process.

(118) Policy on Applying different methods

It is aimed to use different methods (Web, Mobile Device, Citizen Centers, call centers and self-help kiosks, etc..) in providing services_ from government to business enterprises (G2B) and to people/citizens (G2C).

(119) Policy on electronic payment process

It is necessary to set up policy, allowing electronic payment process online. The policy also includes the guidelines on electronic payment gateways, it is required to implement electronic payment system by the cooperation of Ministry of Planning and Finance, Central Bank of Myanmar and other respective ministries.

(4.3.3) Policy on Human Resource Development

- (120) **Digital Knowledge and Skills development Policy:**
in order to upgrade ICT knowledge of Civil servants and people, it is necessary to set up clear policy and to carry out assessment annually. Addition to this, programs to upgrade human resources will also be implemented by cooperation with international organization, especially in education sector.

(4.3.4) e-Government Management Policy

(121) Procurement Policy

It is necessary to set up policy on inviting tender for hardware, software and ICT services.

(122) Policy on financial allocation related to e-Government

It is necessary to prepare clear and precise guidelines on budget allocation required for e-Government process to be implemented by government ministries. Moreover, proper supervision will be needed to ensure transparency and to avoid wasting funds.

(123) Policy on working in partnership with private sector

In the implementation of e-Government system, apart from the government budget as a financial source, there is also an option to invite private investment and shared dividends for the implementation. Therefore, it is required to prepare clear policy on different modes of partnership with private sector.

(124) Policy on setting out quality and warranty period

As e-Government system is intended to provide people with services through ICT technology by government departments, it is necessary to ensure higher performance, extendibility as necessary, meeting standard requirements, interconnectivity, quality document process and security.

(4.4) Standard/Criteria to be initiated for information technology

(125) In order to link between systems of e-Government, to upgrade with changing technologies and to reform procedures as necessary, there should be standard/criteria for technologies and machineries to be used in the implementation. For the reason above, while setting out standard criteria need to be in compliant with international standards, local standard criteria should also be specified as per the local requirements. In doing so, it is aiming not only to limit technology but also to consider the conditions of linking between the systems at ease and in security. The followings should have specific standard/ criteria

- a) Information Security
- b) Technology and Architecture
- c) Workflow and Document Management
- d) Standardization of Software Development

(126) In the introduction of standard criteria, the coordination between Ministry of Transport and Communications, standards development committee, Myanmar Computer Federation, International Organizations and the discussions about Myanmar and International standards/ criteria, should be taken into account. It is advisable that the experience and lesson from international ICT standards/criteria should be learnt in setting out standards/criteria compatible with Myanmar.

(127) In order for the Government's electronic services to be described in Myanmar language for people to understand better, it is needed to set out standard for the required Myanmar Font System on Myanmar, to be in line with international standard and Myanmar language orthography. In technical as well as technological standard criteria, it is necessary to follow international standard while in language standard criteria, it is to

follow orthography, specification, changing perspective, serial arrangement and so on. Only then, there will be more understanding and widespread use among people. Addition to Myanmar language, it is necessary to consider the use of ethnic language by implementing as national level, using Unicode's code points (recognized internationally).

(4.4.1) Standard criteria to be initiated for information technology

- a) Develop Information Security Assurance standards
- b) Develop IT Service Management Standards
- c) Develop Public Records Management standards
- d) Develop Information Access and Transfer Protocols
- e) Develop Interoperability and Integration standards
- f) Develop e-Government Workflow standard
- g) Develop e-Government Project Documentation standards
- h) Develop Software Development Lifecycle Model standards
- i) Develop Enterprise Architecture Framework standards
- j) Develop IT Government and Management standards
- k) Develop System Testing standards
- l) Develop a Public Key Infrastructure
- m) Develop standards for ICT skill development
- n) Develop a Risk Assessment Framework
- o) Develop Encoding Standards
- p) Develop Fonts (Standardized across platforms)
- q) Develop Project Management Skills Framework
- r) Develop Burmese Language Standards
- s) Develop Metadata and Data Standards for Application Domains

(4.5) The Organization/Institution to be initiated

(128) The reasons why e-Government process were not successful before include lack of clear objective; lack of technological skills; difficulty linking/ integrating with current procedures and weakness in policy and bylaws and so on. Therefore, an organization/institution, having strength, capacity and empowerment, will be needed for the implementation of e-Government. It is suggested to learn international experience and to develop an organization structure compatible with Myanmar context.

(4.5.1) Forming ICT Council

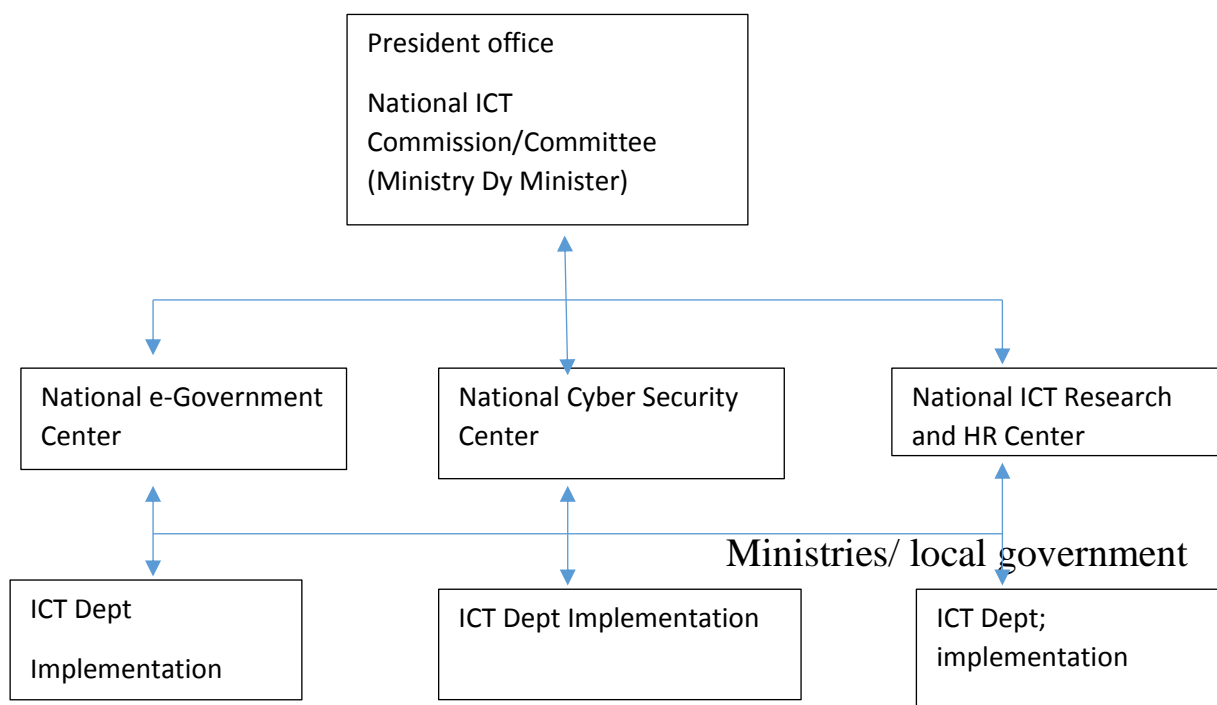
(129) The roles and responsibilities of organization implementing e-Government should include management, policy making, technological coordination and collective investment for expenditure and so on. The responsibilities above mentioned can be carried out with reasonable empowerment and strong organizational structures. Only then, e-Government process will be implemented gaining momentum as per the road-map in Myanmar. The council should be formed as mentioned.

(4.5.2) Forming Council under direct supervision of President office

(130) The ICT council should be formed as mentioned below, under direct supervision of president office in order to implement e-Government process in priority. Addition to this, ICT law should be prepared and constituted to identify the policy conferring empowerment; standard criteria; rights/power allocation, budget

allocation and so on. The council, using the power conferred, has to develop policies such as Digital Signature, public-key encryption, certification authorities, e-Government Integration Standard and so on. Initially, president office will supervise e-Government process directly and after the certain period, the council will be moved under supervision of suitable ministry.

Proposed Commission/ Committee Structure



Chief Information Officers (CIOs) /Chief Security Officers (CSOs) in each ICT Department

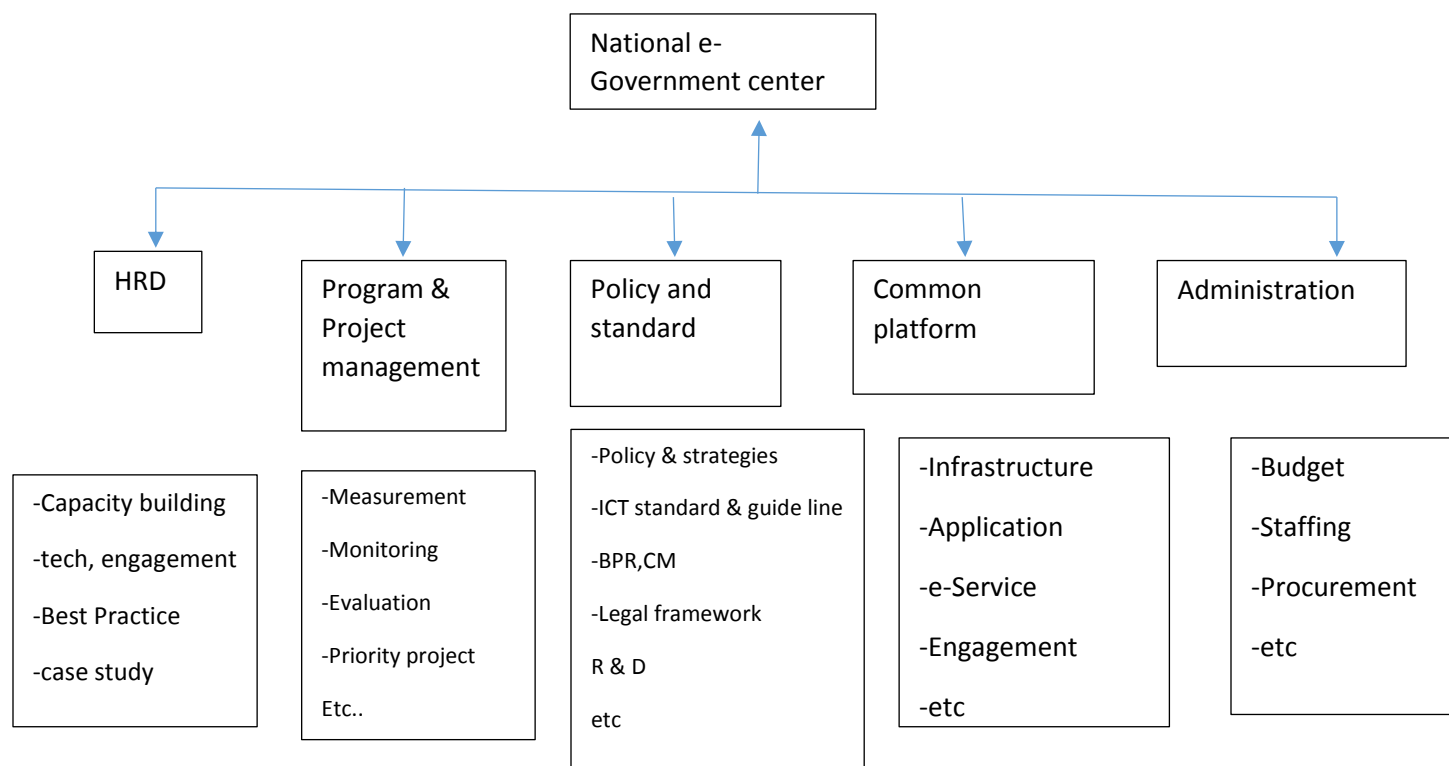
Figure (4) : Proposed ICT Council Structure

(131) With the structure mentioned above, it is necessary to form ICT council and implement e-Government process as per the road-map. The structure of council should be reformed after (3 years) reviewing the

progress of implementation with the formation of ICT council. The ICT council should include technically skilled persons in ICT from Ministry of Transport and Communications and Ministry of Education, chaired by a person, not lower than Union Minister level, directly responsible to the president. Under the supervision of ICT council, there should be inclusions of implementing centers such as National e-Government Center, National Cyber Security Center; and National ICT research and Human Resource development Center. The council's members should include officials from respective government's departments, technically skilled representative from Myanmar Computer Federation, representatives from education sector and individual technical consultants.

- (132) According to the council and respective centers, it is advisable to make formal request for funding from state's Finance, for the expenditure as necessary, with the accountability of the responsible ministry. The responsible ministry, in order for the ICT council and committees to function effectively, can assign reasonable departments to assist /take part in their office work/functions.

The proposed National e-Government Center's Structure and Respective Responsibilities



Proposed e-Government Center's structure

(133) The responsibilities of National e-Government center includes Human Resource development for civil staff in Government's departments, technological coordination, Project management, developing policy and strategies, providing shared infrastructures and common data services, implementing shared online services, preparing budgets for projects, procurement, administration and performing responsibilities assigned by the ICT council occasionally.

Structure and responsibilities of Proposed National Cyber Security Center

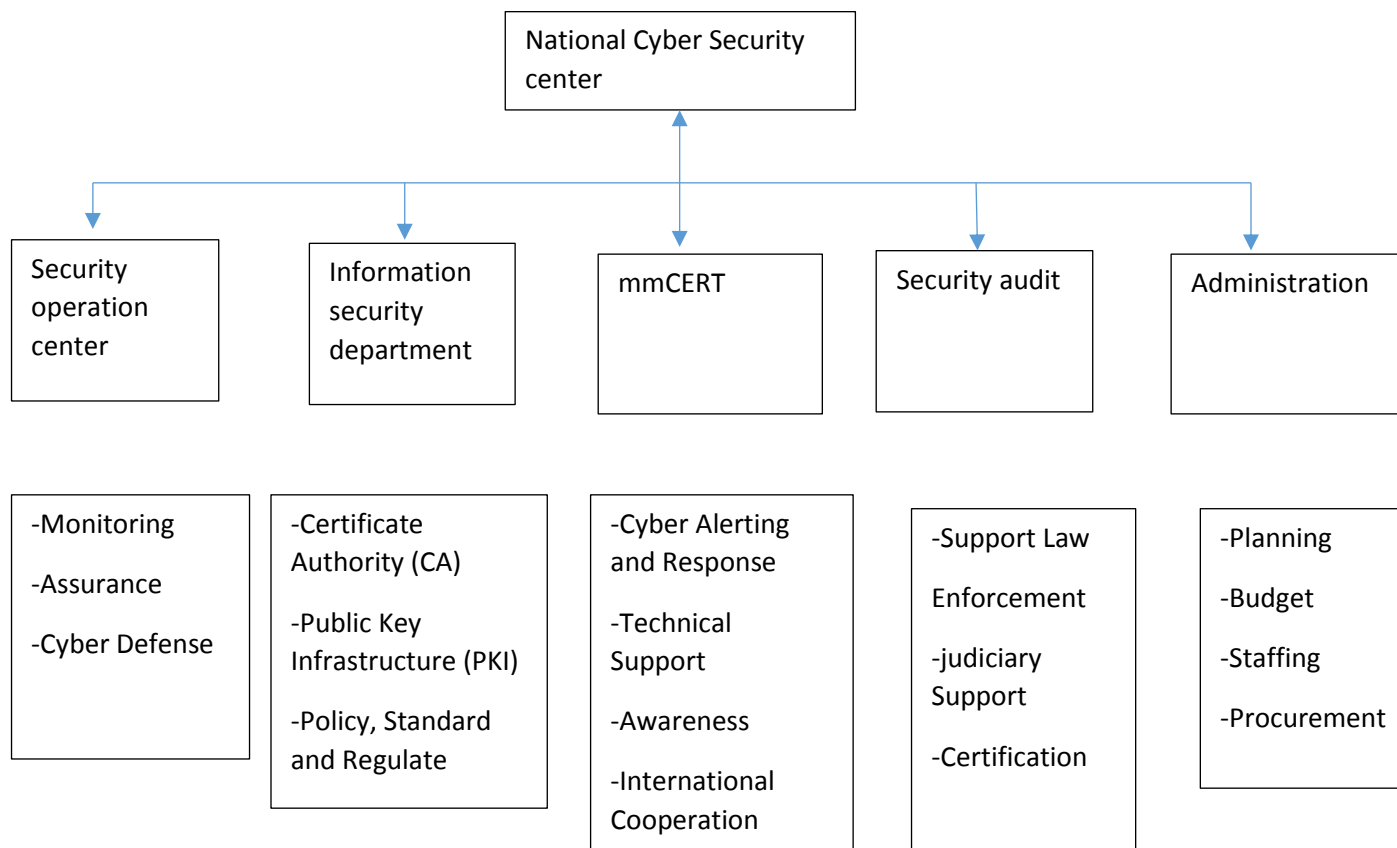


Figure (6) structure of Proposed National cyber Security Center

(134) The responsibility of National Cyber Security Center involves developing policy and guidelines on information security, supervision, monitoring government information network and protection, response to emergency/urgent affairs, knowledge sharing, screening information technology security, dealing in cooperation with local/international organization in the matter of cyber security breakage, supervising internet and network service provider, certification of cyber security regulations, preparing budget for project, procurement, administration and duties assigned by the ICT council occasionally.

Structure and Responsibilities of Proposed National ICT Research and Human Resource Development Center

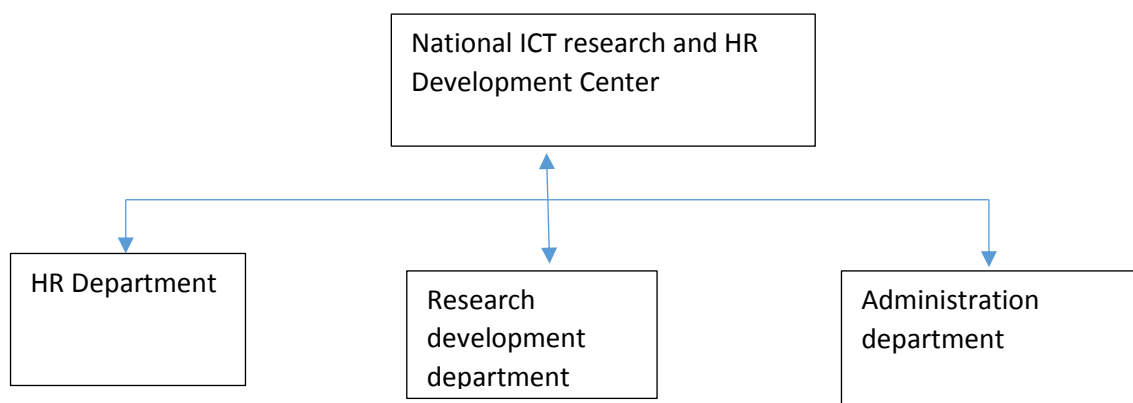


Figure (7) : Proposed National ICT Research and Human Resource Development Structure

(135) The responsibility of National ICT research and Human Resource Development Center involves upgrading process in economic, education, administration sector and so on to be in line with modern technology, using information technology, promoting information technology and research activities, establishing Human Resource Development and process related to information technology, facilitating development process with the assistance of research activity, providing inputs/advice in identifying and maintenance of education and training level related to information technology in the country, providing consultancy in the matter of information technology, supporting respective ministries and organization in order to create opportunities for continuous study/learning in information technology, as per requirements, working in cooperation with local/international organization for necessary trainings, workshops, seminars and meetings in order to develop IT sector in line with the modern age, and so on.

(4.5.3) Organizing ICT departments in respective ministries

(136) It is necessary to assign Chief Information Officers (CIOs) and Chief Information Security Officers (CISOs) in respective ministries for the implementation of e-Government process, as per the road-map. Those occupy these positions mentioned above should be at director level and separately assigned their duties, without being jointly assigned with other duties. Positioning can be specified as necessary, depending on the nature and magnitude of work in the department.

(137) The responsibilities of CIOs involve implementing unique applications according to respective departments, and other areas such as technology, infrastructure and services. The responsibilities of CISOs involve cyber security of Network and individual users, machines, and application implemented by their respective departments.

(4.6) Upgrading level of skills to be initiated

(138) It is highly important to upgrade the level of skills of civil staff for the successful implementation of e-Government in Myanmar.

(4.6.1) Areas/Aspects to be focused for Human Resource Development

(139) It is important to focus on the following areas/aspects for Human Resource Development.

- a) Construction and maintenance of technical infrastructures
- b) The development of e-Government Services
- c) Users' Awareness
- d) Management of large programs
- e) Design and management of business and finance

(4.6.1.1) Construction and Maintenance of Technical Infrastructure

- (140) It is necessary to upgrade level of skills and performance required for planning, construction, expansion, operation and sustainable maintenance of technical infrastructure.

(4.6.1.2) Development of e-Government Services

- (141) It is necessary to upgrade level of skills and performance required for developing and using e-Government applications, delivering electronic services through communication channels, project management, operation and maintenance, priority based on satisfaction and demand of users.

(4.6.1.3) Users' Awareness

- (142) As users' knowledge and awareness of e-Government's benefits are important for the proliferation of e-Government's services among people, it is necessary to provide education program, raising users' awareness.

(4.6.1.4) Management of large programs

(143) In order to achieve the goals and expected outcomes of large program/work plan needing large investment and longer length of time for implementation , it is necessary to upgrade levels and performance of departmental staff, especially for their proper management and implementation.

(4.6.1.5) Systematic Design and Management of Business and Finance

(144) In order for e-Government process to be implemented in the aspect of lower expenditure and higher impact, it is highly important to upgrade level of skill and performance of departmental staff in the following area.

- a) Funding , finance and technical statistics
- b) Capital Expenditure Management and income generating method
- c) Ways to increase income and decrease expenditure
- d) Law and regulation specifications
- e) Reporting, monitoring and evaluation

(4.6.2) Major Strategy for Human Resource Development

(145) It is important to upgrade skill and performance of staff for the successful implementation of e-Government in Myanmar. Major strategies for human resource development are as follows:

- a) Extension of teaching organization specialized in ICT subject
- b) Increased generation of ICT Specialists
- c) Cooperation with international ICT organization
- d) Start teaching ICT subject since basic education school
- e) Training to use modern methods rather than conventional method in e-Government service delivery

(4.6.3) Industrial business support for Human Resource Development

(146) The development of e-Government is closely in parallel with the development of ICT industry in Myanmar. Myanmar Computer Science Development Council has been formed for the development of computer science and information technology sector in and among Government's departments and general public. Therefore, in order to implement e-Government process, the organizations mentioned above, should be exposed closely to other private organizations. (e.g_ Myanmar Computer Federation and its Subsidiaries) and IT companies for effective cooperation and public awareness raising activities. In an attempt to develop Human Resource in IT sector, the active supports from IT-related business enterprises, consultants and amateurs and other associations can be a great advantage.

For example : In cooperation with international organizations, running IT trainings organized by computer-related associations under Myanmar Computer Federation such as Myanmar Computer Professionals Association, Myanmar Computer Industry Association and Myanmar

Computer Enthusiasts Association, are great advantage for Human Resource Development in the sector. The Information technology skill standard- ITSS, depending on categories, specified by Japan are as follows:

Figure (8) Information Technology Skill Standard _ ITSS, by categories

ITSS Career Framework

Job categories	Marketing	Sales	Consultant	IT Architect	Project Management	IT Specialist	Application Specialist	Software Development	Customer Service	IT Service Management	Education
Specialty Fields	Marketing management Sales channel strategy Market communication	Product sales by visiting customers Consulting sales by visiting customers Sales via media	Industry Business function	Application architecture Integration architecture Infrastructure architecture	Systems development IT outsourcing Network service	Software product development Platform Network Database Common application infrastructure Systems management	Security Business application system Business application package Basic software	Middleware Application software	Hardware Software Facility management	Operations management System operation Operation Service desk	Planning training programs Instructions
Level 7											
Level 6											
Level 5											
Level 4											
Level 3											
Level 2											
Level 1											

(4.6.4) Human Resource Development in Government's Departments

(147) The roles of departmental staff are greatly important in implementation and management of projects and work plans for the development of e-Government process, as per the road-map, in Myanmar. Therefore, to improve the capacity of main actors, government's departmental staff, in the implementation of e-

Government projects, it is intended to run necessary capacity building/trainings, organized by Focal Ministry in cooperation with local/international business for better, strengthened and more extensive Human Resource Development in IT sector.

(4.6.5) Raising Public and Private Awareness

(148) The main objective of implementing successful e-Government process is to increase the use of e-Government Services and Applications among citizens and business and to increase awareness of e-Government benefits. By having access to necessary information from Information Infrastructure, Citizens and businesses will acquire technical knowledge, narrowing digital gap. Hence, aiming for extensive acquisition of awareness and knowledge among citizens and business, it is necessary to organize education programs through Media, using Myanmar and ethnic languages. The media proposed for education programs are as follows:

- a) Radio, TV, newspaper, posters, periodicals, pamphlets and other social media
- b) Traditional cultural programs
- c) Non-Governmental organizations
- d) Schools
- e) Government's Departments having Public relation
- f) Communication services
- g) Citizen Service Center, Call Center, e-Government Portal, Post Office and so on.

Chapter (5)

Suggestion for Management Change

- (149) The road-map, regulations, guidelines and manuals for e-Government implementations are described. Design for management change is also suggested. It is also suggested that the continuation of existing shared infrastructure and application in Myanmar e-Governance Master Plan can be much time-saving.
- (150) It is described, in the road-map, that technical standards/criteria are required for upgrading shared infrastructure and shared applications, and reformation of policy, law, guidelines and so on. Addition to this, the work programs generating immediate benefits, short-termed and long-termed programs are also described. Only then, the undertakings already implemented can also be used beneficially.

(5.1) Change Management Approach

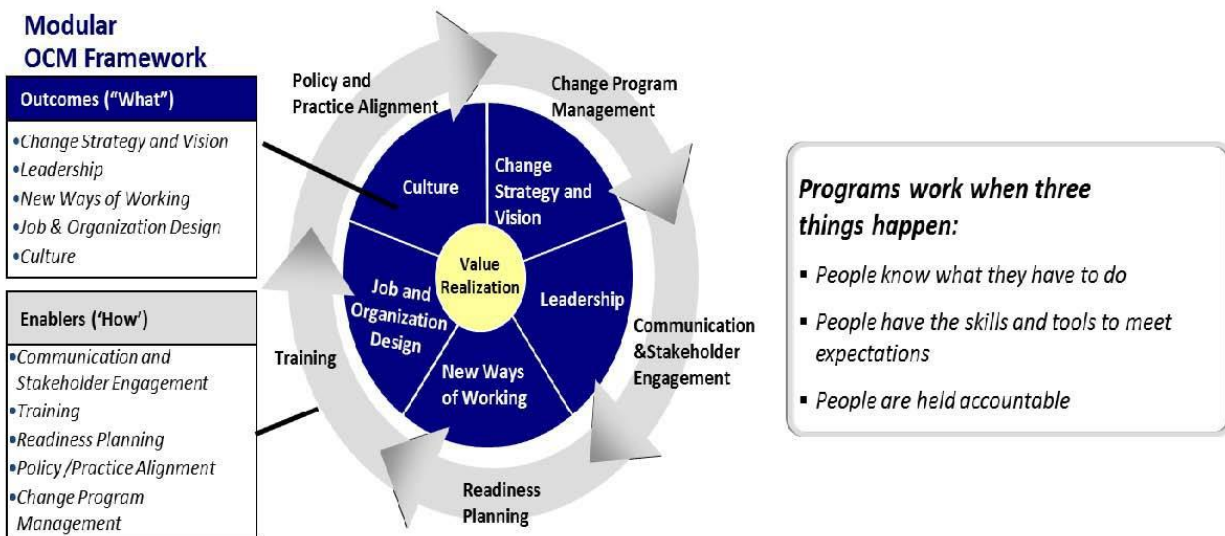
- (151) In implementing reform process, it is observed that there were some failures due to not reflecting current conditions and other causes. The causes of failure include reaching nowhere and in no-win situation, lack of proper leading organization/person, lack of clear objective, lack of support from top management positions, changes in policy and procedures, corruption, deeply-rooted negative attitudes, fear of failure/loss of job or fear of increasing responsibilities, fear of decreasing rights, reluctance to change and stay in normal routine work instead, difficulty receiving advice/suggestion provided by external organizations. Owing to a big gap in procedures between government's

agency/department and external organization, and last but not least, shortage of finance/funding.

(152) It is important to identify real causes of change management plan failure. How comprehensive change management plan will be implemented, can be observed in the following figure.

(153) When a system/undertaking is going to be implemented, it is necessary to prepare change management plan at the same time with preparing work plans. This means by describing various tasks and technical requirements, budget estimation can be included in the submitted proposals for implementation.

Figure (9) : The Change Wheel-Enablers and Outcomes



Chapter (6)

Implementation of Road-map

(154) Based on international experience/lessons and functions /responsibilities of government agencies/departments, the road-map has been developed, aiming to implement the process in compliance with national economic policy of Myanmar. The road-map includes project/tasks to be implemented by different time frames.

(6.1) Different Steps of Road-map

(155) In order to implement the process step by step according to the road-map, it is divided into different parts such as initial tasks, short-termed projects, middle-termed projects and long-termed projects.

Figure (10) Different steps of Road-map

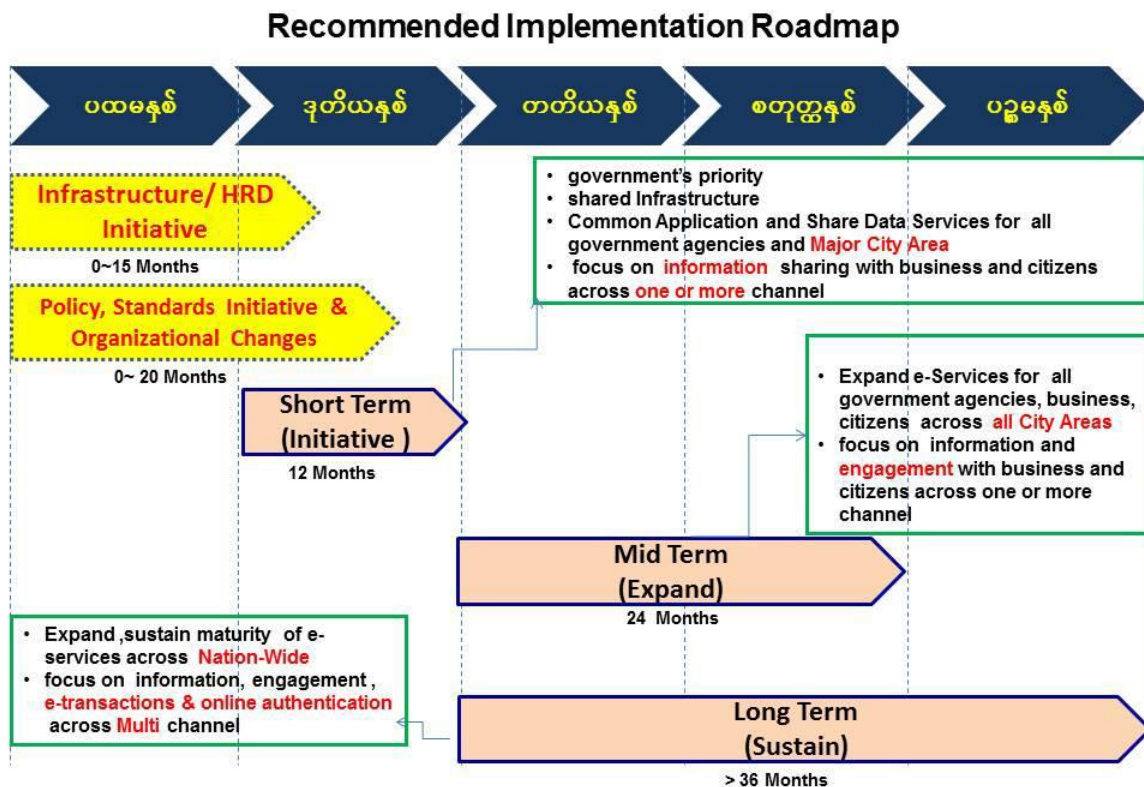


Table (2) Clarification of Road-map to implement e-Government system successfully

Terms	Major Task	Focus	Area	Channel
Initiative	Infrastructure, HRD, Organizational Changes, Strategies, Policy, Standard	Government		

Short Term (Initiative)	Government 's Priority – Shared Infrastructure (e.g. Cloud, DataCenter, etc...) – Common Applications and Share Data Services for all government agencies (e.g-National Portal,Nation al DB, Citizen ID, Payment Gateway, Land Registration, Mobile Gateway, Maps/GIS etc ...)	informatio n sharing with business and citizens	Major Cities	one or more channel (e.g. mobile, web, etc.)
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<p>Mid Term (Expansion)</p>	<p>Expand e-Services for all government agencies, business, citizens based on Common Application and Shared Data Services already developed</p>	<p>information and engagement with business and citizens</p>	<p>All Cities</p>	<p>one or more channel (e.g. mobile, web, smart phone, etc...)</p>
<p>Long Term (Sustain)</p>	<p>– Expand e-services for all government agencies, business, citizens. – Sustain maturity of e-services</p>	<p>information, engagement, e-transaction & online authentication with business and citizens</p>	<p>Nation-Wide</p>	<p>multi-channel (e.g. portal, PAP, mobile, web, smart phone, etc...)</p>

(6.1.1) Initial Tasks

- (156) It is the work plan to be initiated fast in a year. In such period, the work plans include construction of ICT infrastructure and Human Resource Development. In parallel with the construction of infrastructure, it is intended to form in national level organization having capacity, strength and empowerment, along with the other organizations required to initiate e-Government process.
- (157) Aiming for reasonable impacts in government procedures, better exposure to general public, transparency in business matter and investment increase, the organization mentioned has to initiate nurturing human resource development and issuing necessary publication of standard/criteria, policy, law and strategy.

(6.1.2) Short-termed Projects

- (158) The word short-termed is being defined as one year, in which government first priority tasks are to be implemented. Indeed, it involves sharing existing ICT infrastructure and application, sustainable maintenance and expansion as necessary. For example, Cloud, Data Center, Government Service Network.
- (159) While it is necessary to review the applications which are being implemented or already implemented by government departments, it is also required to follow the framework mentioned in Chapter (4), covering the tasks such as integration of these application for common service in government departments, sharing, providing integrated services and upgrading.

For example, National Portal, National DB, Citizen Identity, Payment Gateway, Land registration, Mobile Gateway, Maps/Global Information System (GIS), Single Login government identity across all systems government, video conferencing services, email, document management system, etc.

- (160) Online public services are intended to start providing in economically developed city areas, in priority, aiming to deliver services through mobile applications and internet sites.

(6.1.3) Middle-termed projects

- (161) Middle-termed projects cover government's prioritized procedures, in which Inter-activity online will be there among government, citizens and business enterprises. In this period, it is intended to upgrade and/or extend existing ICT infrastructures as necessary. In fact, it is to extend and upgrade common data services implemented in the first stage, shared applications, Ministry Specific Applications, and integrated services for extensive accessibility not only among government's departments but also among citizens and businesses.

- (162) It is intended to extend online public services delivery in all urban areas across Myanmar, through mobile Applications, smart phones, Internet sites/pages.

(6.1.4) Long-termed Projects

(163) Long-termed projects cover work plans allowing online interactive communications among citizen users. In this period, it is intended to extend and upgrade existing ICT infrastructures as necessary_ to implement upgrading process for better and widespread accessibility to government's electronic services among government's departments, citizens and business. Moreover, it is to ensure the sustainability of these services. Delivering these services will be carried out to cover all places across the country through Portals, Public Access Points, mobile Applications, smart phones and internet sites/pages.

(164) It is necessary to develop policy to ensure communication through safe and secure IT infrastructures, following Open Standard, and integration among different departments. Effective supervision to enforce this policy will also be important. It should be able to provide electronic services through different Web, Mobile, Citizens Service Center and Self-Help Kiosks and so on. Meanwhile, it is also important to develop a framework, in cooperation with education sector to promote IT knowledge.

Chapter (7)

Developing Myanmar e-Governance Master Plan

(165) The preparation of this Myanmar e-Governance Master Plan has been started since 2014, with the support of Asia Development Bank (ADB). During the project period, activities such as discussion, coordination meetings and workshops have been carried out with responsible persons from Government's central organizations/ ministries, CIOs, specialists from Myanmar Computer Federation and international development partners. In 2015, the draft version of this has been completed and clarified by inviting responsible persons from government's central organizations/ ministries and Myanmar Computer Federation for their feedbacks. The list of activities_ meetings and workshops held and important participants are described in the following table.

No	Date	Description/ clarification	Participants
1.	5.3.2014	Preliminary coordination meeting	U Thaung Tin U Than Htun Aung U Ye Naing Moe Daw Nwe Ni Soe Yin Daw Saint Saint Aye
2.	5.3.2014	Work Coordination meeting	MDRI
3.	6.3.2014	Preliminary workshop	Representatives

			from Finance, Commerce, Electricity, Construction, Planning and Commerce, IT & communication ministries
4.	7.3.2014 18.3.2014	Group discussions, current status of e-Governance, visions and methods	Government's ministries, associations from ICT industry, partner organizations
5.	10.6.2014 20.6.2014	Reviewing the condition of Government's websites	Government's departments, ICT associations
6.	12.8.2014	Reviewing the condition of application, Data center and network connectivity	U Ye Naing Moe Daw Nwe Ni Soe Yin
7.	13.6.2014	Adopted IT Data policies, defined IT regulation	Daw Saint Saint Aye
8.	15.6.2014	Monitoring visit to data center and observed e-Government Applications providing services	U Ye Naing Moe

9.	30.9.2014	Work progress coordination meeting	U Thaung Tin U Ye Naing Moe Daw Nwe Ni Soe Yin Daw Saint Saint Aye ADB
10.	1.10.2014 7.10.2014	Work coordination meeting to identify tasks to be initiated by respective ministries	Respective ministries
11.	8.10.2014	Workshop meeting	ADB, Myanmar Computer Federation
12.	9.10.2014	Work coordination meeting with International development partners	World Bank, DFID, JICA, KoICA, ADB
13.	10.10.2014	Work coordination meeting with Tele-communication operator organizations	Yadana Pon teleport, Oreedo, Telenor
14.	3.12.2014 4.12.2014	Work coordination meeting with international development partners	World Bank, DFID, JICA, KoICA, ADB
15.	5.12.2014	Work coordination meeting with Tele communication operator organization	MPT, Yadanar Pon teleport, Oreedo, Telenor

16.	27.12.2014	Clarification of draft version to ministries and collecting feedbacks	All government's central organizations/ ministries
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Table (3) : Meetings and workshop held in 2014

No	Name	Positions/department	Remark
1	U Thaung Tin	Deputy Minister, Ministry of Communication and IT	Provided supervision
2	U Than Htun Aung	Director, Department of Communication	Local specialists
3.	U Ye Naing Moe	Deputy Chief Engineer, Myanmar Telecommunication Service	
4.	Daw Nwe Ni Soe Yin	Deputy Chief Engineer, Myanmar Telecommunication Service	
5.	Daw Saint Saint Aye	Assistant Director, Department of Communication	
6.	Mr. Arun Ramamurthy	Asia Development Bank	International specialists
7.	Mr.C.N.Raghupathi	Infosys limited, India	

8.	Mr.Prakash Jayaram	Infosys limited, India	
9.	Mr. Srinivasan Subramanian	Infosys limited, India	
10.	Mr. Dipankar Khasnabish	Infosys limited, India	
11.	Mr. Monisha Borthakur	Infosys limited, India	
12.	Mr. Pallavi Pradhan	Infosys limited, India	
13.	MCF, MCPA, MCIA	Myanmar Computer Federation	Local specialists

Table (4) : The list of participants in developing Myanmar e-Governance Master Plan

(166) In order to be in line with changing administrative conditions of the country and fast-moving advancement of information technology, the Ministry of Transport and Communications, to be compatible with current Myanmar context, has revised this Master Plan in 2016. The main participants in such activity are described in table (5).

No	Name	Position/ department	remark
1.	U Kyaw Myo	Deputy Minister, Ministry of Transport and Communications	Provided guidance and supervision

2.	U Khin Maung Thet	Permanent Secretary, Ministry of Transport and Communications	Supervising
3.	U Ye Naing Moe	Director, National Cyber Security Center	Local specialists
4.	Daw Nwe Ni Soe Yin	Director, e-Government Department	
5.	Mr. Manish Chadha	Consultant for e-Government Service Delivery Unit of Myanmar, KPMG Co.Ltd. (India)	International specialists
6.	Mr. Ivan WEE	Senior Consultant, IDA International Pte Ltd, Singapore	
7.	Ms. Natalie Theng	Senior Consultant, IDA International Pte Ltd, Singapore	

Table (5) : The list of participants in revising Myanmar e-Governance Master Plan (2016)

Chapter (8)

Conclusion

- (167) The first requirement for the successful implementation of e-Government process is to define strategic vision. There was clear vision in every country with successful e-Government policy. This e-Government process includes regulations and guidelines, frameworks, and road-map, aiming for strategic implementation in order to achieve the objectives of development impacts in the country's administration, economic and social sector in harmony.
- (168) This master plan has been developed aiming at national level implementation, based on current Myanmar context. Therefore, in order to be in line with changes in administration, social and economic sector of the country and fast-moving advancement of information technology, further review and revisions will be done after a certain period.
- (169) If the implementation will be carried out as per Myanmar e-Governance Master Plan, e-Government process will be developed significantly in Myanmar along with higher UN's e-Government Development Index (EDGI). Accordingly, manufacturing and supply of ICT Industry in the country's public and state-owned sector will also be promoted. Thereby, with the support of law, bylaws and regulations, IT Industry and ICT sector as a whole will soon be reaching the important role of the country, economic infrastructure.