YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF APPLIED ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME

A STUDY ON THE ROLE OF ICT HRD FOR E-GOVERNMENT INITIATIVES IN MYANMAR

PHYO WAI MIN
EMPA – 57 (17th BATCH)

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A thesis submitted as the requirement for the Degree of Master of Public Administration (MPA)

Supervised by:

Dr. Thet Mon Soe
Lecturer
Department of Applied Economics
Yangon University of Economics

Submitted by:

Mg Phyo Wai Min
Roll No. 57
EMPA 17th Batch
(2018 – 2022)

ABSTRACT

The main objective of this study is to analyze the role of ICT HRD for E-Government Initiatives in Myanmar, and the sub-objectives are to study the importance of ICT HRD for E-Government, to identify the overview of ICT HRD and E-Government implementation in Myanmar, and to examine the progress of ICT HRD for E-Government in Myanmar. Descriptive Method is used in this study. Primary data and secondary data were used for the survey analysis. The primary data was collected through an online survey questionnaire which was sent to the randomly selected 158 respondents from 14 union ministries/organizations. The survey was conducted from December, 2020 to January, 2021. The secondary data was compiled from a variety of sources include UN E-Government Survey Reports, websites, publications, and unpublished dissertations, during the period from 2000 to 2020. It is observed that the status of ICT HRD in Myanmar's E-Government initiatives has not significantly improved, according to the analyzed data while ICT infrastructures and online services resulted in noticeable improvements. It was difficult to get more responses from the respondents who were working at rural areas with lack of internet access.

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EMPA 17th Batch

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
ASOCIO	Asian-Oceanian Computing Industry Organization
CBM	Central Bank of Myanmar
CICS-LM	Central Institute of Civil Service (Lower Myanmar)
CICS-UM	Central Institute of Civil Service (Upper Myanmar)
CIO	Chief Information Officer
COVID-19	Coronavirus Disease 2019
CU	Computer University
EDMS	Electronic Document Management System
EGDI	E-Government Development Index
e-GIDC	e-Government Integrated Data Center
e-ID	Electronic Identification
GOM	Government of Myanmar
GPMS	Government Personnel Management System
HCI	Human Capital Index
HRD	Human Resource Development
ICT	Information and Communication Technology
ICTRC	Information and Communication Technology Research Center
ICTTI	Information and Communication Technology Training Institute
IMCEITS	India-Myanmar Center for Enhancement of Information Technology Skills
ISP	Internet Service Provider
ITCSD	Information Technology and Cyber Security Department
ITCSTC	Information Technology and Cyber Security Training Center
ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
KOICA	Korea International Cooperation Agency
LDC	Least Developed Country
MCSDC	Myanmar Computer Science Development Council
MCF	Myanmar Computer Federation

MIIT	Myanmar Institute of Information Technology
MOALI	Ministry of Agriculture, Livestock and Irrigation
MOBA	Ministry of Border Affairs
MOC	Ministry of Commerce
MOCS	Ministry of Construction
MOD	Ministry of Defense
MOE	Ministry of Education
MOEE	Ministry of Electricity and Energy
MOFA	Ministry of Foreign Affairs
MOHA	Ministry of Home Affairs
MOHS	Ministry of Health and Sports
MOHT	Ministry of Hotels and Tourism
MOI	Ministry of Information
MOLIP	Ministry of Labor, Immigration and Population
MONREC	Ministry of Natural Resources and Environmental Conservation
MOPFI	Ministry of Planning, Finance and Industry
MOPO	Ministry of President's Office
MORAC	Ministry of Religious Affairs and Culture
MOSCO	Ministry of State Counsellor's Office
MOSWRR	Ministry of Social Welfare, Relief and Resettlement
MOTC	Ministry of Transport and Communications
MOUG	Ministry of Office of the Union Government
MPT	Myanmar Posts and Telecommunications
MSQ	Member States Questionnaire
MTU	Mandalay Technological University
MyCO	Myanmar Companies Online
NCSC	National Cyber Security Center
NPTC	Nay Pyi Taw Council
OSI	Online Service Index
OUAG	Office of Union Auditor General
OUATG	Office of Union Attorney General
PC	Personal Computer
PPP	Public-Private Partnership
PTD	Posts and Telecommunications Department

SIM	Subscriber Identity Module
TII	Telecommunication Infrastructure Index
TU	Technological University
UCC	Universities' Computer Center
UCSB	Union Civil Service Board
UCSM	University of Computer Studies, Mandalay
UCSY	University of Computer Studies, Yangon
UIT	University of Information Technology
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Educational, Scientific and Cultural Organization
UT-YCC	University of Technology (Yatanarpon Cyber City)
VAS	Value Added Service
YTU	Yangon Technological University

CHAPTER I

INTRODUCTION

1.2 Rationale of the Study

Increasing access to Information and Communications Technology (ICT) brings high expectations and demands from citizens on their governments, and encourages for digitalization. E-Government is the use of ICT through various electronic communication devices, computers, and internet to promote more efficient governance, facilitate more convenient government services, allow easy public access to governmental information, and make governments more accountable to citizens. It can save time and money, even though there are high costs at the beginning. It can also reduce the human errors, malpractices, corruption and bribery. ICT has integrated remarkably in public and private sectors, given a new ideological shift in the public administration reform. ICT in public administration provokes a new communication and service delivery platform. This new paradigm shift is called the E-Government initiative.

In the context of globalization, the recent conceptualization of E-Government is significant in administrative reforms. Appropriate use of ICT will usher in a new era in public administration with improved capacities to (a) reduce the cost of government (b) increase utilization of online services by citizens (c) improve public decision-making (d) increase transparency in government budgeting and procurement. A major challenge in smooth implementation of E-Government is the lack of human capacity in terms of management and technical perspectives. The lack of human resources can impede the uptake of E-Government. To overcome such barrier, civil servants must upgrade their skills and knowledge to meet the requirements under the ever-changing ICT environment.

Despite having real concern, ASEAN's focus on equally E-Government implementation has been going slow, mainly because of digital divide among the member states. The divide identifies that there are different levels of ICT literacy among ASEAN member states. So, it encourages to carry out capacity building schemes from the more ICT-advanced member states to the less advanced ones. Hence, ASEAN launched the E-Government Strategic Plan 2020, which serves as the guideline for E-Government development of member states at the national level.

In Myanmar, there are potentials to achieve more developments through effective implementation of E-Government and utilization of ICT in every sector. After the telecom sector reform established in 2013, there have been improvements in telecom and IT infrastructures. In 2016, E-Government is stipulated as one of the priorities, in the 12-point Economic Policy. It was followed by launching of the e-Governance Master Plan in the same year and remarkable efforts for E-Government initiatives. In every ministry, ICT-skilled civil servants are required for successful implementation of E-Government projects. It means, Myanmar's E-Government initiatives cannot be completed unless the responsible civil servants are not qualified enough. So, it is needed to carry out the ICT Human Resource Development (HRD) programs widely in all government ministries and organizations to improve ICT skills of civil servants who involve in the E-Government tasks.

Besides, ICT graduates with management and IT skills, critical thinking, problem-solving, and communication skills are essential to escalate the E-Government initiatives. Technical Universities, IT and Computer Universities are major sources to generate ICT talents for private sector and government sector. In addition, government ministries are required to have a close collaboration with the ICT industry and international organizations to get technical and financial support for development of ICT HRD programs.

E-Government is enabled to drive economic development of a country. It takes a crucial role in implementing sustainable development as well as the qualified and well-trained ICT workforce is a valuable asset in this effort. ICT professionals are needed to always update their skills and knowledge, and should be adaptable to the cutting-edge technologies. That's why, the role of ICT HRD is important for successful implementation of E-Government and this study was made to analyze the role of ICT HRD for E-Government initiatives in Myanmar.

1.2 Objective of the Study

The main objective of the study is to analyze the role of ICT HRD for E-Government initiatives in Myanmar. And the sub-objectives are (1) to study the importance of ICT HRD for E-Government (2) to identify the overview of ICT HRD and E-Government implementation in Myanmar, and (3) to examine the progress of ICT HRD for E-Government in Myanmar.

1.6 Method of Study

Descriptive method is used in this study. The data, information, facts, and figures used in this study are based on both primary data and secondary data. For the primary data, e-mail and Microsoft Forms online survey questionnaire methods were used to collect the data from randomly selected 158 civil servants from 14 government ministries and organizations in Myanmar. The survey questionnaire consists of three sections: general information, ICT skills & trainings, and level of satisfaction. The survey was conducted from December, 2020 to January, 2021.

For the secondary data, relevant data from websites, UN E-Government Survey Report, previous research works, and publications has been used. The period of the secondary data used in this study covered for the period from 2000 to 2020. EGDI and E-Government ranks were used to make a comparative analysis of E-Government developments of Myanmar, Bangladesh, Laos and Cambodia.

1.7 Scope and Limitation of the Study

The primary data was collected from randomly selected 158 respondents from the Ministry of Foreign Affairs, Ministry of Planning, Finance and Industry, Ministry of Investment and Foreign Economic Relations, Ministry of Transport and Communications, Ministry of Labour, Immigration and Population, Ministry of Commerce, Ministry of Education, Ministry of Electricity and Energy, Ministry of Health and Sports, Ministry of Construction, Union Civil Service Board, Nay Pyi Taw Council, Yangon and Mandalay Region Government Offices through e-mail and Microsoft Forms online survey questionnaire methods. It was difficult to get more responses from the respondents who were working at rural areas with lack of internet access.

This study is primarily focused on overview and progress of ICT HRD for E-Government in Myanmar, rather than infrastructures and online services. The number of respondents who did not responded the survey questionnaire was not taken into an account.

1.8 Organization of the Study

This study is composed of five chapters. Chapter I explains the Introduction including the rationale, objectives, method, scope and limitation, and organization of the study. Chapter II states the Literature Review. Chapter III reviews the ICT HRD and E-Government Implementation in Myanmar. Chapter IV expresses the Survey Analysis for the primary and secondary data. And the last one, Chapter V provides the Conclusion of this study, which illustrates findings and recommendations on the ICT HRD for E-Government initiatives in Myanmar.

CHAPTER II

LITERATURE REVIEW

Digital transformation is a paradigm shift across the countries in the world caused by rapid growth in ICT in the past decades and it has encouraged governments around the world to undertake E-Government initiatives as a way of ensuring effective and efficient operations in public administration. Progress of E-Government has shown the achievements in accountability and transparency as well as delivery of services in a timely and cost-effective manner. The development of essential ICT skills among the organizational human resource is fundamental for successful E-Government implementation and adoption.

2.1 Background of E-Government

Since the mid-1990s, governments in the world have been executing digital transformation initiatives through vast potential of internet with the purpose of improving governance process. The term E-Government emerged in the late 1990s, but the history of computing in government organizations can be traced back to the beginnings of computer history. The literature on "IT in government" goes back at least to the 1970s (Kraemer, et al, 1978, Danziger and Andersen, 2002). This literature concerns IT use within government, while the recent E-Government literature more often concerns external use, such as services to the citizens (Ho, 2002).

Generally, E-Government refers to the delivery of government services to the public over internet. A broader view of E-Government is that it relates to the entire range of government roles and activities, shaped by use of ICT. E-Government brings two elements; (1) the environment within government and in the society, by use of ICT technologies, with intention for client/citizen centricity and single-window convergence, and (2) the basic model of the state and public administration within that, linking the dynamics of democracy and governance.

E-Government can be defined as the use of ICT to deliver more effectively and efficiently government services to citizens and businesses, and achieves public participation by digital means. It makes a capacity to transform conventional public administration, and a new form of government. The principle of E-Government is

supported by an effective e-governance institutional framework, to improve the internal operations of the public sector by reducing financial costs and transaction times. So, it is better to integrate work flows and processes, and enable effective resource utilization across the various government agencies. Governments in the world can provide better services and respond effectively to the citizens with transparency and accountability through E-Government.

E-Government has arisen from the interactions between three separate sets of forces; ICT, management concepts, and the government itself. In the past decades, the convergence of computing and telecommunications resulted in the widespread adoption of computing on the client-server model. It was followed by the adoption of internet and e-mail, and then followed by the development of government websites and online services delivery, and easy access to government information.

Traditionally, E-Government has been considered as the use of ICT for improving the efficiency of government agencies and providing government services online. Later, the framework of E-Government has broadened to include use of ICT by government for conducting a wide range of interactions with citizens and businesses as well as open government data and use of ICTs to enable innovation in governance.

In addition to these technology and management factors, there are other forces which are important in the development of E-Government. The first one is government's need to respond to the demands of the public, economy and society. Politicians are also a factor and they are cautious about adopting new technologies, especially in the political process itself. Another important driver is the public service itself, with the recruitment of ICT-skilled civil servants.

E-Government has had a significant impact on public administration, changing the environment in which the public service operates, adding new concepts and methods to its operations, and changing the relationships among established elements of public administration. As with the government as a whole, the changes are ongoing and it is difficult to predict where they will lead (Brown, 2005).

E-Government services can be classified according to the service areas as follows.

(1) Government-to-Citizen (G2C): Government and Citizens will continuously communicate when implementing E-Government, thus supporting accountability, democracy, and improvements to public services.
(2) Government-to-Business (G2B): G2B include various services exchanged between government and the business sectors, including distribution of policies, memos, rules, and regulations.
(3) Government-to-Government (G2G): It refers to the online communications among government organizations, departments, and agencies based on a government database. Moreover, it refers to the relationship between the government and its employees.
(4) Government-to-Employee (G2E): It refers to the relationship between the government and its employees only. The purpose of this relationship is to serve employees and offer some online services such as training, applying online for annual leave, checking the balance of leave, and reviewing salary payment records, among other things.

The adoption and use of the E-Government strategy can provide significant benefits for the government in the delivery of more effective and efficient information and services to all sectors. The benefits of E-Government include (1) reducing costs (2) promoting economic development (3) enhancing transparency and accountability (4) improving service delivery (5) improving public administration (6) facilitating an e-society, and (7) reduce corruption.

In the other hand, there are different challenges and barriers that can delay progress of E-Government implementation. The variety and complexity of E-Government initiatives across the world encounter a wide range of challenges and barriers as follows (Alshehri & Drew, 2010).

(1) Technical barriers: ICT infrastructure, Information security.
(2) Organizational barriers: Top Management support, Resistance to change for digitalization, Collaboration, Lack of qualified personnel and training.
(3) Social barriers: Digital divide, ICT literacy.
(4) Financial barriers: Government's financial support, Budget allocation

2.2 Importance of ICT HRD in E-Government

The role of government in ICT can be classified into five categories: (1) construction of ICT infrastructure, providing ICT equipment, financing R&D for ICT development, (2) creating the macroeconomic environment for growth and innovation in ICT, including fiscal policies, legal and regulatory environment and mobilizing resources for ICT, (3) formulation of education policy for the proper quantity and quality of manpower resources for a digital economy curricula, ICT training facilities, networking of educational institutions, (4) addressing the digital divide and low ICT literacy rate, (5) improving E-Government functions such as online services, e-procurement, trade facilitation, civil society participation, accelerating the adoption of ICT by government agencies.

One of the main factors affecting the rollout of E-Government in a country is the level of human capacity. The issues of human capacity refer to the skills and capacities within the public administration needed to implement E-Government projects, and to the citizens that need to possess ICT literacy to fully benefit from E-Government services.

For the effective implementation of E-Government transformation, broad capacity development is needed at the institutional, organizational, and individual levels in government. Digital or E-Government transformation also requires building digital capacities in government by attracting and retaining the best digital talent in a country (United Nations, 2020). Civil servants are at the forefront of public services delivery and play a key role in smooth running of E-Government projects. It is required to promote coordination at the organizational level to enable different government ministries to effectively communicate and exchange information. There is a growing gap between the skills of public sector employees and the skills of private-sector employees, such as digital skills and ICT literacy. Securing the best digital talents and a team of E-Government experts is important. E-Government projects may be rolled out, but if there is no internal capacity to sustain them, they will soon become unsuccessful.

Capacity building is defined as “a coordinated process of deliberate interventions to (i) upgrade skills, (ii) improve procedures, and (iii) strengthen organizations. It refers to the middle-income investment in people, institutions and

practices that will enable countries to achieve their development objectives" (Rhee, 2009). Policymakers face two general issues regarding ICT human capacity building. The first one is ensuring that all citizens have the basic competencies to use the E-Government services. The second one is to develop specialized ICT skills of ICT professionals.

For a successful implementation of E-Government, it is necessary to expand the supply of ICT professionals and ICT-skilled workforce by increasing enrollment in ICT courses at universities and other technical institutes, and by encouraging private sector training institutions to expand their intake. It is important to boost ICT education at primary and secondary schools, and increase basic ICT contents in the school curriculum.

2.3 ICT HRD Experiences of Bangladesh, Cambodia and Laos

ICT development is essential in building a modern developed nation as well as human resource development is a critical part for ICT development. The developing countries have been trying to promote their ICT HRD improvement and achieve their considerable targeted level, the same as the developed countries. ICT HRD experiences of developing countries - Bangladesh, Cambodia, and Laos are presented in this study. Bangladesh is a neighboring country of Myanmar and a member of SAARC (South Asian Association for Regional Cooperation), and BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) along with Myanmar as well as listed in LDC (Least Developed Countries), and it is a Lower middle-income country. Cambodia and Laos are members of the ASEAN (Association of Southeast Asian Nations), CLMV, and GMS (Greater Mekong Subregion Economic Cooperation Program). They are also LDC countries and Lower middle-income countries. Laos is a neighboring country of Myanmar. Likewise, Myanmar is also a LDC country and Lower middle-income country, and a member of BIMSTEC, ASEAN, CLMV and GMS. But the E-Government rankings of Bangladesh and Cambodia are above Myanmar. In 2020, Bangladesh is ranked 119, and Cambodia is ranked 124 out of 193 United Nations (UN) Member States, while Myanmar's rank is 146. Laos is ranked 167 out of 193 UN member countries.

2.3.1 Bangladesh

In Bangladesh, E-Government initiatives were started with the formation of a National Task Force (NTF) on ICT in 2001 with the Prime Minister as Chairperson and the Secretary of Ministry of Planning as Member-Secretary. IT is usually included in general training courses for employees by government-run different training academies/institutes. A trend of arranging specific IT training courses by these training academies or institutes is also noticeable in recent years. IT training courses are often locked up with word processing and with some other elementary operations, where trainees limit their concentration merely on word processing. Such training courses hardly include any component to provide the broader concept and practices of ICT in public administration. Trainees perceive computers as a modern typing machine with storage capacity and restrict themselves within word processing jobs in using computers in their workplaces. Therefore, scopes remain for significant improvement in the area of IT training for civil servants regarding training plans, facilities, methods and curriculum.

The administrative setup of Bangladesh is organized with the Secretariat at the apex that consists of the ministries and divisions of the government. In recent years, government officials have been trained in the fields of basic computer literacy, E-Government project management, information system management, system analysis, and design, basic troubleshooting, Internet and web management, network management, database management, E-Government policy and strategy formulation, e-commerce concepts, and management. And they attend workshops, seminars and IT fairs to accumulate relevant knowledge. Bangladesh Government keeps budget for research and development in the area of E-Government and conducts in-service training, foreign training, study tour, and workshop for government officials. Besides, there is an ongoing exercise of technology transfer, several local and foreign consultants involve throughout the implementation period of the project and ultimately the government officers will take over from them (Sanaul Hoque, 2005).

Bangladesh Government realizes the need for widespread introduction of IT education as a prerequisite for producing skilled human capital. The National ICT Policy ensures that facilities shall be built to promote IT education and computer-aided education at all levels. The policy also identifies the shortage of trained and qualified teachers and trainers for ICT education and training as an impediment to the

HRD plan. It proposes building capacity in teacher training institutions through special certification and in-service programs to upgrade skills that will create a pool of skilled trainers.

Course curricula for Secondary and Higher Secondary levels have been developed and these are taught in school and colleges as optional subjects. There are efforts from the public and private sectors and from NGOs about distributing computers in educational institutes and providing training for teachers. Privately-owned educational institutes have their efforts, in these respects. Government has a further plan to introduce ICT as a mainstream subject at secondary and high higher-revelation.

At the higher level, 21 public universities, 52 private universities, 31 colleges under the National University, and several foreign-affiliated universities/institutes are offering computer science courses, producing about 5000 computer science graduates per year. The Ministry of Science and ICT has been conducting one year Post Graduate Diploma in ICT through public universities to create skilled manpower and trainers in ICT. The Ministry also has a 3 years program for ICT internship to facilitate the on the job training to new IT graduates. Many private ICT training institutions are running with a lack of standard syllabus and technical qualities that lead to a discrepancy between market demand and the ICT training courses. Except for some institutes that are affiliated with the National University or with foreign universities, private ICT training institutes in Bangladesh, provide short-term diplomas, programming, networking, graphical, hardware maintenance, and basic computer literacy training courses. Some government agencies have specific projects for providing ICT training for citizens. Some of those organizations have facilities for providing training at the divisional and district levels, ICT courses of these public organizations are also pondered with basic literacy.

2.3.2 Cambodia

In August 2000, the Government of Cambodia established the National Information Communication Technology Development Authority (NiDA). In 2001, the Government of Cambodia enacted the E-Government Project. NiDA has offered ICT training courses to government officials, Phnom Penh municipality, and schools. In Cambodia, low salaries of civil servants are the major obstacle in fostering human

resource development at government agencies. The performance of civil servants is affected negatively by the low salary which consequently leads them to seek another job in the private sector. Particularly, young ICT graduates tend to shift their work to the private sector or have part-time jobs, because their salary is not sufficient (NiDA & JICA, 2009). The government ministries either improved or maintained their ICT literacy, by providing free or subsidized training courses. For the civil servants, ICT literacy is assessed in seven areas, word processing, spreadsheet, presentation, e-mail, web browse/search, file, and printer sharing. In Cambodia IT sector, it is difficult to recruit competent IT staff. At the entry-level, there are plenty of applicants, but the level of skills is very low. In terms of senior-level level staff, there is a widespread lack of local applicants that have the skills and experience to take on senior roles.

Cambodia's government commits to promoting the use of ICT in education (MEYS, 2004). All students in teacher colleges are required to attend 2 hours per week in ICT courses, starting in 2003. The number of computers in teacher training institutions increased dramatically. The recent increase in computer numbers has been significant and all colleges now have a computer room. But not all colleges have enough computers to run ICT courses effectively and some have problems with power supply. More than 300 teacher trainers had attended training courses in basic ICT skills and in using ICT for administration, teaching, and learning. An ICT curriculum for Provincial Teacher Training Colleges (PTTCs) and Regional Teacher Training Center (RTTCs) is under development. This will include the use of ICT in administration and professional development and for making teaching resources. Since Cambodia is in a serious shortage of well-trained lecturers and professors, the universities must use their scarce human resources to their full capacities through ICT as well as connecting learners to virtual learning resources worldwide.

Cambodia government undertakes implementation measures to promote ICT HRD include establish a range of courses for ICT professionals in higher education both public and private, train all teacher trainers in the use of ICT for administration and professional development in teacher training institutions, update the curriculum for training of primary school teachers to include the use of ICT for administration and professional development, update the curriculum for training of secondary school teachers to include the use of ICT for administration, professional development and as a tool to support teaching and learning, promote ICT-based research activities and

independent and lifelong learning in every education institution, train at least one member of staff from each of all educational institutions in computer maintenance and repair, equip all teacher training colleges and universities with the necessary hardware and infrastructure to allow teachers and students to access to computers and the Internet, provide budget for repair and maintenance, and provide power supply to all secondary schools and equip them with the hardware to give students access to computers, radio and TV for learning.

In 2020 there were 120 mobile cellular phone subscriptions per 100 inhabitants in Cambodia. The country has also been using social media platforms and websites at the national and local government levels to engage citizens in decision-making processes. At the same time, infrastructure and human capital in Cambodia are at a higher level of development than online services provision (United Nations, 2020).

2.3.3 Laos

The Government of the Laos recognizes ICT as an increasingly crucial tool for achieving socio-economic development, aims to bring the country into the information age by increasing general access to ICT with the provision of modern telecommunications infrastructure and computer networks by fostering enterprise and industry, promoting research and development in the fields of ICT, and by developing the necessary human resources and institutional capacities. Since the late 1990s, the Government of Laos has attempted to computerize major leading ministries in the country and has maintained a steady movement toward the digitalized governance. The Laos Government steadily maintained ties with the various foreign donors to provide better government services and to build up their IT infrastructure. In the 2010s, government agencies in Laos have made a wider variety of informatization attempts than before.

The history of the E-Government of Laos is categorized based on the change of national level E-Government plan and the shift of major donor for the implementation process. According to the criteria, the timeline could be segmented with the 4 periods as (1) The first period: The first plan and the trials for computerization. 1996-2004. (2) The second period: Stepping into e- governance. 2004-2006. (3) The third period: Era of Infrastructure & Increased complexity of

stakeholders. 2006-2012, and (4) The fourth period: restarting from the lessons. 2012-current.

For ICT HRD in Laos, as in the E-Government project of second period, there was a series of programs for the purpose of human resource development. To maximize the efficiency of the training programs in the context of nationwide project coverage of this project, there were several training programs planned and implemented at the local regional E-Government centers and there was a full IT device support for the regional centers as well. By this time, there are the identified training programs confirmed as implemented through the project: Training programs for ICT specialists, ICT engineers, content providers, and end-users. The training targets were to train 40 ICT engineers, 300 ICT engineers from various ministries, and 1,500 government personnel from various organizations. There was a MOU under the International Technical Exchange Cooperation (ITEC) Program between the Governments of Laos and India, including setting up an ICT Training Laboratory, capacity building: training program for 150 government officials, capacity building: training students, setting up the national datacenter, setting up the rural telecentre, setting up a VSAT-based(satellite) network for province governors and centers, policy/legal preparation for Cyber security, and quality ICT education: Entrepreneur development programme. In addition, training programs were added into the project as usual and the National Informatics Centre of India tried to contribute for the project through taking in-depth research on E-Government status assessment.

At present, there are few universities that specialize in electronics and communications engineering except for the national universities. The Ministry of Posts and Telecommunications is running a technical college but the facility is outdated and also under a lack of quality education. Many graduates are lack of core theoretical knowledge and practical skills.

The Government of Laos has formulated an ICT HR Master Plan including (1) Establishing an Education Network, Promoting e-learning initiatives, Review and strengthening computer school curricular, Computer training for school teacher, Provision of school information infrastructure: telecom network, computer facilities, basic educational software and content, and quality internet access for Formal Education Sector (2) Establishing higher ICT Institutes, Helping government agencies set up their management information systems as well as agency-specific software

system, Acquiring and producing educational software and digital content, and Conducting research and development in ICT application for distance learning for Higher Education Sector (3) Using ICT to upgrade workers, unemployed youth and women, e-Learning for lifelong learning, and Development of ICT professionals and re-training of existing workforce in ICT for Non-formal Education Sector. In Laos, there is still limited development of IT skills and Human Resource for E-Government improvement.

2.4 ICT and E-Government in COVID-19 Pandemic Period

E-Government has taken the important role as a necessary element of communication, leadership, and collaboration between policymakers and society during the COVID-19 pandemic. Digital technologies have enabled broader sharing of knowledge, encouraging collaborative research to find solutions and provide transparent guidance to governments and people. Digital government offices have also experienced rapid digital transformation during the COVID-19 pandemic (United Nations, 2020).

ICT is vital to the health and safety of people, and in keeping economies and societies working amid impacts of COVID-19 outbreak. Digital government technologies have kept governments and people connected during the outbreak, either through information sharing or online services delivery. The use of technology has also enabled governments to make rapid policy decisions based on real-time data and analytics, enhancing the capacities of national and local authorities to better coordinate and deploy evidence-based services to those who need them most. Countries focused on providing basic information related to general health precautions and emergency numbers accompanied by public announcements on national portals. As the crisis intensified, governments began extending their reach and started using more social media channels to report on COVID-19 statistics.

The COVID-19 pandemic has forced governments and societies to emphasize on digital technologies to respond to the crisis in the short-term recover, and resolve socio-economic repercussions in the mid-term, and reinvent existing policies and tools in the long term. The pandemic has shown the importance of digital connectivity and literacy to thrive in a fast-changing environment.

2.5 Reviews on Previous Studies

United Nations (2020) stated that capacities that support effective E-Government transformation are required at the societal, institutional, organizational, and individual levels. Capacities for managing data, mobilizing resources, and ensuring adequate ICT infrastructure and the availability of affordable and accessible technology and high-speed connectivity are equally important. Digital capacities at the societal level including digital skills and competencies but also the appropriate values and norms are critical for the uptake and continued use of digital services and sustained digital participation. Government capacity for iterative feedback is needed to ensure continuous improvement.

Alshehri & Drew (2010) stated that the major challenge of an E-Government initiative is the lack of ICT skills. This is a particular problem in developing countries, where the constant lack of qualified staff and inadequate human resources training has been a problem for years. The availability of appropriate skills is essential for successful E-Government implementation. E-Government requires human capacities: technological, commercial, and management. Technical skills for implementation, maintenance, designing, and installation of ICT infrastructure, as well as skills for using and managing online processes, functions and customers, are compulsory. To address human capital development issues, knowledge management initiatives are required focusing on staff training to create and develop the basic skills for E-Government usage. Ongoing access to training is a fundamental prerequisite as the rate of change increases and new technologies, practices, and competitive models appear. The full economic benefits of ICT depend on a process of training and learning skills, this is universal for all governments.

Rhee (2009) stated that almost all the developing countries of the Asia Pacific region recognize the importance of ICT skills for national development. In today's global economy, developing ICT capacity is an important policy objective for any country seeking to harness the power of ICT for development. As the former UN Secretary-General Kofi Annan stated, "Information society means one which human capacity is expanded, built up, nourished and liberated with the education and training to use technologies effectively". Governments need to act swiftly and decisively to ensure that they provide the right environment for innovations in ICTs and the use of

the technologies in creative ways towards sustainable social and economic development necessary for a modern information society.

Wairiuko, Nyonje & Omulo (2018) mentioned that Human Capacity Building refers to developing an organization individual's core skills and capabilities that help them achieve their development goals. The realization of the full potential of ICTs requires training for relevant skills to build individual and institutional capacity for users and all beneficiaries. In government organizations, employees are not adequately trained on IT, these results to resistance in change and use as well as underutilization of the technology innovation. Therefore, high level of personnel IT skills can have a positive impact in adoption of E-Government in public organizations. Existence of knowledgeable management can support using of IT to achieve organization objectives. Digital literacy among the government staff affects E-Government development and implementation in developing countries.

Ojo, Janowski, Estevez & Khan (2007) revealed that Electronic Government offers enormous potentials for improving the internal efficiency of the public sector and the delivery of public services to citizens and other government customers. Most governments around the world have integrated E-Government into their broader public sector modernization agendas. The availability of skilled workforce with a good learning capacity is essential for E-Government, along with other factors like leadership, regulatory frameworks, financial resources, organizational conditions, and Information and Technology (IT) infrastructure. Human resource planning for E-Government is based on the agreed set of competencies required for E-Government. The typical steps involved in such planning include Skill Definition, Initiation, Strategy Development, Sourcing of Resources, Specification of Training Needs, Implementation, and Application. The identified skill-sets are provided to civil servants by governments through formal education, informal education, and training programs often carried out in partnership with private organizations and academic institutions.

CHAPTER III

ICT HRD AND E-GOVERNMENT IMPLEMENTATION IN MYANMAR

In an attempt to achieve all-round development for the country covering administration, social, economic, education and health sectors, E-Government can be considered as an effective and efficient way. The Government of Myanmar (GOM) aimed at the economic development and, has included a policy "to establish Data ID Card System, Digital Government Strategy and E-Government system" in the 12-point Economic Policy as a national objective in August 2016, for the successful implementation of E-Government process. This chapter highlights overview of E-Government in Myanmar, and includes ongoing E-Government and ICT HRD activities.

3.1 Overview of E-Government in Myanmar

The first computer ever brought and used in Myanmar was IBM's PDB-11 mainframe, which programmers had to use punch-cards to save programs, not disks. This first computer resulted in the founding of Universities Computer Center (UCC) in Yangon in 1979. Then, Myanmar has been gradually adopting ICT by using desktop computers in some government offices since the early 1980s. The emphasis on ICT Sector started with the enactment of the Computer Science Development Law in 1996, followed by the formations of Myanmar Computer Science Development Council (MCSDC) in 1996 and Myanmar Computer Federation (MCF) in 1998. In November 2000, the GOM signed the e-ASEAN Framework Agreement with other ASEAN governments, with the purpose of creating opportunities from ICT and electronic commerce, gain access to these new technologies, and facilitate cross border trade and electronic transactions for the people of ASEAN countries.

In 2004, the GOM engaged a private sector consulting group from Malaysia, to assist in developing and implementing E-Government initiatives. Specifically, the government aimed to develop e-visa, e-passport, smart schools, and e-procurement capabilities. But the initiatives failed due to lack of cooperation among the ministries, lack of high-level sponsorship, and lack of budget. Along with the economic and social sector reforms since 2012, the government constructed a high-speed fiber network to connect to 37 ministries in Nay Pyi Taw and developed two E-

Government applications such as Electronic Document Management System (EDMS) and Government Process Management System (GPMS). Unlike 2004, E-Government initiatives are supported by international donor agencies, such as World Bank, Asian Development Bank (ADB) and Japan International Cooperation Agency (JICA), which can provide much-needed financial and technical support to supplement Myanmar's outdated technology and to develop government official's capabilities in ICT.

The E-governance Master Plan was developed in 2016 with the support of ADB, in order to accelerate the efforts on E-Government initiatives. The plan provides the overall framework for digital transformation in Myanmar, identified priority areas, and a holistic approach for collaboration and linkage across GOM. Meanwhile, due to the results of telecommunication sector reforms since 2013, mobile and internet connectivity were improved nationwide. So, Myanmar has a great opportunity to take advantage of digital technology and mobile devices as a means to enhance the government's public service delivery. Following a recommendation in the E-governance Master Plan, the E-Government Steering Committee (eGSC) was established in January, 2018 consisted of State Counsellor as the patron and Vice President (1) as the chairman with 46 members from government agencies, MCF and its affiliated associations. The eGSC functions as a guidance and decision body to facilitate an enabling environment for digital transformation, particularly focusing on a public sector modernization agenda and public service delivery and digital service enablement. The E-Government Implementation Committee (eGIC) was also established in 2018 alongside with the eGSC. It is led by the Union Minister for the Ministry of Office of the Union Government (MOUG) and has total 31 members. It is responsible for coordinating and controlling in E-Government implementation, formulation of plans and budget proposals for submission to the eGSC, and leading to facilitate the required ICT infrastructure and other supporting plans to implement the E-Government.

The eGIC set up the following 8 subcommittees based on various tasks, with the purpose to strengthen the implementation efforts.

(1) Management Subcommittee.

(2) Infrastructure, System and Design Subcommittee.

(3) Procurement and PPP Subcommittee.

(4) HRD Subcommittee.

(5) Cyber Security Subcommittee.

(6) Standardization Subcommittee.

(7) Research and Development Subcommittee.

(8) Information and International Cooperation Subcommittee.

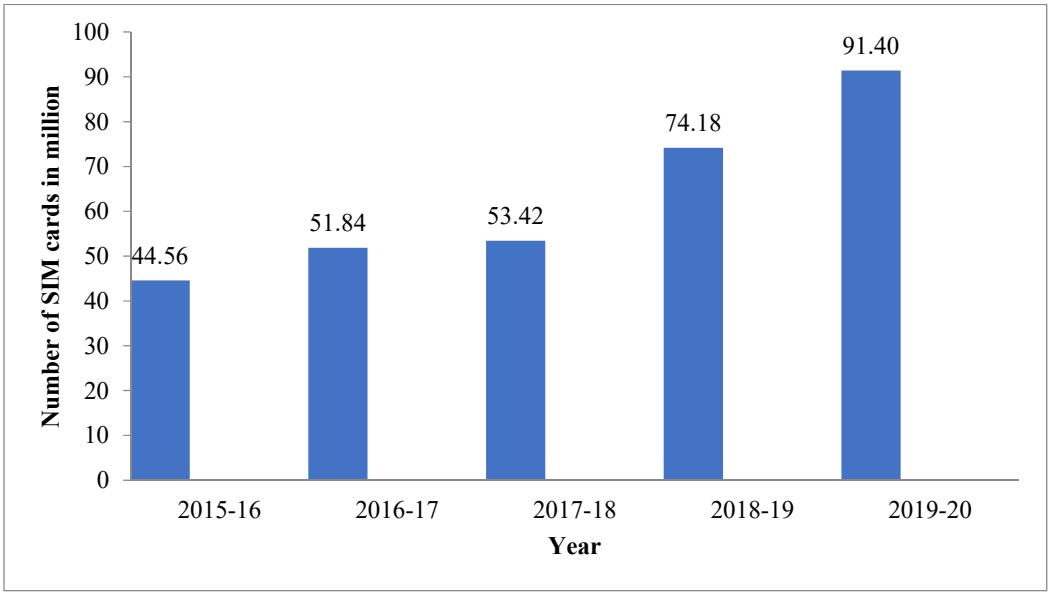
In 2020, usage of internet and ICT increased in both private sector and public sector since the time of COVID-19 pandemic affected. Utilization of various ICT platforms for e-learning, webinar, work from home, online meeting, and electronics payment have increased. The GOM utilized ICT for dissemination of announcements and news for public awareness, and was able to continue government operations mostly online amid COVID-19 control measures.

3.1.1 Development of Telecommunications infrastructures in Myanmar

Over the past two decades, telecomm has become an essential element of a country's infrastructure. In addition to the direct benefits, scaling up investments in telecom infrastructure would (i) improve access to domestic and regional markets, (ii) attract private investment, (iii) reduce urban – rural development gaps, and (iv) help countries reap the full potential gains from regional connectivity and integration. The low quality of telecommunications environment and inadequate facilities became an issue to do business in Myanmar. In 2013, a new Telecommunications Law was enacted for liberalization of telecommunications sector. Then, Telenor and Ooredoo were awarded the telecom operator licenses in 2014 and the State-owned telecom operator MPT was restructured as a joint operation with KDDI and Sumitomo Corporation from Japan in 2015, and currently the status is in progress of corporatization. In 2017, the fourth operator Mytel was granted the telecom operator license. To date, there are four telecom operators providing mobile phone services, internet and VAS across the country. A strong competition among the four operators brings cheaper rates and better services to subscribers. It has resulted in increasing of mobile SIM cards subscription up to 91.40 million as shown in Figure (3.1). Posts and Telecommunications Department has been awarding the Network Facilities Service license, Network Service License and Application Service License to internet service

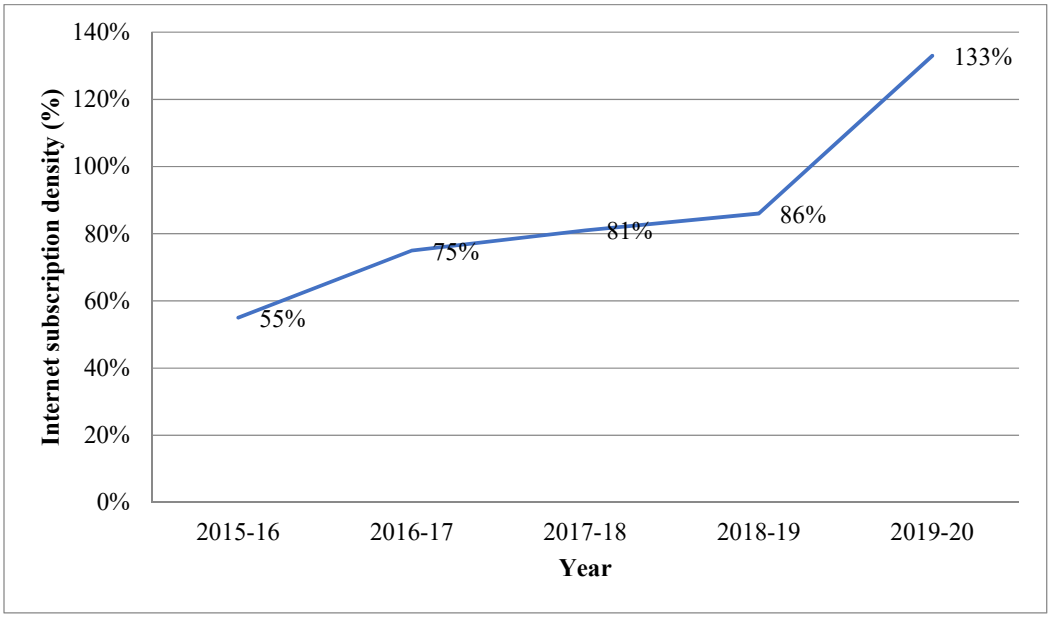
providers and ICT companies since 2015. Then, the subscribers have many choices with various internet services and speed as they like, and the density of internet subscription increased up to 133% in 2019-20 as shown in Figure (3.2).

Figure (3.1) Increasing of Mobile SIM cards subscription (2015-2020)



Source: MOTC (2020)

Figure (3.2) Increasing of Internet subscription density in Myanmar (2015-2020)



Source: MOTC (2020)

3.2 Focal Ministry and Department for E-Government Implementation in Myanmar

Ministry of Transport and Communications (MOTC) was formed according to the order No. (3/2016), issued by the President's Office on March 30, 2016. The Ministry of Transport and Communications is the focal ministry to develop the ICT sector and lead the E-Government implementation in Myanmar. MOTC's tasks include constructing infrastructures and developing human resources in line with standardizations of International Telecommunication Union (ITU) and Universal Postal Union (UPU) for improvement in ICT sector, accelerating E-Government implementation progress, modernizing postal services, enhancing telecom services in line with international standards, and deploying ICT services nationwide and provide the services at affordable rates.

MOTC consists of totally 18 departments. There are 14 departments, responsible for transport sector and the following 4 departments are mainly responsible for ICT sector.

(1) Posts and Telecommunications Department (PTD)

(2) Information Technology and Cyber Security Department (ITCSD)

(3) Myanma Posts and Telecommunications (MPT)

(4) Myanmar Posts (MP)

Among them, the Information Technology and Cyber Security Department was established on April 1, 2015. The department is composed with the following (6) divisions with aims to implement E-Government initiatives of the various government agencies by means of efficient integration, to establish the new projects by studying, preparing and drafting the new processes, to define the standardization of ICT and draft cyber laws, to cooperate with law enforcement organizations to track and trace cybercrimes by monitoring, analyzing and preventing the cyber threats.

(1) Admin/Finance/Supply Division

(2) E-Government Division

(3) Legal/International/Information Division

(4) National Cyber Security Center

(5) Satellite Communications Division

(6) Information Technology and Cyber Security Training Center

ITCSD also strives to enter into agreements with international satellite operators to hire satellite channel bandwidths for government ministries, media and telecom companies include efforts to launch a State-owned satellite named MyanmarSat-2, in collaboration with Intelsat Global Sales & Marketing Limited from United States. It can enhance to provide high-quality satellite channel bandwidths for E-Government, health, education, border security & immigration, disaster management & response, rescue, environmental conservation, meteorological services, telecom & IT, media, oil & gas, agriculture and fisheries sectors respectively.

3.3 Myanmar Computer Federation

Myanmar Computer Federation (MCF) was established in 1998 by the promulgation of "Computer Science Development Law" which was enacted in 1996, with the objective to contribute towards the emergence of a modern developed State through ICT. MCF is an ICT organization from private sector which represents ICT companies and professionals as well as the umbrella organization of all official ICT-related associations and working groups in Myanmar. Under MCF, there are two main associations, Myanmar Computer Industry Association (MCIA) and Myanmar Computer Professionals Association (MCPA). MCIA and MCPA consist of State and Region level associations which represent local and foreign ICT companies, ICT-related services, and ICT professionals. In order to implement the E-Government transition successfully, an effective collaboration mechanism between Public Sector and Private Sector is necessary. MCF is a key stakeholder in the ICT industry and plays a vital role in collaboration with respective government agencies, provides advisory capacity for E-Government initiatives while make an effort to develop the whole ICT Industry in Myanmar.

MCF works closely with the Myanmar Computer Science Development Council and MOTC as the private sector representing organization, and actively involves in E-Government activities such as organizing E-Government conferences, forums, workshops, seminars and exhibitions, drafting the ICT Master Plans and the e-Governance Master Plan, providing advisory services in E-Government committee

meetings, and organizing Myanmar Unicode Migration launch and awareness raising campaigns. Some Executive Committee members of MCF routinely serve in the eGSC, eGIC and the subcommittees, and strive to improve E-Government initiatives and Human Resource Development for ICT industry in Myanmar.

MCF has awarded educational institutions or students for their excellence in utilization of ICT. Technical seminars & workshops, and corporate trainings for executives have been organized by MCF and its associations. MCF organizes hundreds of training courses, which are delivered by foreign and local teachers. MCF and its affiliated associations dispatch several professionals and executives to overseas trainings through scholarship programmes offered by foreign governments and organizations. The Associations have awarded local scholarships to the university students with computer and ICT specialized subjects. MCF is a member of ASOCIO (Asian-Oceanian Computing Industry Organization) and closely collaborates with reputable ICT organizations from Japan, Malaysia, India, Korea and Singapore. MCF dispatched over 600 students to overseas scholarship programmes and trained over 8,000 participants through 162 IT courses in Myanmar.

3.4 Ongoing E-Government Projects

Since MOTC is the focal ministry, responsible for E-Government development in Myanmar, the E-Government Division of ITCSD strives for successful implementation and improvement of E-Government system. The E-Government Division carries out necessary E-Government tasks for other government agencies include (1) construction of ICT infrastructures such as Network, Data Centers, IACs (2) providing common applications such as e-mail, EDMS, GPMS (3) support technical assistance, advisory services, capacity building services (4) in collaboration with international organizations for E-Government development, and (5) review and evaluation of E-Government tasks implemented by other government agencies.

MOTC set up a Video Conferencing System/Network to facilitate online meetings between government departments in Nay Pyi Taw and government agencies in the State and Region, and undertake maintenance works. The ministry provides dedicated video conference rooms, Point to Multi Point Conferencing connection, and

technical support. Server co-location services are provided at the E-Government Data Center located in the S12 Exchange Building for E-Government common applications services delivery. Web Hosting Services are provided with an aim to reduce the use of Hardware and to utilize advanced technologies such as Cloud, VM. Myanmar – Korea Information Access Center was established in Nay Pyi Taw with the aid of Korea, to raise ICT awareness of the citizens. The IAC is utilized for ICT & E-Government trainings and provided free of charge internet access service for people.

The construction of E-Government Integrated Data Center (e-GIDC) which is the first National Data Center to be shared by all government departments, is under way. It is being implemented with a USD 104.25 million loan from the Economic Development Cooperation Fund (EDCF). The main building of e-GIDC will be constructed in Nay Pyi Taw and the Disaster Recovery Center will be constructed in Thanlyin, Yangon Region. Once the project is completed, the Data Center can provide Co-location services, Cloud Services, Government Service Network, and Disaster Recovery Services to all government agencies. The e-GIDC project is aimed to reduce duplication in ICT investment for data centers across government organizations, to improve information security & efficient management of data, to promote easy access of data sharing among the central and regional governments, and to enhance public services delivery in line with the e-Governance Master Plan.

The Division also manages the common applications for government agencies include Government Personnel Management System (GPMS), Electronic Document Management System (EDMS), e-mail services, e-Meeting, Web Hosting service, Civil Service ID Management System (CSMS), E-Government Service Delivery Unit formation project, and Myanmar National Portal (www.myanmar.gov.mm). Myanmar National Portal was launched in 2018 to deliver easy, fast, and effective Single Window Public Services for Myanmar People.

The E-Government Division and the NCSC draft a Cyber Law and related policies in order to develop E-Government, e-commerce, and cyber security in Myanmar. Also, the Division makes an effort to formulate the Myanmar E-Governance Master Plan (2021 – 2030). Drafting an e-commerce law is also under way with the collaboration of Ministry of Commerce. The Division formulates the Consolidated Strategy on the Fourth Industrial Revolution (4IR) for ASEAN, with other ASEAN counterparts.

The Ministry of Labor, Immigration and Population and Austria's OeSD Company are working together to sign an agreement under the Government to Government (G2G) collaboration to implement the e-ID system, which is essential to E-Government. The GOM tries to replace the existing paper National Registration Cards with chip included smartcards detailing personal information of the holder such as photograph, address, employment, blood type, eye scan and finger print. The e-ID system is also listed in the 12- point Economic Policy, together with the E-Government system. The system can enhance supporting Rule of law and National Security, citizenship identifying, taking population census, and sharing the people's biographic and biometric data for governmental procedures and public services delivery among the central government and regional governments.

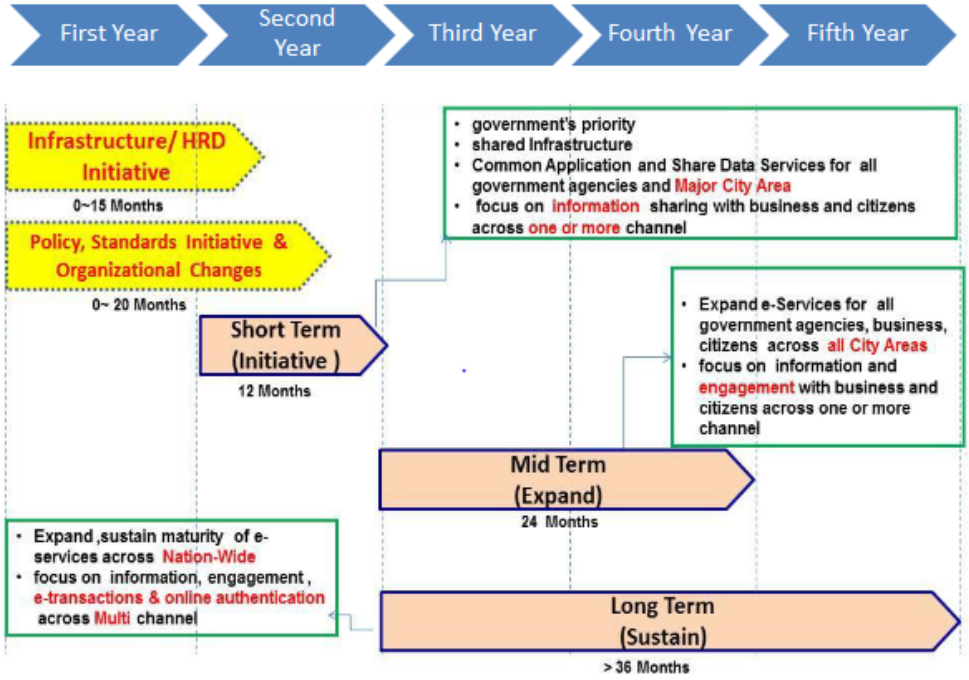
3.4.1 The E-Governance Master Plan (2016-2020)

The e-Governance Master Plan was initially developed in 2014 with the support of ADB, to formulate short/long-term projects, strategies and policies, objectives/goals to be followed and implemented by government organizations for successful implementation of E-Government system in line with the 12-point Economic Policy. The draft plan was finished in 2015. In 2016, the Master Plan was revised and completed by the cooperation of international consultants and the responsible officials from Information Technology and Cyber Security Department of MOTC, in compliance with the current situation in Myanmar.

In the Master Plan, the important points are formulated to set up and implement the E-Government activities such as organizational structures, strategies and laws, policies and Guidelines, the Roadmap, E-Government Conceptual Architecture Framework, projects to be implemented at initial phase, and short-term, middle-term and long-term projects to be implemented for the five years period 2016 - 2020.

As shown in Figure (3.3), the short-term projects of the Master Plan include strategies and policies aiming for positive impacts on the Government's procedures, better dealing with public, and more transparency in business and investments. In the middle-term projects, online interactive communication procedures between government and private sector are included. The long-term projects include procedures allowing citizen users to connect each other online.

Figure (3.3) The recommended Roadmap for E-Government implementation in Myanmar



Source: Myanmar e-Governance Master Plan (2016-2020)

3.5 ICT HRD for E-Government Implementation in Myanmar

In order to boost the modernization of the nation and the socio-economic improvement of Myanmar people, development of ICT infrastructure is especially important as well as a driving force to reduce the digital divide. There are no proper organizational structures for ICT departments in government agencies to support the Chief Information Officers (CIOs) who are in charge for E-Government tasks. As a result, lack of E-Government workforce in government agencies and capacity building for human resource is currently critical. Generally, union ministries and regional governments have a small number of staff, works on handling ICT functions on a part-time basis, in addition to their regular operational responsibilities.

Technological Universities, Computer Universities and IT Universities are main sources to provide advanced-ICT education and produce talents for ICT industry in Myanmar. But the graduates from those universities are not incentivized to join government services and contribute towards E-Government initiatives. Skilled and experienced manpower at various levels are in significant shortage of supply in the government sector. Ministries have limited ICT-skilled staff and the E-Government

departments also lack adequately provisioned staff. Implementing a large E-Government project requires availability and access to create a pool of people skilled in implementing ICT systems, and a large number of graduates with basic ICT degrees.

3.5.1 Information Technology and Cyber Security Training Center

In order to meet the ICT skilled-manpower requirements of the government departments, the Information Technology and Cyber Security Training Center (ITCSTC) was formed in 2015 with the establishment of ITCSD, as per MOTC's notification No. (9/2015). The ITCSTC is located in Nay Pyi Taw and it is the one out of six divisions in ITCSD, and plays a vital role in ICT Human Resource Development (HRD) for successful E-Government implementation in Myanmar. The ITCSTC took over the E-learning Center I and II from Myanma Posts and Telecommunications (MPT). Then, the training center has been providing E-Government, cyber security and ICT trainings to the civil servants including CIO/ACIO from union ministries and government agencies since 2016.

The ITCSTC carries out ICT HRD schemes in line with MOTC's ICT sector policies include planning and execution to continuously nurture the Chief Information Officer (CIO), Assistant Chief Information Officer (ACIO), Chief Information Security Officer (CISO), and IT technicians. It provides technical and management trainings in compliance with the objectives of ITCSD, and conducts research. It organizes local and overseas trainings to generate qualified ICT trainers, and collaborate across the government agencies. The training center also organizes trainings, workshops, seminars, and forums in collaboration with local and foreign ICT organizations.

Currently, there are 9 officers and 38 staff, led by a director in ITCSTC. The ITCSTC provides 29 courses include Basic IT, Networking, Programming, Server & Applications, Cyber Security, E-Government, English and other ICT trainings regularly to government officials and staff from various ministries as shown in Table (3.1). The courses are designed to facilitate the ICT skill requirements of civil servants. The training center also extends HRD activities by coordinating with the E-Government HRD Subcommittee to deliver the basic ICT trainings in States and Regions for government employees. As shown in Table (3.2), the ITCSTC has trained

total 3014 government employees since 2016 – 2017 academic year and the number of trainees increased year by year. But in 2019 – 2020 academic year, the number of trainings and trainees has decreased due to impacts of COVID-19 pandemic.

Table (3.1) Training courses delivered by ITCSTC

Training Programme	Course
Basic IT	Computer Basic and Microsoft Office Word 2007 Computer Repair and Maintenance Microsoft Office Excel 2007 Microsoft Office Word 2010 Microsoft Office Excel 2010 Microsoft Office PowerPoint 2010 Microsoft Office 365 Administrator Training
Networking	Basic Networking Networking Course Level-I Wireless LAN Networking Course Level- II
Programming	Web Design HTML5 & CSS3 Responsive Web Design & JavaScript Java Programming Fundamental MySQL Database
Server and Application	Linux Foundation Course Linux System Administration Window Server Administration – I
Cyber Security	Web Application Security for Beginners Securing Network Using Wireshark Information Security Management Training Incident Handling & CSIRT Management Course
E-Government	Authentication and Digital Signature
Office training	English Language
Other	VMWare Training Data Analytics & Business Intelligence Reporting for Management Essential Infrastructure Configuration for E-Government How to effectively work from home using Google tools Project Planning and Management

Source: ITCSTC website (2020)

Table (3.2) Number of training and trainee in ITCSTC

Academic year	Number of training	Number of trainee
2016-2017	11	309
2017-2018	30	1038
2018-2019	30	1135
2019-2020 (September)	17	532
Total	**88**	**3014**

Source: ITCSTC website (2020)

3.5.2 Ministry of Education

Ministry of Education (MOE) is also important for nurturing qualified ICT Human Capital for Myanmar ICT industry and government agencies. The Ministry is composed of Office of the Union Minister and 11 departments. Among the 11 departments, the Department of Research and Innovation has set up the Information and Communication Technology Research Center (ICTRC) in Yangon, with an aim to provide advanced ICT training programs to produce ICT manpower ready to take on the challenges of ever-changing demands of the ICT industry, and to conduct innovative researches on the application of ICT to address societal and industrial needs. Under management of ICTRC, there are two ICT training centers called India-Myanmar Center for Enhancement of Information Technology Skills (IMCEITS) and Information and Communication Technology Training Institute (ICTTI).

IMCEITS was established on 16th October, 2008 as a joint effort between Government of India and Government of Myanmar. The center was setup with a vision to produce IT manpower ready to take on challenges of ever-changing demands of ICT industry. Center for Development of Advanced Computing (C-DAC) which is the R & D organization of Ministry of Communication & IT, India has provided technical assistance for setting up the center, course design and planning of course delivery. The center is opened to ICT Graduate/Post-Graduate candidates aspiring to join ICT industry as well as government staff from various ministries. There are 10 trainers, led by an associate professor/course director. Training courses are delivered in November and May every year. To date, there are total 5,312 trainees completed the courses, from Batch 1 to 26 in IMCEITS.

ICTTI was established on December 2006 as a joint effort between University of Computer Studies, Yangon (UCSY) and Japan International Cooperation Agency (JICA). The first training course was successfully inaugurated on January 2007 as Technology Transfer Program. ICTTI is opened to ICT Graduate/Post-Graduate candidates aspiring to join ICT industry as well as government staff from various ministries. There are 16 trainers in ICTTI, led by a professor/course director. Training courses are delivered in November and May every year. To date, there are total 6,359 trainees completed the courses, from Batch 1 to 26 in ICTTI.

ICT courses delivered by IMCEITS and ICTTI are shown in Table (3.3).

Table (3.3) Training courses delivered by IMCEITS and ICTTI

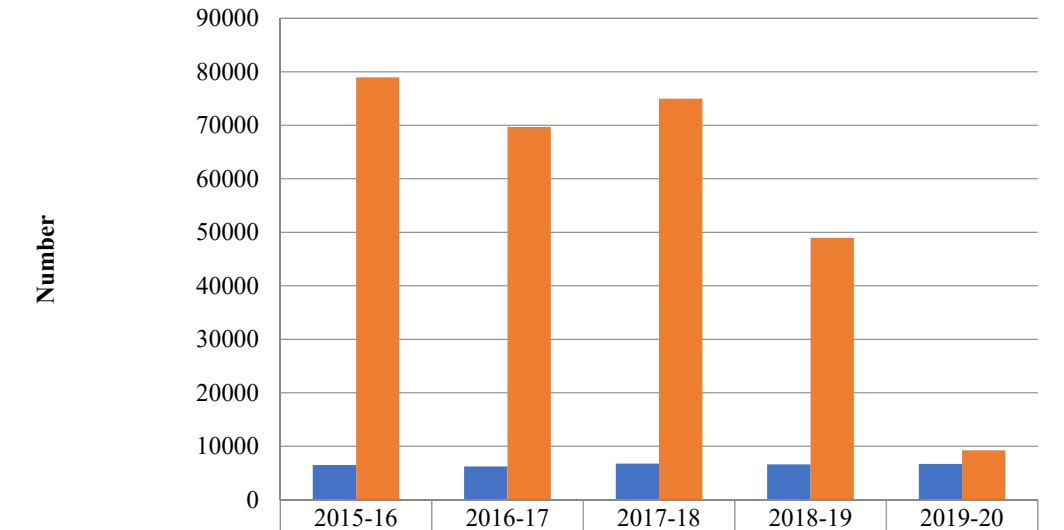
IMCEITS	ICTTI
(1) Professional Diploma in Java Programming.	(1) Professional Diploma in Software Engineering.
(2) Professional Diploma in MS.NET Programming.	(2) Advanced Web Development with Laravel Framework Course.
(3) Professional Diploma in Wireless and Mobile Computing.	(3) Oracle Database 11g Course (SQL, PL/SQL and DBA).
(4) Certificate in Android Application Development.	(4) Professional Diploma in Network Engineering.
(5) Certificate in Linux.	(5) Cisco CCNA: Routing and Switching.
(6) Certificate in Web Technologies.	(6) Advanced Server Course (Virtualization and LDAP).
(7) WinCE.NET Programming.	(7) Project Management Course.
	(8) Mobile Phone System Development Course.

Source: Ministry of Education (2020)

Ministry of Education also strives to facilitate the increasing demand for ICT skilled-workforce by nurturing ICT talents in ICT-specialized universities and technological universities. To date, there are 32 Technological Universities, 26 Computer Universities, and two Information Technology Universities, a total of 60.

The technological, computer and IT universities offer variety of Bachelor, Master and Doctorate degrees specialized in IT and computer technologies yearly. University of Computer Studies, Mandalay offers Master Double Degree Program, in collaboration with University of Miyazaki, Japan. The numbers of teachers and students in all technological, computer and information technology universities are shown in Figure (3.4). The numbers of graduates in these universities are shown in Table (3.4). In 2020, all universities were temporarily closed due to COVID-19 control measures. So, new enrolments could not proceed and there were no graduates as well.

Figure (3.4) Number of teachers and students in all TUs, CUs and ITUs in Myanmar



	2015-16	2016-17	2017-18	2018-19	2019-20
Number of Teachers	6481	6202	6781	6616	6691
Number of Students	78969	69699	74971	48961	9250

Source: Ministry of Education (2020)

Table (3.4) Number of Graduates in all TUs, CUs and ITUs in Myanmar

Degree	2016	2017	2018	2019
Diploma	211	1	79	78
Bachelor	36267	22223	11966	16232
Master	446	550	666	197
Doctorate	146	88	92	63
Total	**37070**	**22862**	**12803**	**16570**

Source: Ministry of Education (2020)

The higher education sector in Myanmar needs quality communication infrastructure to enable universities and research organizations of MOE to meet their networking and internet connection requirements. ICT infrastructure is very important and a driving force to reduce the digital divide, and it is a prerequisite for E-Government, e-commerce, e-education and other fields. Currently, ICT usage of universities is very diverse. Internet connectivity ranges of the universities are from the lowest (2 Mbps) to the highest (350 Mbps) of bandwidth through MPT's fiber internet services. An ICT infrastructure improvement plan for universities called Myanmar Research and Education Network (mmREN) is under way to boost access to high-quality internet and revolutionize the education system. It is to be implemented with the support of MOTC and will link 173 universities across the country, and it will enable high speed dedicated connectivity to the education sector.

3.5.3 E-Government HRD Subcommittee

The E-Government HRD Subcommittee was formed in 2018, along with other seven subcommittees as per notification No. (2/2018) issued by the E-Government Implementation Committee. The subcommittee consists of four members from government departments, and four members from Myanmar Computer Professionals Association (MCPA) and Myanmar Computer Federation (MCF). It has a proportional combination of representatives from public sector and private sector that enhance the efforts on E-Government and ICT Human Resource Development in Myanmar. The Principal of ITCSTC is also a member of the subcommittee. The subcommittee strives to carry out the ICT HRD schemes under guidance of the eGSC and the eGIC. Its functions include providing supportive trainings to all government agencies which implement E-Government schemes and developing ICT curriculum in

line with specified skill framework. The subcommittee's duties and responsibilities include (1) collects evaluation reports during and after the trainings, and awards the certificates, (2) identifies the needs for skill sets for coming years and plans to facilitate the needs, (3) plans to invite foreign trainers for the HRD trainings, in line with the procedures in case if the local trainers have lack of abilities to facilitate the needs for skill sets, (4) develops management and formulates rules when necessary to establish ICT Institutes in partnership with private sector or the Government.

3.5.4 Central Institute of Civil Service (Upper Myanmar) and (Lower Myanmar)

Central Institute of Civil Service (Upper Myanmar) (CICS-UM) and Central Institute of Civil Service (Lower Myanmar) (CICS-LM) provide ICT trainings to civil servants. CICS-LM was established in 1965 with an aim to provide basic level trainings for the civil servants to support good governance and deliver capacity development training programmes for middle level and senior level officers. CICS-UM was established in 1998 with the aim to accelerate providing trainings to civil servants in Upper Myanmar. CICS-LM and CICS-UM deliver the training courses include politics, economics, management and social affairs. Both institutes have 7 academic departments each as listed below.

(1) Department of Management Studies.

(2) Department of Economics.

(3) Department of Political Science.

(4) Department of Social Science.

(5) Department of Law.

(6) Department of Information and Communication Technology (ICT).

(7) Department of English.

Among the mentioned departments, the Departments of Information and Communication Technology in both institutes undertake delivering ICT courses to civil servants to improve their ICT skills as shown in Table (3.5). By means of this method, civil servants can apply ICT in their respective workplaces and get readiness for E-Government related duties.

Table (3.5) ICT courses delivered by CICS-LM and CICS-UM

CICS-LM Department of ICT	CICS-UM Department of ICT
- Introduction to ICT - Computer System - Technology Element - MIL (Mobile Information Literacy) - ICT Strategy - ICT Management - ICT Technology -ICT Strategy & Information Management System - E-Government Trend for Middle Officers - Information Security & Privacy - Introduction to Application - Computer Basic	- Introduction - Computer System - Technology Element - Mobile Information Literacy (MIL) - Basic Theory - Computer Basic - ICT Strategy - ICT Management - ICT Technology - Introduction to Application (MIL & E-Government)

Source: Union Civil Service Board website (2020)

CICS-LM trained 340,099 civil servants from 1965 to 2019 while CICS-UM has trained 156,811 civil servants from 1999 to March, 2020. Then, the regular training programmes were suspended due to the COVID-19 control measures, but CICS-LM resumes delivering some designated trainings to civil servants by online training method.

CHAPTER IV

SURVEY ANALYSIS

In this chapter, two different approaches were used to examine the progress of ICT HRD for E-Government initiatives in Myanmar. The first analysis was assessed through the secondary data from the UN E-Government Survey Reports (2010 – 2020). The second analysis is the empirical study and the primary data was collected from the randomly selected 158 respondents, who are civil servants from 14 union ministries/organizations by using Microsoft Forms online survey questionnaire.

4.1 UN E-Government Survey Report

In the first analysis, E-Government Development Index (EGDI) and E-Government rank of Myanmar was collected from the UN E-Government Survey Reports. The EGDI and E-Government rank of Myanmar were analyzed for the period 2010 – 2020. The EGDI assesses E-Government development of a country at a national level and it is calculated based on three components: Online Service Index (OSI), Telecommunication Infrastructure Index (TII) and Human Capital Index (HCI). In the UN E-Government Surveys, EGDI is used to evaluate the E-Government development of 193 UN member countries and benchmark the E-Government ranking. The important indicators for E-Government development are as shown in Table (4.1).

Table (4.1) Indicators for E-Government development

Indicators	Sub-Indicators
Human Capacity	1. ICT Training
	2. Government Financial Support
	3. Government Training Support
Online Service	1. One-stop Portal
	2. Web-based Service
	3. Reliable Information
	4. Government Financial Support
Technology	1. Computer Equipment
	2. Internet Access
	3. Network Infrastructure
	4. Broadband Access
	5. Fixed Telephone Network
	6. Mobile Telephone Network

Source: Htay (2017)

EGDI and E-Government Ranking of UN member states are mentioned in UN E-Government Survey Reports. E-Government related information is gathered from the member countries through the Member States Questionnaire (MSQ) for the survey. Every E-Government Focal Department of 193 UN member countries are responsible to response the MSQ. United Nations Department of Economic and Social Affairs (UNDESA) is responsible for E-Government affairs of the member states. UNDESA assesses national portals with the assistance of independent researchers to construct OSI, requests data from the International Telecommunications Union (ITU) for TII, and UNESCO for HCI respectively. There is a division under UNDESA, named Division for Public Institutions and Digital Government. The formula for EGDI is as follows.

EGDI = 1/3 (OSI + TII + HCI)

4.1.1 EGDI and E-Government Rank of Myanmar

There are 193 UN member countries including Myanmar. The UNDESA is a part of the UN Secretariat and is a vital interface between global policies in the economic, social and environmental spheres and national action. UNDESA issues the UN E-Government Survey Reports biennially which is included E-Government development status, ranking and EGDI index of the 193 member countries.

Table (4.2) EGDI and E-Government rank of Myanmar by year

Year	EGDI	Change (%)	Rank	Rank change
2010	0.2818	-	141	-
2012	0.2703	-4.08%	160	-19
2014	0.1869	-30.85%	175	-15
2016	0.2362	+26.38%	169	+6
2018	0.3328	+40.90%	157	+12
2020	0.4316	+29.69%	146	+11

Source: UN E-Government Survey Data

As shown in Table (4.2), UN E-Government Survey (2010) ranked Myanmar 141 out of 193 UN member countries with EGDI 0.2818 out of 1.0000, due to the results in establishment of Yatanarpon Teleport which is the first ISP in Myanmar,

and expansion of mobile phone networks. It is found that the EGDI went down to 0.2703 in 2012, and 0.1869 in 2014. Then, EGDI improved to 0.2362 in 2016, 0.3328 in 2018, and 0.4316 in 2020 due to the results in telecom sector privatization, expansion of internet networks and ICT infrastructures, establishment of E-Government initiatives and launching of online services as well as better access to government information. In 2020, Myanmar was ranked 146 out of 193 member countries, with rank change +11.

Table (4.3) OSI, TII and HCI of Myanmar by year

Year	Online Service Index (OSI)	Telecommunication Infrastructure Index (TII)	Human Capital Index (HCI)
2010	0.0825	0.0045	0.7643
2012	0.1046	0.0000	0.7064
2014	0.0236	0.0084	0.5288
2016	0.1594	0.0655	0.4837
2018	0.2292	0.2565	0.5127
2020	0.2588	0.5234	0.5125

Source: UN E-Government Survey Data

As mentioned in Table (4.3), the OSI increased to 0.1046 in 2012 due to launching of E-Government online applications for ministries. In 2014, the TII increased to 0.0084 due to establishment of telecom sector reforms including enactment of the Telecommunications Law (2013), but the E-Government rank did not improve. In 2016, the OSI increased to 0.1594 due to launching of ministry websites and the e-Governance Master Plan, and the TII increased to 0.0655 due to rapidly deployment of telecom infrastructures nationwide by the telecom operators, resulting improved in E-Government rank 169 with rank change +6. In 2018, the OSI increased to 0.2292 due to launching of Myanmar National Portal and Myanmar Companies Online (MyCO) system, and the TII increased to 0.2565 due to expansion of telecom networks and ICT infrastructures, and the HCI increased to 0.5127 due to E-Government related ICT trainings for civil servants, resulting improved in E-Government rank 157 with rank change +12. In 2020, the OSI increased to 0.2588 due to launching of Myanmar Tradenet 2.0 and more government websites for online

services delivery to the public by central and regional governments, also the TII increased to 0.5234 due to improvement in implementation of E-Government projects, and expansion of internet access by ISPs. As a result, the E-Government rank increased to 146 with rank change +11 although the HCI slightly decreased to 0.5125.

4.1.2 Comparative Analysis on Bangladesh, Cambodia, Myanmar and Laos

A comparative analysis has been conducted to compare the EGDI and HCI among Bangladesh, Cambodia, Laos and Myanmar. Bangladesh is bordered by Myanmar and a Lower middle income country, ranked 119 out of 193 UN member countries in 2020. Cambodia is a member of ASEAN and a Lower middle income country, ranked 124 in 2020. Laos is bordered by Myanmar and a Lower middle income country, ranked 167 in 2020. All countries in this comparative analysis are Least Developed Countries (LDC).

Table (4.4) E-Government rank of Bangladesh, Cambodia, Myanmar and Laos

	2010	2012	2014	2016	2018	2020
Bangladesh	134	150	148	124	115	119
Cambodia	140	155	139	158	145	124
Myanmar	141	160	175	169	157	146
Laos	151	153	152	148	162	167

Source: UN E-Government Survey Data

As shown in Table (4.4), in 2010, Myanmar was in position 3 behind Cambodia in position 2 and Bangladesh in position 1 while Laos in position 4. In 2012, Myanmar declined to position 4 behind Cambodia in position 3, Laos in position 2 and Bangladesh in position 1. In 2014, Myanmar was still in position 4 behind Laos in position 3, Bangladesh in position 2 and Cambodia in position 1. In 2016, Myanmar was still in position 4 behind Cambodia in position 3, Laos in position 2 and Bangladesh in position 1. In 2018, Myanmar improved to position 3 behind Cambodia in position 2 and Bangladesh in position 1 while Laos in position 4. In 2020, Myanmar is still in position 3 behind Cambodia in position 2 and Bangladesh in position 1, and Laos is still in position 4. It is found that Bangladesh went down to position 2 only in 2014 and took position 1 in the rest of period.

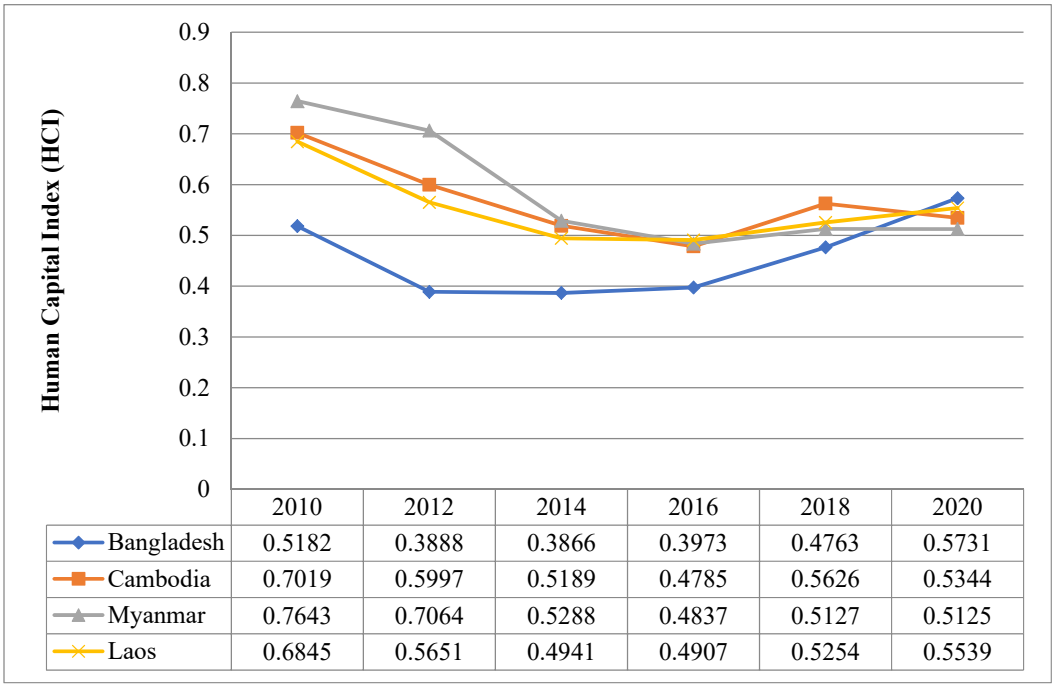
Bangladesh Government launched an E-Government Master Plan in 2019 and has been implementing E-Government projects with the support of KOICA. Bangladesh Government studies Korea's E-Government experiences and adopts the

best practices. E-Government-related legal frameworks, and ICT & E-Government policies are formulated and practiced. Bangladesh Computer Council play a leading role in E-Government implementation. So, Bangladesh gets significant improvement in E-Government ranking.

Cambodian ICT Masterplan 2014-2020 was developed with the support of KOICA. The Telecom ICT Development Policy 2020 was developed by Cambodia Ministry of Education, Youth and Sport. The Cambodia E-government Master Plan (2017-2022) and National ICT Policy were proposed by JICA. Cambodia Government aims to achieve in four main areas of E-Government include (1) empowering people: ICT HRD & E-awareness (2) ensuring connectivity: National ICT Infrastructure, Legal Framework, Cyber Security (3) enhancing capabilities: ICT Industry, Standards, R & D, and (4) enriching e-services. So, it is found that Cambodia gets improvement in E-Government ranking.

National E-Government Action Plan (2006) and E-Government Development Plan (2013-2020) were developed for Laos' E-Government improvement. Laos Government focused on G2G applications from 2013 to 2015, integrated government data into one single service and initiated G2B service applications from 2016 to 2018, fully computerized the administration system and e-services, and initiated G2C service applications from 2019 to 2020. An E-Government Center led by a Director General and two Deputy Director Generals was formed for specific E-Government tasks. There are total 122 government websites include two national portals for public services delivery and better access to government information.

Figure (4.1) HCI of Bangladesh, Cambodia, Myanmar and Laos



	2010	2012	2014	2016	2018	2020
Bangladesh	0.5182	0.3888	0.3866	0.3973	0.4763	0.5731
Cambodia	0.7019	0.5997	0.5189	0.4785	0.5626	0.5344
Myanmar	0.7643	0.7064	0.5288	0.4837	0.5127	0.5125
Laos	0.6845	0.5651	0.4941	0.4907	0.5254	0.5539

Source: UN E-Government Survey Data

As shown in Figure (4.1), in 2010, Myanmar got highest HCI 0.7643 while Cambodia got second, Laos got third and Bangladesh stood in fourth. In 2012, Myanmar's HCI decreased slightly but still in first while Cambodia stood in second, Laos stood in third and Bangladesh got fourth. In 2014, Myanmar's HCI declined significantly but still in first, and the position of Cambodia, Laos and Bangladesh remain unchanged. In 2016, Laos got highest HCI while Myanmar declined to second, Cambodia stood in third and Bangladesh stood in fourth. In 2018, Cambodia took highest HCI and Laos got second, Myanmar declined to third and Bangladesh was still in fourth. In 2020, Bangladesh got highest HCI while Laos got second, Cambodia got third, and Myanmar declined to fourth. According to the data, it is obviously found that Myanmar's position for HCI apparently declined year by year after 2014, unlikely when Myanmar got highest HCI for the period 2010 – 2014.

Bangladesh Government provides budget for E-Government related in-service trainings, overseas trainings, study tour and workshop for government officials. And there are technology transfer programs and involvements of foreign consultants in E-Government projects. Bangladesh Government strives to promote IT education and

computer-aided education at all levels since 2014. That's why, Bangladesh has steadily increased in HCI.

Cambodia government ministries improved their ICT literacy by providing free or subsidized training courses. Cambodia Government promotes the use of ICT in education since 2003. All students in teacher colleges are required to attend ICT courses at least 2 hours per week. Cambodia Government undertakes a wide range of implementation measures to promote ICT HRD include establishing courses for ICT professionals in both public sector and private sector and update the ICT curriculum for training of primary and secondary school teachers.

Laos Government an ICT HR Master Plan for establishing education network and e-learning, higher ICT institutes, and development of ICT professionals. Since 2004, a series of programs for the purpose of ICT HRD has been implementing to upgrade the training courses with the support of India Government.

4.2 Empirical Study

A survey was conducted through email and Microsoft Forms online survey questionnaire to analyze the current status of ICT HRD for E-Government initiatives in government ministries and organizations. The survey was conducted from December, 2020 to January, 2021. The survey data were collected from randomly selected 158 respondents from MOFA, MOPFI, MIFER, MOTC, MOLIP, MOC, MOE, MOEE, MOHS, MOCS, UCSB, NPTC, Yangon Region and Mandalay Region Government Offices. The 158 respondents are assigned for various E-Government tasks in their respective departments.

The survey questionnaire consists of three sections include (1) general information about the respondent and organization (2) ICT skills of the respondent and method of ICT trainings, and (3) respondent's level of satisfaction with ICT trainings.

4.2.1 Positions of the respondents

The positions of the 158 respondents are categorized into six levels: Deputy General Manager/Director, Assistant General Manager/Deputy Director, Manager/Assistant Director, Assistant Manager/Staff Officer, Supervisor/Deputy Staff Officer and Other rank. The number of respondents and positions are shown in Table (4.5).

Table (4.5) Respondents by position

Position	Number of Respondent	Percentage (%)
Deputy General Manager/Director	11	7
Assistant General Manager/Deputy Director	19	12
Manager/Assistant Director	36	23
Assistant Manager/Staff Officer	27	17
Supervisor/Deputy Staff Officer	39	25
Other rank	26	16
Total	**158**	**100**

Source: Survey Data (2020-2021)

The highest-ranking respondents are Deputy General Manager/Director. They are in-charge of the E-Government teams in their respective departments as well as CIOs who play a vital role for smooth running of E-Government projects. These positions are ranking third in every government department. It is examined that all levels of civil servants include officers, supervisors and other ranked staff are assigned for E-Government tasks.

4.2.2 Education level

The education levels of the 158 respondents are shown in Table (4.6).

Table (4.6) Education level of the respondents

Degree	Number of Respondent	Percentage (%)
Doctorate	5	3
Master's Degree	49	31
Bachelor's Degree	104	66
Total	**158**	**100**

Source: Survey Data (2020-2021)

According to the survey data, it is found that there are respondents with Doctorate degree and Master's degree respectively. Most of the respondents are Bachelor's degree holders.

4.2.3 ICT education background of the respondents

As shown in Table (4.7), the 158 respondents were asked about their ICT education background, to identify their first academic degree is specialized in ICT or not.

Table (4.7) ICT education background of the respondents

Respondent's first academic degree is specialized in ICT	Number of Respondent	Percentage
Yes	103	65
No	55	35
Total	**158**	**100**

Source: Survey Data (2020-2021)

According to the survey data, 65% of the respondents' first academic degrees are specialized in ICT and the rest 35% got non-ICT specialized first academic degrees. There are respondents with non-ICT education background although they have been assigned for E-Government tasks.

4.2.4 Formation of specific teams for E-Government tasks

The 158 respondents were asked about formation of specific teams for E-Government tasks in their respective departments as shown in Table (4.8).

Table (4.8) Formation of specific teams for E-Government tasks

Respondent's department has dedicated E-Government team	Number of Respondent	Percentage
Yes	122	77
No	36	23
Total	**158**	**100**

Source: Survey Data (2020-2021)

According to the survey data, 77% of respondents answered that their departments have dedicated E-Government team and 23% of respondents answered that they have no dedicated E-Government team in their departments. There are still government departments with no specific teams for E-Government tasks even though the GOM has been implementing E-Government initiatives at national level.

4.2.5 Level of ICT skills of the respondents

In the survey, the 158 respondents were asked to access their level of ICT skills as shown in Table (4.9).

Table (4.9) Respondent's level of ICT skills

ICT Skill	Poor	Fair	Intermediate	Very Good	Excellent	Mean
Microsoft 365	0	25%	37.5%	25%	12.5%	3.25
Internet browsing, E-mail	0	0	37.5%	37.5%	25%	3.88
Google applications	0	12.5%	62.5%	12.5%	12.5%	3.25
Online meeting/event platforms	0	25%	50%	12.5%	12.5%	3.13
Networking	0	37.5%	50%	12.5%	0	2.75
Programming	50%	37.5%	12.5%	0	0	1.63
Server and application	25%	37.5%	37.5%	0	0	2.13
Cyber Security	37.5%	25%	37.5%	0	0	2.00
E-Government applications	12.5%	25%	37.5%	25%	0	2.75
Cloud computing	37.5%	50%	12.5%	0	0	1.75
Hardware installation and maintenance	25%	37.5%	12.5%	25%	0	2.38
IT Project Management	37.5%	0	37.5%	25%	0	2.50
Adobe Software's	37.5%	25%	12.5%	25%	0	2.25
Facebook, Messaging Apps	0	25%	25%	25%	25%	3.50
Website design and development	50%	25%	12.5%	12.5%	0	1.88

Source: Survey Data (2020-2021)

According to the data, the respondents have most excellent skills in internet browsing and E-mail. The respondents also have excellent skills in Facebook & Messaging Apps, Microsoft 365, Google applications and Online meeting/event

platforms. The respondents are weakest in Programming, and also weak in Website design and development, and Cloud Computing.

4.2.6 Method of Training

The 158 respondents were asked about the method of training what they feel most effective as shown in Table (4.10).

Table (4.10) Method of training which the respondents feel most effective

Method of training	Not at all effective	Not so effective	Effective	Very Effective	Mean
Scholarship programmes	0	25	63	13	2.88
Training in partnership with ICT companies/foreign organizations	0	25	75	0	2.76
Seminar/workshop	0	45	55	0	2.55
Private ICT schools	0	25	75	0	2.76
Online learning system	0	52	48	0	2.48
Training in e-government training center	0	25	75	0	2.76
Training in your department/ministry	0	13	75	13	3.01

Source: Survey Data (2020-2021)

The respondents feel Training in their department/ministry is most effective for them to learn ICT courses. The respondents feel Scholarship programmes are second most effective. The respondents feel Online learning system is least effective due to different status of internet access, electric supply and ICT facilities among States and Regions.

4.2.7 Acceptable quality and quantity of existing E-Government trainings

In this survey, the 158 respondents were asked about acceptable quality and quantity of existing E-Government trainings, as shown in Table (4.11).

Table (4.11) Adequacy of existing E-Government trainings

Existing E-Government trainings are adequate	Number of Respondent	Percentage
Yes	38	24
No	120	76
Total	**158**	**100**

Source: Survey Data (2020-2021)

The survey data shows that 76% of the 158 respondents answered existing E-Government trainings are not adequate and 24% expressed that the trainings are adequate. It is analyzed that there are requirements in quality and quantity of existing E-Government trainings due to the responses of most of the respondents.

4.2.8 Level of satisfaction

The 158 respondents were asked about their level of satisfaction with E-Government trainings which they attended. It is shown in the Table (4.12).

Table (4.12) Respondent's level of satisfaction with the E-Government trainings

The statements that expressed the respondent's experience with the trainings which they attended	1	2	3	4	5	Mean
Course contents	0	38	63	0	0	2.63
Library service	13	25	63	0	0	2.50
Training schedule is convenient	0	13	88	0	0	2.88
Knowledge you gained throughout the training can be applied at your work	0	25	63	13	0	2.88
Training outcomes meet your expectation	0	25	63	13	0	2.88
Curricula are updated	0	50	25	25	0	2.75
Provided computer & ICT peripherals	0	25	50	25	0	3.00
Training materials	0	25	63	13	0	2.88
Skill and responsiveness of the instructor	0	0	75	25	0	3.25
Classroom facilities	13	13	50	25	0	2.88
Internet connection	0	13	25	63	0	3.50

Source: Survey Data (2020-2021)

The respondents are most satisfied with Internet connection. In second, they are satisfied with Skill and responsiveness of the instructor. In third, the respondents are satisfied with Provided computer & ICT peripherals. They are least satisfied with Library service and Curricula update.

CHAPTER V

CONCLUSION

E-Government shapes enormous potentials for improving the internal efficiency of the public sector and the delivery of public services to citizens. The availability of an ICT-skilled workforce is essential for successful implementation of E-Government. In Myanmar, there are limitations and difficulties in an effort to achieve improvements in ICT HRD. This chapter presents the findings and recommendations for ICT HRD in Myanmar's E-Government initiatives based on the secondary data from UN E-Government Survey Reports and the primary data collected from an online survey questionnaire sent to the 158 respondents.

5.1 Findings

Due to positive impacts of liberalization in telecom sector, the subscription of internet and mobile phone is increasing across the country. Since 2013, because of telecommunication sector privatization efforts, there are four telecom operators and mobile SIM cards subscription has reached up to 91.4 million in Myanmar. Also, internet subscription density has reached up to 133%. Myanmar National Portal, a single window to access information about Myanmar, was launched in 2018. And MyCO, Myanmar Company Electronic Registry System was launched also in 2018. Myanmar Tradenet 2.0, the online trade licensing system was launched in November, 2020. So, Myanmar has improved in TII and OSI because of the developments in telecom and IT infrastructure, and online services.

ICT-skilled professionals are nurtured through formal education and various training programmes. Technical Universities and Computer Universities under Ministry of Education are major sources to facilitate the demands for ICT technicians in public sector. The e-Governance Master Plan is the only policy framework which provides the strategic plan and roadmap for E-Government implementation in Myanmar. There is no legal framework or specific law for E-Government yet. ITCSTC is the main training center to deliver E-Government related ICT trainings to civil servants, there are still requirements to upgrade training facilities, equipment and organization structure. The E-Government HRD Subcommittee is most responsible for ICT HRD improvement in Myanmar's E-Government initiatives. The members of E-Government HRD Subcommittee are government officials and executive committee

members of MCF and MCPA. So, they have difficulties and limitations to fully emphasize on the Subcommittee's works. The E-Government Division of ITCSD is most responsible for E-Government development in Myanmar, and led by a Director level officer. It has limitations in organization structure and decision making as well as coordination with top level management from other government departments. CICS-LM and CICS-UM provide ICT courses for civil servants. But there are requirements in number of intake and update on the curriculum. IMCEITS and ICTTI also provide ICT courses. But the location of training centers and training schedules are not convenient for civil servants.

Myanmar was in Middle EGDI (MEGDI) Group with EGDI 0.2818 in 2010, EGDI 0.2703 in 2012, EGDI 0.3328 in 2018 and EGDI 0.4316 in 2020 respectively. But it is found that Myanmar was in Low EGDI (LEGDI) Group with EGDI 0.1869 in 2014 and EGDI 0.2362 in 2016.

It is identified that Bangladesh, Cambodia and Laos have specific E-Government Master Plan, ICT HRD Master Plan, Legal frameworks and organization structure for E-Government related ICT HRD. These three countries have implemented the E-Government initiatives in collaboration with foreign countries which have achieved high E-Government ranking and EGDI. The three countries have clear objectives, specific organization structure and priorities for ICT HRD.

Deputy General Manager/Director level officers are assigned as the CIOs for E-Government projects implementation. They are ranking third in their respective departments. E-Government teams consist of civil servants with various positions, from third level officers to other ranked staff. The highest education level of respondents is Doctorate Degree. Most of the respondents are Bachelor's Degree holders and Master's Degree holders are also included. Respondents with advanced academic degrees consists in E-Government teams. There are respondents with non-ICT education background, but most of the respondents' first academic degrees are specialized in ICT. It is found that there are non-ICT graduates in E-Government teams. Although E-Government initiatives have been implemented at a national level, there are still departments with no dedicated E-Government teams.

Regarding the quality and quantity of existing E-Government trainings, 76% of the respondents expressed that it is inadequate based on their experiences with

previous trainings. It is required to update the curricula and upgrade the training facilities. The respondents prefer to attend ICT trainings in their departments.

5.2 Recommendations

It is necessary to formulate a specific ICT HRD policy framework, regulatory framework and institutional framework as well as a robust coordination mechanism among stakeholders, with the support of effective leadership from top level government officials. Major ICT HRD strategies shall be set up, include expansion of ICT training centers for civil servants nationwide, nurturing well-qualified ICT trainers through TOT and capacity building schemes, collaboration with international ICT organizations for training curriculums updates, start teaching ICT subjects from primary education and onwards, and upgrading necessary ICT infrastructures and training facilities in computer universities, technological universities and IT universities.

Since the E-Government HRD Subcommittee was formed with an aim to focus on nurturing qualified ICT workforce for E-Government initiatives, it shall work more actively in strategic planning, organizing, implementing, monitoring and evaluation process for the E-Government HRD activities of all government agencies. The ITCSTC shall be upgraded to National E-Government Training Center, in collaboration with local and international organizations. It should be led by a Director General level officer and should have empowerment for all ICT-HRD related efforts in Myanmar. Internship programmes shall be considered to recruit the ICT talents for E-Government projects.

The e-governance Master Plan (2021 – 2030) should be updated in line with current context of the country and fast-moving ICT technologies. In the master plan, a clear and precise guideline for E-Government ICT HRD should be described with details of short-term, mid-term and long-term plans. Meanwhile, the Myanmar Cyber Law (draft) should be completed and enacted, as the legal framework. In the Cyber Law, a specific part for E-Government should be included and followed by associated rules, procedures, notifications and directives from the focal ministry.

Dedicated E-Government Divisions shall be formed in all government departments. The E-Government Divisions shall be led by CIOs who are ICT graduates. The E-Government Division of ITCSD shall be upgraded to a separate E-

Government Department which is led by a Director General level officer. The training contents for CIOs should be included the courses include ICT technology and trends, Roles and responsibilities of CIOs, ICT policies, E-Government concepts, IT project management, knowledge management, Business Process Reengineering, IT laws, outsourcing/acquisition, and information security.

International cooperation and lessons learned from the E-Government HRD experience of EGDI high-ranking countries are imperative in striving to improve Myanmar's E-Government ICT HRD. The E-Government HRD Subcommittee should work closely with UNDESA, ITU, World Bank, ADB, JICA, KOICA, ASOCIO and try to obtain the technical, advisory and financial support for improvement of Myanmar E-Government HRD.

The E-Government HRD Subcommittee, ITCSTC, the E-Government Division of ITCSD, MOE, MCF, CICS-LM and CICS-UM shall set up a coordination mechanism to promote ICT HRD in Myanmar and get readiness for cutting-edge technologies and next level migration of E-Government to Digital Government.

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APPENDIX (I)

E-Government Steering Committee in Myanmar (2018 – 2020)

No.	Title and Ministry/Organization	Position
1	State Counsellor	Patron
2	Vice President (1)	Chairman
3	Union Minister	Vice Chairman (1)
4	Union Minister	Vice Chairman (2)
5	All Union Ministers (Exclude MOUG and MOTC)	Member
6	Union Attorney General	Member
7	Union Auditor General	Member
8	Chairman	Member
9	Chairman	Member
10	All Chief Ministers	Member
11	Governor	Member
12	Deputy Minister	Member
13	Patron, Myanmar Computer Federation (MCF)	Member
14	Deputy Minister	Secretary

Source: Myanmar Gazette (March 30, 2018)

APPENDIX (II)

E-Government Implementation Committee in Myanmar (2018 – 2020)

No.	Title and Ministry/Organization	Position
1	Union Minister, MOUG	Chairman
2	Union Minister, MOTC	Vice Chairman
3	Deputy Minister, MOPO	Member
4	Deputy Minister, MOHA	Member
5	Deputy Minister, MOD	Member
6	Deputy Minister, MOBA	Member
7	Deputy Minister, MOSCO	Member
8	Deputy Minister, MOI	Member
9	Deputy Minister, MOALI	Member
10	Deputy Minister, MOTC	Member
11	Deputy Minister, MOEE	Member
12	Deputy Minister, MOC	Member
13	Deputy Minister, MOE	Member
14	Deputy Ministers, MOPFI	Member
15	Deputy Minister, MOCS	Member
16	Deputy Minister, MOSWRR	Member
17	Deputy Attorney General, OUATG	Member
18	Member, UCSB	Member
19	Member, NPTC	Member
20	Minister, State/Region Governments	Member
21	Deputy Governor, CBM	Member
22	Permanent Secretary, MOUG	Member
23	Permanent Secretary, MOFA	Member
24	Permanent Secretary, MORAC	Member
25	Permanent Secretary, MONREC	Member
26	Permanent Secretary, MOLIP	Member
27	Permanent Secretary, MOHS	Member
28	Permanent Secretary, MOHT	Member
29	Permanent Secretary, OUAG	Member
30	President, MCF	Member
31	Director General of ITCSD, MOTC	Secretary

Source: Myanmar Gazette (March 30, 2018)

APPENDIX (III)

E-Government Human Resource Development Subcommittee (2018 – 2020)

No.	Title and Organization	Position
1	Rector, University of Computer Studies (Mandalay) Ministry of Education	Chairman
2	Director, Office of the Union Minister Ministry of Defence	Member
3	Deputy Director, Admin, HR & Technical Department Ministry of Labour, Immigration and Population	Member
4	Director, ITCSD (Principal of ITCSTC) Ministry of Transport and Communications	Member
5	Vice President Myanmar Computer Professionals Association	Member
6	Secretary Myanmar Computer Professionals Association	Member
7	Executive Committee Member Myanmar Computer Professionals Association	Member
8	Joint Secretary Myanmar Computer Federation	Secretary

Source: Myanmar Gazette (June 12, 2018)

APPENDIX (IV)

Degrees offered by Technological, Computer and IT Universities in Myanmar

Univ.	Bachelor Degree	Master Degree	Ph.D. Degree
MIIT	B.E (Hons.) Computer Science & Engineering B.E (Hons.) Electronics & Communications Engineering	M.E (Computer Science)	
UIT	B.C.Sc. (Software Engineering) B.C.Sc. (Business Information Systems) B.C.Sc. (Knowledge Engineering) B.C.Sc. (High Performance Computing) B.C.Tech. (Embedded Systems) B.C.Tech. (Communication & Networking) B.C.Tech. (Computer Systems)	M.C.Sc. (Software Engineering) M.C.Sc. (Business Information Systems) M.C.Sc. (Knowledge Engineering) M.C.Sc. (High Performance Computing) M.C.Tech. (Embedded Systems) M.C.Tech. (Communication & Networking)	Ph.D. (Information Technology)
YTU	B.E (Information Technology)	M.E (Information Technology)	Ph.D. (Information Technology)
MTU	B.E (Computer Engineering & Information Technology)	M.E (Computer Engineering & Information Technology)	Ph.D. (Computer Engineering & Information Technology)

UT-YCC	B.E (Information Science & Technology) B.E (Computer Engineering)	M.E (Information Science & Technology) M.E (Computer Engineering)	Ph.D. (Information Technology)
UCSY	B.C.Sc. (Knowledge Engineering) B.C.Sc. (Software Engineering) B.C.Sc. (Cyber Security & Forensics) B.C.Sc. (Business Information Systems) B.C.Sc. (High Performance Computing) B.C.Tech. (Embedded Systems) B.C.Tech. (Computer Communication & Networks)	M.C.Sc. (Knowledge Engineering) M.C.Sc. (Software Engineering) M.C.Sc. (Cyber Security & Forensics) M.C.Sc. (Business Information Systems) M.C.Tech. (Embedded Systems) M.C.Tech. (Computer Communication & Networks)	Ph.D. (Information Technology)
UCSM	B.C.Sc. (Software Engineering) B.C.Sc. (Knowledge Engineering) B.C.Sc. (High Performance Computing) B.C.Sc. (Business Information Systems) B.C.Tech. (Computer Communication & Networks) B.C.Tech. (Embedded Systems)	M.C.Sc. (Software Engineering) M.C.Sc. (Knowledge Engineering) M.C.Sc. (High Performance Computing) M.C.Sc. (Business Information Systems) M.C.Tech. (Computer Communication & Networks) M.C.Tech. (Embedded Systems)	Ph.D. (Information Technology)

Source: Ministry of Education (2020)

APPENDIX (V)

E-Government Ranks of Asian Countries (2020)

No.	Country	Rank in Asia	World Rank	EGDI
1	Republic of Korea	1	2	0.9560
2	Singapore	2	11	0.9150
3	Japan	3	14	0.8989
4	United Arab Emirates	4	21	0.8555
5	Kazakhstan	5	29	0.8375
6	Israel	6	30	0.8361
7	Bahrain	7	38	0.8213
8	Saudi Arabia	8	43	0.7991
9	China	9	45	0.7948
10	Kuwait	10	46	0.7913
11	Malaysia	11	47	0.7892
12	Oman	12	50	0.7749
13	Thailand	13	57	0.7565
14	Brunei	14	60	0.7389
15	Qatar	15	66	0.7173
16	Philippines	16	77	0.6892
17	Kyrgyzstan	17	83	0.6749
18	Sri Lanka	18	85	0.6708
19	Vietnam	19	86	0.6667
20	Uzbekistan	20	87	0.6665
21	Indonesia	21	88	0.6612
22	Iran	22	89	0.6593
23	Mongolia	23	92	0.6497
24	India	24	100	0.5964
25	Bhutan	25	103	0.5777
26	Maldives	26	105	0.5740
27	Jordan	27	117	0.5309
28	Bangladesh	28	119	0.5189
29	Cambodia	29	124	0.5113
30	Lebanon	30	127	0.4955
31	Syria	31	131	0.4763
32	Nepal	32	132	0.4699
33	Tajikistan	33	133	0.4649
34	Timor-Leste	34	134	0.4649
35	Iraq	35	143	0.4360
36	Myanmar	36	146	0.4316
37	Pakistan	37	153	0.4183
38	Turkmenistan	38	158	0.4034
39	Laos	39	167	0.3288
40	Afghanistan	40	169	0.3203
41	Yemen	41	173	0.3045
42	North Korea	42	187	0.2235

Source: UN E-Government Survey Report (2020)

APPENDIX (VI)

Survey Questionnaire

A Study on the role of ICT HRD in Myanmar's E-Government initiatives

Section I

This part contains questions concerning general information about the respondent and organization.

1. Position

2. Highest Education level

- Doctorate
- Master's Degree
- Bachelor's Degree

3. Your first academic degree is specialization in ICT?

- Yes
- No

4. Does your department have a dedicated E-Government team?

- Yes
- No

Section II

This part contains questions concerning ICT skills of the respondent and ICT trainings.

5. Please indicate your level of ICT skill in the following statements.

ICT Skill	Poor	Fair	Intermediate	Very good	Excellent
Microsoft 365					
Internet browsing, E-mail					
Google applications					
Online meeting & event platforms					
Networking					
Programming					
Server & Application					
Cyber Security					
E-Government applications					
Cloud computing					
Hardware installation & maintenance					
IT Project Management					
Adobe Softwares					
Facebook, Messaging Apps					
Website design and development					

6. Please rate the method of training you feel would be most effective to improve your ICT skills.

	Not at all effective	Not so effective	Effective	Very effective
Training in your department/ministry				
Training in an E-Government training center in other ministry				
Online learning system				
Private ICT schools				
Seminar/Workshop				
Training in partnership with ICT companies/foreign organizations				
Scholarship programmes				

Section III

This part contains questions related to the level of satisfaction based on the respondent's experience with ICT trainings.

7. Do you think the existing E-Government related ICT trainings for civil servants are adequate?

- Yes
- No

8. Please rate your level of satisfaction based on your experience with the E-Government related trainings you have attended. Choose the appropriate number to show your level of satisfaction for each statement. If you are NOT satisfied, choose number 1. If you are VERY satisfied, choose number 5.

	1	2	3	4	5
Internet connection					
Classroom facilities					
Skill and responsiveness of the instructor					
Training materials					
Provided computer & ICT peripherals					
Curricula are updated					
Training outcomes meet your expectation					
Knowledge you gained throughout the training can be applied at your work					
Training schedule is convenient					
Library service					
Course contents					