Study on Subnational Governance E-system Mapping in Provincial and Local Government Institutions in Sri Lanka

Funded by European Union

UNDP

STRIDE | CDLG Capacity Development of Local Governments

Supported By: EML Consultants

This report is part of an initiative supported under the Capacity Development of Local Governments (CDLG) project implemented by the United Nations Development Programme (UNDP) in Sri Lanka with the financial assistance of the European Union (EU).

CDLG is a four-year project (2020-2023) targeting the Eastern, Northern, North-Central and Uva Provinces of Sri Lanka. It is part of the European Union's STRIDE (Strengthening Transformation, Reconciliation and Inclusive Democratic Engagement) programme focused on strengthening the capacities of local government authorities to be inclusive, responsive and accountable, and improve service delivery.

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PREFACE

This report is part of an initiative supported under the Capacity Development of Local Governments (CDLG) project implemented by the United Nations Development Programme (UNDP) in Sri Lanka with the financial assistance of the European Union (EU).

CDLG is a four-year project (2020-2023) targeting the Eastern, Northern, North-Central, and Uva Provinces of Sri Lanka. It is part of the European Union's STRIDE (Strengthening Transformation, Reconciliation, and Inclusive Democratic Engagement) programme focused on strengthening the capacities of local government authorities to be inclusive, responsive, and accountable, and to improve service delivery. Supported by development partners including the European Union, the World Bank, and the British Council, CDLG aims to strengthen the decentralization process and the local governance system in Sri Lanka. The project envisions making local governments "fit for future" by not only improving efficiencies through digital solutions but also about enhancing downward accountability of elected officials and local governments, as well as establishing the mechanisms for public engagement in local decision-making processes. The project will provide catalytic support to strengthen the role of local government in harnessing digital transformation and promoting sustainable and resilient development in the coming years.

In line with the national policy framework, 'Vistas of Prosperity and Splendour' (2019), digitalization of services is viewed as imperative to ensure citizen centric and efficient public service delivery. The disruption to business continuity of the public sector during the COVID19 further underscored the need for more responsive, adept and digital governance. Although previous administrations have taken steps towards digital systems to improve efficiency in public administration through development of different digital solutions to facilitate provincial and local administration, there is significant duplication of services and a lack of an integrated, cohesive and mainstreamed approach to the digital transformation of the public sector. As the country moves forward with its digital transformation, mapping different e-systems and their user-friendliness (from the perspective of both civil servant/providers and users/public) is imperative to assessing current capabilities and gaps in e-local governance.

To that end, UNDP supported the implementation of an island- wide wider systems mapping to take stock of different systems at sub-national level and identify best practices and gaps in enabling digital transformation of the subnational governments. The scope of the present study included a mapping of the different e-systems available at the sub-national level for providing government-to-citizen, government-to-business, and government-to-government services (including information management, payroll front office, revenue systems etc) for 265 out of 341 Local Authorities across 9 provinces i.e. covering 78% of the entire LA network.

The study provided a detailed analysis of the institutional and technical challenges and gaps for adopting the e-Systems at subnational and LA levels; prevailing set-up, usage, efficiency, linkages and benefits of available e-Systems; best practices that would enable access to all, including persons with disabilities, youth, and women; and policy analysis of impediments at the legal and policy level. Leveraging results from the study to drive policy and systems change will help drive progress towards strategic and well informed digitalization of public administration and support to address disparities in the usage of e-Government between national and subnational level. The implementation of suggested improvements to e-systems will go a long way towards facilitating a more active role of local governments in providing public services, revenue generation and resource allocation and ultimately contribute to enhanced economic growth and greater downward accountability to the people.

PROJECT TEAM

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ACRONYMS

ADSL	Asymmetric Digital Subscriber Line
BPR	Business Process Re-engineering
CDLG	Capacity Development of Local Governments
CIGAS	Computerised Integrated Government Accounting System
CINTEC	Computer and Information Technology Council of Sri Lanka
COVID	Corona Virus Disease
CP	Central Province
D.	Department
DE	Department of Education
DL	Department of Land
DLG	Department of Local Government
DMT	Department of Motor Traffic
DR	Department of Revenue
DS	Divisional Secretariat
DOS	Disk Operating System
EP	Eastern Province
eRL	e-Revenue License
eSLIMS	e-State Land Information Management System
FAM	Field Assessment Manager
FGD	Focus Group Discussion
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
ICTA	Information and Communication Technology Agency
IPR	Intellectual Property Rights
ITMIS	Integrated Treasury Management Information System
KII	Key Informant Interview
LA	Local Authority
LAN	Local Area Network
LG	Local Government
LGC	Lanka Government Cloud
LGN	Lanka Government Network
MC	Municipal Council
MCO	Municipal Council Ordinance
MIS	Management Information System
NARESA	Natural Resources, Energy and Science Authority of Sri Lanka

NP	Northern Province
NCP	North Central Province
NVQ	National Vocational Qualification
NWP	North Western Province
PC	Provincial Council
PPS	Provincial Planning Section
PS	Pradeshiya Sabha
PSA	Pradeshiya Sabha Act
SaaS	Software as a Service
SP	Southern Province
SubP	Sabaragamuwa Province
UAT	User Acceptance Testing
UC	Urban Council
UCO	Urban Council Ordinance
UN	United Nations
UNDP	United Nations Development Programme
Uva	Uva Province
VPN	Virtual Private Network
Vs.	Versus
WP	Western Province

CHAPTER 1 : INTRODUCTION

1.1 Background to the study

The role of e-Government as a powerful method and ICT as a powerful tool for delivering citizen services across the sectors across all levels of the government has been recognized by a majority of 21st Century governments. The e-Government has changed the traditional ways of accessing government services by citizens and has drastically improved public administration in most countries. However, there is a big disparity in the magnitude of the usage of e-Government services between countries and between the national and subnational levels. At the sub-national levels, the digital divide is commonly manifested at the lower level of access to e-Government. Inadequate network infrastructure, insufficient content in local languages, affordability, poor awareness, and lack of digital literacy are some of the factors impeding access and use of e-Government, particularly in developing countries. Although accessibility and quick service delivery are key elements to ensure the maximum benefit of e-Government to the citizens, without generating proper awareness, enhancing digital literacy, and making the e-Government services affordable, it would not be possible to achieve the objectives of creating an effective ecosystem at the sub-national level which uses the maximum benefit of the e-Government.

The subnational governance structure in Sri Lanka plays a prime role in the overall governing system of the Country. The duties and responsibilities of Provincial Councils (PCs) have been enshrined by the constitution and they have been institutionalized over the last three decades whilst Local Authorities (LAs) have existed for a longer duration (well over 150 years). The share of the national budget of the subnational governing structures - PCs and LAs for the year 2019 has merely been 25.67%.[1] In addition to the above national budget allocations, both the subnational governing structures incur a considerable share out of their self-generated revenue annually for service delivery within their respective jurisdictions. Thus in 2018 PCs and LAs have contributed 35.8% and 72.5% respectively out of their self-generated revenue towards the service delivery process in their respective areas. (Source; Financial Performance of provincial councils-2018 and Review of Financial Performance of local authorities -2018, Monitoring Division, Ministry of Provincial Councils, Local Government and Sports).

As in many countries, Sri Lankan subnational governance structures are comparatively closer to the citizens. Consequently, service recipients always expect efficient and quality services from respective governing bodies. Majority of services mandated by PCs and LAs still reach the end user through conventional and manual service delivery systems.

During the past two decades, several e-Government applications have been introduced aimed at enhancing service delivery efficiency by both provincial and local governing entities. Some of these e-Government applications are developed by government agencies, and some by private developers within the e-Government policy framework. The improved efficiency and effectiveness of government institutions, and accessibility of government information & service for citizens and other government institutions are specific objectives of the Sri Lanka e-Government Policy (2009). Accordingly, PCs and LGs are in the process of using e-Government applications based on their existing capacity to improve service delivery efficiency.

The functional domain of the subnational governing structures is very extensive and diverse. Therefore, meaningful coverage of provincial and local area functional scope by e-Government applications will be a long process. The Sri Lankan government initiated its ICT process in 1983. Given Sri Lanka's status as a developing nation and the protracted 30+ year civil war, the current level of e-Government development at the national level in Sri Lanka is satisfactory. However, contributions to the subnational governing sector from adapting the e-Government applications have yet to go a long way. This is because it is the closest service delivery entity to the public in terms of payment windows, building permits, licenses, primary utility services, etc. As envisaged

[1] Appropriation Act No. 6 of 2019

in the national e-Government policy framework and the strategies, if well-planned e-Government input is introduced, the efficiency and effectiveness of these aspects will indeed improve considerably.

Therefore, to achieve the objectives of the national e-Government policy framework, the broader involvement in terms of funding, technical support, and human resources development of subnational governing spheres could be considered a prime responsibility of the Government. Through the expansion and upgrading of the role of the Information and Communication Technology Agency (ICTA) to reach provincial & local level governing entities in a sustainable manner, the efficiency and effectiveness of subnational governance could be improved, and services would also be further streamlined.

1.2 Subnational Governance

Subnational government space in Sri Lanka has two tiers namely Provincial Councils and Local Government Authorities. Both tiers have administrative units and elected public representatives. Both these tiers have linkages to the national level administrative units, such that the Ministry and Department of Local Government at Provincial Administration directly support and regulate the Local Government Authorities. (Please refer Annexure 1).

The provincial sphere of governance is comparatively a recent development that came into effect in 1988 with the 13th Amendment to the Constitution as a solution for the long-standing ethnic conflict on the island. Since the independence from British rule in 1948, many attempts have been made to devolve the administrative decision-making process, since the centralized governing model failed to satisfy the aspirations of the cosmopolitan composition of people of the island nation.

A notable feature of this governing sphere is that there is no legal definition of the PC. It is an autonomous body that does not fall under any Ministry. It derives its authority and power from the Constitution and Acts of Parliament. PCs undertake functions and activities in provinces that have previously been dealt with by the Government Ministries, Departments, Corporations, and Statutory Authorities.

The entire Local Government System in Sri Lanka was created by law and exists within a legal framework. It was designed based on the British Local Government System in the latter part of the 19th Century. The structure, form, and constitution of LAs as well as the powers, duties, and functions have been determined by law. LAs are empowered to carry out certain functions and do not have the authority to exercise powers beyond the given scope. LAs are organized as corporate bodies with perpetual succession. These authorities can sue and be sued. They can acquire, hold, or sell properties, enter into agreements, and are free to formulate policies and make by-laws for the administration of affairs entrusted to them by law. There are three types of LAs in the present structure of local government as indicated below:

Municipal Councils	-	24
Urban Councils	-	41
Pradeshiya Sabhas	-	276
	=	341

1.3 Maturity of e-Services Readiness

At the institutional level, the evolvement of e-Systems to their maturity level is a process that involves several steps. Understanding the current state of maturity in delivering e-Services would be beneficial to categorize the institutions functioning under the PCs and the LAs as per the level of maturity that they have achieved.

The readiness of citizens, businesses, and the government for using e-Systems is a significant indicator that reflects the position of the country in harvesting efficiencies gained from e-Systems which enable efficient

and effective public services. As the closest service provider to the citizens and businesses, the provincial and local government institutions, including its human resources and associated infrastructure, should be ready to utilize the benefits and deliver the need-based services.

Based on technical, institutional, and managerial feasibilities, Karen Layne and Jung woo Lee[2] suggests that "e-Systems in the government are an evolutionary phenomenon and therefore e-System initiatives should be accordingly derived and implemented". In this regard, they posit four stages of a growth model for e-Systems and e-Government evolvement: (1) cataloguing, (2) transaction, (3) vertical integration, and (4) horizontal integration. These four stages are explained in terms of complexity involved and different levels of integration as shown in Fig. 1.3-1.

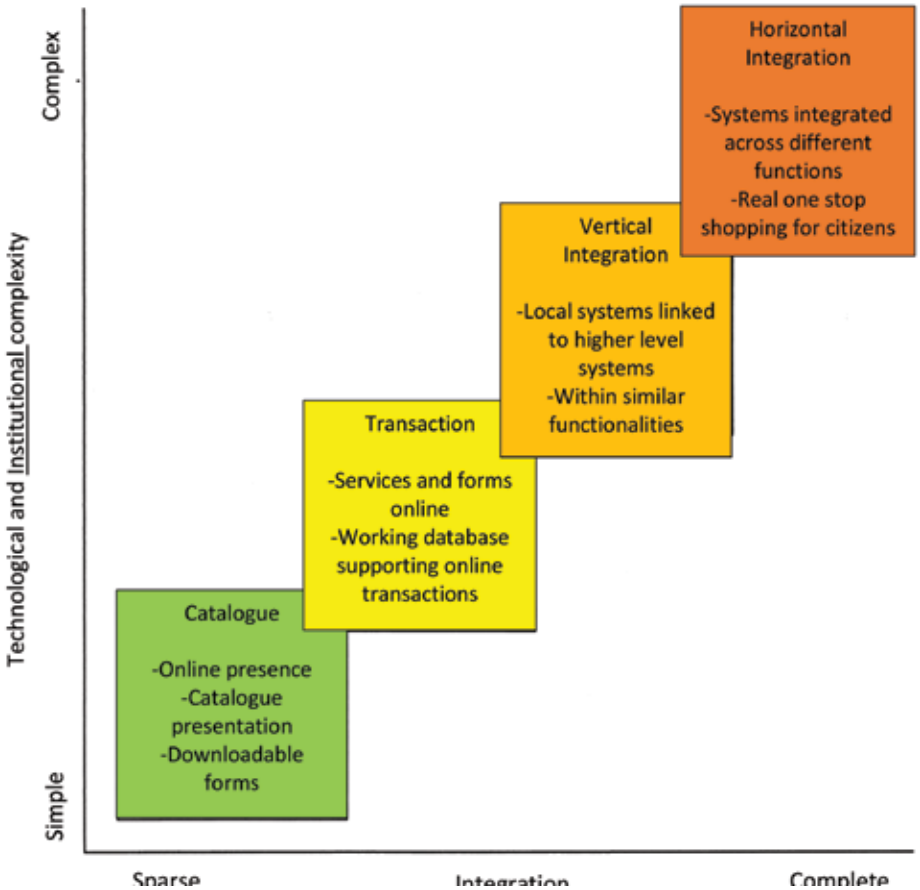

Figure 1.3-1: Systems Evolvement

Nevertheless, the citizens and businesses should reflect their readiness to explore the benefits of ICT and e-Systems and they should also be able to uptake the services delivered by the government. Furthermore, it should be noted that to maximize the impact of e-Systems, affordability and awareness of available services are prerequisites.

(For further details please refer to Annexure 2)

[2] Karen Layne and Jungwoo Lee; "Developing fully functional e-Government: A four stage model" Government Information Quarterly 18 (2001) 122–136

1.4 Measuring e-Government readiness at the national level

The UN e-Government Development Index is an internationally recognized composite index that measures the capacity of governments to develop and implement e-Systems and e-Government services. The index ranges from 0 (low level of readiness) to 1 (high level of readiness).

Constructed within the framework of the UN Global e-Government Survey, the indicator consists of three sub-indexes:

- Online Service Index.
  The Online Service Index ranks countries based on the coverage, sophistication, and availability of e-Services and e-Products. The index categorizes countries as having an emerging, enhanced, interactive, transactional, or networked e-Government presence.
- Telecommunication Infrastructure Index.
  The Telecommunication Infrastructure Index is a weighted average of 5 measures of ICT infrastructure capacity per 100 persons: number of personal computers, number of internet users, number of telephone lines, number of broadband subscriptions, and number of mobile phones.
- Human Capital Index.
  The Human Capital Index is a weighted average of the adult literacy rate (two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (one-third weight).

As per the UN e-Government Development Index, Sri Lanka is placed in 85th place in the e-Participation Index, ranking in 66th place in the year 2020. Sri Lanka ranks the highest in the order of countries in the South Asian region.[3] In terms of the Online Service Index, Telecommunication Infrastructure Index, and Human Capital Index, Sri Lanka has scored 0.7176, 0.5289, and 0.7660 respectively and it demonstrates that Sri Lanka is weak in telecommunication and infrastructure which will have an impact on the implementation of e-Systems at provincial and local government levels.

However, it was noted that in the process of building the overall index, other potentially important aspects of readiness, such as the availability of laws on privacy and data protection and e-Government policy directives have not been considered. The index would be more pragmatic if these aspects also could have been incorporated into the process of constructing the index.

1.5 Global perspective of e-Systems and e-Government at the local level

Due attention has not been afforded to the e-Systems development at provincial and local level administration globally as well as locally. The UN e-Government survey has revealed that proper attention from the government is needed to enhance the e-transformation at the subnational level. UN e-Government report 2020 has highlighted that "e-Government development is a rising priority in political agendas, but attention has been focused primarily on digital government transformation at the national level. Local e-Government merits attention as well because the city and municipal administrations have more direct interaction with residents and are responsible for addressing concerns affecting people's daily lives"[4].

Under the UN- e-Government-Survey 2020, levels of e-Government development have been assessed in 100 cities across the globe. According to the Survey Report "In some settings, local governments are creating "smart cities", harnessing and leveraging cutting-edge technologies to accelerate sustainable development. Specific strategies include using Artificially Intelligent chatbots to improve service delivery and streamline internal workforce management; using big data and analytics to design and implement effective local government

[3] https://publicadministration.un.org/legovkb/en-us/Reports/UN-e-Government-Survey-2020; page xxviii
[4] https://publicadministration.un.org/egovkb/en-us/Reports/UN-e-Government-Survey-2020; page xxviii

policies and optimize urban public resources; using the "Internet of Things" to support smart applications. In recent years, it has been observed that there is an increase in regional initiatives and partnerships focused on e-Government development. Among the regional priorities highlighted by these initiatives are digital trade, digital economy, open government, and open data, user-centric evaluation of regional e-Government development, disaster risk mitigation, and large-scale digitalization of core public sector functions and the adoption of strategic digital policies and implementation plans at the national and provincial and local authority levels"[5].

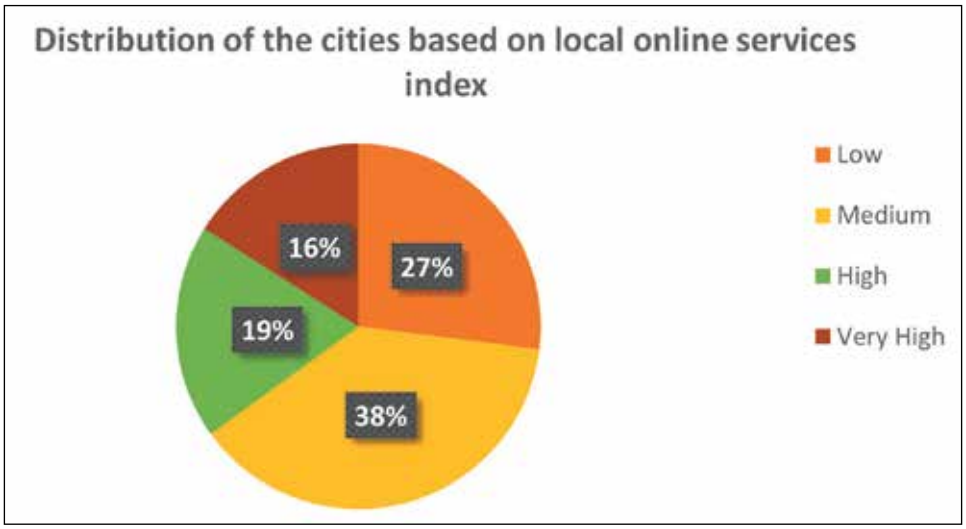

Figure 1.5-1: Distribution of the cities based on Local Online Services Index

In the current atmosphere of development, the provincial-level institutions and LAs are assuming greater development responsibilities for their communities. Especially in the developed regions of the world, local level administration plays a greater role in citizen services delivery rather than the national governments. It has been observed that ICT and e-Systems implemented at the LAs make the citizen services delivery very efficient and effective in advanced countries. According to European research, the LGs in developed countries are offering up to 77% of public services as e-Services. Therefore, developing countries should invest more resources to incorporate information and communication technologies in improving citizen services delivery and thereby enabling local governments to work more efficiently and provide better services to the citizenry. According to the e-Governance Academy *"At the local level, e-Governance and the appropriate use of ICT can enhance and support economic and social development, particularly in empowering officials and municipal representatives, ensuring linkages, networking, timely, efficient, transparent, and accountable services. e-Local governance means exploiting the power of ICT to help transform the accessibility, quality, and cost-effectiveness of public service and to help revitalize the relationship between customers and citizens and the public bodies who work on their benefit. Information Society development is to a large extent an issue of local governments – local governments, compared with central government, are closer to the citizens"*[6]. Through this statement, the e-Governance Academy has also stressed the importance of e-Government for subnational level administration.

1.6 Statutes governing e-Systems and their implementation.

There are no specific legal provisions for governing and introducing e-Systems to PCs as well as LAs in Sri Lanka. However, in pursuit of digitalizing government services, necessary changes to the national legal framework in Sri Lanka were fast-tracked after the year 2000. However, the foundation for such changes was laid in the

[5] https://publicadministration.un.org/egovkb/en-us/Reports/UN-e-Government-Survey-2020; page xxviii-xxix
[6] https://publicadministration.un.org/egovkb/en-us/Reports/UN-e-Government-Survey-2020; page xxviii-xxix

early 80s with the establishment of the Computer and Information Technology Council of Sri Lanka (CINTEC) by the Parliamentary Act No.10 of 1984. In 2003, Information and Communication Technology Agency (ICTA) was established as a successor of CINTEC by the ICT Act No.27 of 2003. After the entablement of the ICTA, enactment of key legislations was accelerated and as a result, the Electronic Transaction Act No.19 of 2006, Computer Crimes Act, No. 24 of 2007, and Personal Data Protection Act ("PDP Bill" - September 24, 2019) were introduced to regulate ICT related affairs[7].

1.7 e-Services at National/Local/Provincial levels in Sri Lanka

Sri Lanka has recorded a higher ICT literacy rate in comparison to the rest of the Asia Pacific region. According to the statistics published by the Telecommunications Regulatory Commission of Sri Lanka, internet penetration in Sri Lanka is increasing at a rapid rate[8]. Therefore, it is expected that, in the future, more people will use the internet to fulfill their daily needs. This is a trend prevalent in many developing countries. Therefore, in consideration of this trend, many governments around the world are working on providing government services online, where the online services are provided in a citizen-friendly manner while improving the internal efficiency of respective government institutions.

Since the launch of Lanka Gate (country portal) in 2009, ICTA has developed many e-Services and mobile services, which offer services to clients through the internet, SMS, and mobile applications. It is expected that these multiple online service options would provide a more effective, efficient, and citizen-friendly mechanism for delivering public services.

Almost all PCs have been taking steps to introduce ICT-based service delivery systems during the last couple of decades in line with e-Systems developed and implemented by different central government institutions. The software applications developed under the leadership of the ICTA are efficiently functioning in most of the PCs, such as the eRL, the e-System used for vehicle revenue licensing and eSLIMS, the e-System used for the government land alienations process to the citizen. In addition, the PC entities such as Provincial Revenue Department, Planning Secretariat, Management & Development Training Unit, Department of Local Government, Provincial Department of Education, and Provincial Department of Land have taken a lead role in improving their ICT infrastructure for providing efficient services to the public. However, the quantum of ICT-based service delivery facilities, the extent, and efficiency of such services vary from PC to other due to the constraints of resources.

LAs in Sri Lanka are recognized as institutions empowered to provide basic public services for people within a designated geographical area. These institutions are autonomous and self-governed entities that have the power to make by-laws and policies. They are mandated to provide public health services, sanitation services, land and housing approvals, and thoroughfares within their respective jurisdictions. They are also expected to provide public utility services such as markets, illumination of roads and public places, libraries and sports infrastructure and public toilets. With the digitization of public services at the national level, the LAs have implemented digitalized services such as assessment rates recovery, accounting systems, library service and staff payroll. These facilities are predominantly confined to large municipalities and UCs. However, ICTA started a local government re-engineering project in 2009 targeting a limited number of selected LAs including PSs under which eight services delivery activities were taken into digitalization.

Following are some of the key e-Services /m-Services that have been launched as part of the e-Services initiative in the country.

[7] Government Process Re-Engineering e-Local Government Project (Final Report) ICTA Sri Lanka. 2009.
[8] https://trc.gov.lk/2014-05-13-03-56-46/statistics.html (March 2016)

Table 1.7-1: Systems implemented and piloted at national level:

S. No.	Name of the e-Systems	Type of intervention	Nature of services	Status
1	National Identity Card Status Enquiry	Full Intervention	G2C	Inactive
2	Police Clearance Certificate Status Enquiry	Full Intervention	G2C	Active
3	Reservoirs Storage Details Enquiry	Full Intervention	G2C	Inactive
4	Examination Results	Full Intervention	G2C	Active
5	Employment Opportunities	Full Intervention	G2C	Inactive
6	Purchase of Tender Documents	Full Intervention	G2C/G2B	Active
7	Train Schedule Enquiry	Full Intervention	G2C	Active
8	Reasonable Price Enquiry	Partial	G2C	Inactive
9	Elevational Average Price Enquiry	Partial	G2C	Inactive
10	Shipping Agent License Issuance /Renewal	Full Intervention	G2B	Active
11	Container Operator License Issuance /Renewal	Full Intervention	G2B	Active
12	Freight Forwarders and NVOCC License /Renewal	Full Intervention	G2B	Active
13	Vessel Wise License Issuance	Full Intervention	G2B	Active
14	Addition of Principals License Issuance	Full Intervention	G2B	Active
15	View and Change EPF Profile	Full Intervention	G2C	Active
16	View EPF Account Details	Full Intervention	G2C	Active
17	View Refund status	Full Intervention	G2C	Active
18	View Housing Loan Details	Full Intervention	G2C	Active
19	Online Purchase of Vehicle Information	Full Intervention	G2C	Inactive
20	Viewing of Ongoing Vehicle Registration Number by Vehicle Category	Full Intervention	G2C	Active
21	Postal code enquiry	Full Intervention	G2C	Active
22	Life Location Code information	Full Intervention	G2C	Inactive
23	Land Applicant List	Full Intervention	G2C	Active
24	Objections for Selected Candidates	Full Intervention	G2C	Active
25	Land Application Submission	Full Intervention	G2C	Active
26	Daily Fish Prices	Full Intervention	G2C	Inactive
27	University Admission Results	Full Intervention	G2C	Active
28	Reservation of Bungalows at Wildlife Parks	Full Intervention	G2C/G2B	Active
29	Bungalows Reservation Status Enquiry	Full Intervention	G2C/G2B	Active

Table 1.7-2: Systems implemented and piloted at Provincial Council level

S.No	Name of the system	Intervention type	System Type	Status
1	Provincial Planning Management System at DCS Planning	Full Implementation	G2G	Active
2	Provincial Finance Management System at DCS Finance	Full Implementation	G2G	Active
3	Provincial HR Management System	Pilot	G2E	Active
4	Provincial Cadre Management System	Full Implementation	G2G	Active
5	Field Monitoring System for DCS Engineering	Full Implementation	G2B	Active
6	Knowledge Management System	Full Implementation	G2C	Active
7	Council Data Portal	Full Implementation	G2C	Active
8	Mail Routing System at Ministry	Full Implementation	G2G	Active

S.No	Name of the system	Intervention type	System Type	Status
9	Rural Development Societies Management System	Full Implementation	G2C	Active
10	Education Management Information System	Full Implementation	G2G, G2C, G2E	Active
11	Provincial Youth Skill Registry	Pilot	G2C	Inactive
12	Asset Management System	Full Implementation	G2G	Active
13	Fleet Management System	Pilot	G2G	Active
14	Beneficiary Management System at Social Service	Pilot	G2C	Inactive
15	Probation and Childcare Management System	Full Implementation	G2C	Active
16	Disability Profile Management System at PDHS	Full Implementation	G2C	Active
18	Food Establishment Assessment System by Public Health Inspectors	Pilot	G2G	Active
19	Dengue Mapping and Control System	Full Implementation	G2C	Active
20	Complaints Management System	Pilot	G2C	Inactive
21	Provincial Revenue Management System	Full Implementation	G2G	Active
22	Training Management System	Full Implementation	G2E	Active
23	Information Kiosk System	Full Implementation	G2C	Active
24	Feedback Kiosk System	Full Implementation	G2C	Active
25	Special Road and Asset Inventory	Pilot	G2G	Active
26	CIGAS Accounting System	Full Implementation	G2G	Active
27	Payroll System	Full Implementation	G2G	Active

Table 1.7-3: Systems implemented and piloted at Department of Local Government (G2G systems):

S.No	Name of the system	Intervention type	System type	Status
1	Fiscal Analysis and Reporting System (ProMIS)	Implementation	G2G	Active
2	Mail Routing System	Pilot	G2G	Inactive
3	CIGAS	Implementation	G2G	Active
4	Payroll System	Implementation	G2G	Active
5	Knowledge Management System	Pilot	G2G	Inactive

Table 1.7-4 : Systems implemented and piloted at Local Government Authorities (G2C systems):

S. No.	Name of the system	Intervention type	System type	Status
1	Assessment Revenue Processing System	Implementation	G2C	Active
2	Miscellaneous Revenue Processing System	Implementation	G2C	Active
3	Fleet Management System	Pilot	G2G	Inactive
4	Complaints Management System	Pilot	G2C	Inactive
5	CIGAS Accounting System	Implementation	G2G	Active
6	Payroll Management System	Implementation	G2G	Active
7	Library Management System	Pilot	G2C	Inactive
8	Mail Routing System	Pilot	G2G	Inactive
9	HR Management System	Pilot	G2G	Inactive
10	Asset Management System	Pilot	G2G	Inactive
11	Record Management System	Pilot	G2G	Inactive

CHAPTER 2 : APPROACH AND METHODOLOGY

2.1 Objectives of the study

2.1.1 General objective

The overall objective of the study is to take stock of different e-Systems available at the subnational level for providing Government to Citizen (G to C), Government to Business (G to B) and Government to Government (G to G) services as a part of the services delivery of Provincial and Local Authority administration system in Sri Lanka. This process has been completed by the research team, employing mixed methods of data collection and processing to derive the findings, using primary survey instruments, Key Informant Interviews (KII) and Focus Group Discussions (FGD).

2.1.2 Specific objectives

The specific objectives of the study are.

1. Identify the prevailing institutional and technical challenges, gaps, and impediments to adopting the e-Systems at a subnational level including LA levels.
    a. The prevailing institutional and technical challenges, gaps, and impediments to adopting the e-Systems at a sub-national level and LA levels were explored comprehensively in the study. The challenges could have been identified and addressed if blueprints for implementing e-Systems were known to the institutions. It should be noted that subnational institutions were unable to clearly express their challenges except for a few since they have had limited exposure and capacity in technology-related activities.

2. Record current nature and usage of available e-Systems.
    a. The study mapped available arrangements for back-end management and maintenance of systems.
    b. The efficiency of the e-Systems was probed, considering.
        i. functional efficiency.
        ii. level of usage (by providers and users).
        iii. interoperability between e-Systems (including potential areas of interoperability).
        iv. linkages and coherence between provincial, and local level (district level, DS level) systems.
        v. benefits of the systems (for example – reduction in time to access service, the percentage increase in revenue collection).

3. Identify best practices.
    a. Identified the mode of these services that enable access to all, including persons with disabilities, persons with diverse ethnic origins, youth, and women.
    b. Identified the best practices that are prevalent across the institutions that could be replicated.

4. Identify impediments prevailing at legal and policy levels through policy analyses.
    a. The legal and policy framework governing the e-Systems development and provision of digital services were examined in the primary survey instrument and verified through secondary information. It was observed that there is a lack of clear legal provisions and policies to govern the e-Systems.
    b. Identified the level of connectivity of Provincial and LG to a certain level to understand the possibility to function online and provide essential services

The specific objectives of the study were also met with a detailed analysis of available data and qualitative findings, enabling the identification of suitable interventions in the future.

2.2 Scope of the study

The study was mainly focused on taking stock of different e-Systems used for regulatory, management and services delivery functions of the PCs (including Provincial Planning Secretariats, Management Development and Training Units, Provincial Revenue departments) and LAs in Sri Lanka. It also considered the provisions available for online services delivery through the internet, SMS, or mobile applications to the citizen, businesses, and other government institutions. Moreover, the study has explored the capability of available e-Systems in providing facilities for public participation in the provincial and local level decision-making process.

Furthermore, the study has focused on the legal, regulatory, and policy framework of governing e-Systems and available provisions for the digital services delivery. Accordingly, while considering the favorable aspects of the legal and regulatory framework, the study has also identified and recorded the gaps and impediments of current laws and regulations at both national and subnational levels.

The effectiveness and efficiency of the e-Systems have been quantified through attributes of the functionality of the system, level of usage, overall benefits, and identifying the interoperability among the systems. Necessary linkages and coherence among the provincial level, district level, divisional secretary level and local authority level systems, provisions for the back-end management and maintenance of the systems and provision for differently abled people, children, youth, women, and different ethnic groups have been considered and incorporated.

As key recommendations of the study, the best e-Systems have been earmarked with potential replicability by PCs or LAs. Furthermore, the study has identified the gaps in current and future needs of the subnational level, including the requirements and challenges in adopting e- Solutions under unforeseen circumstances such as the COVID-19 pandemic. The findings and recommendations of the study have focused on enhancing e-Local governance. As an outcome, the identified departments of the PCs and all LAs have been categorized in the e-Government maturity index which would enable them to understand the relative performance of their institution, benchmarked in line with the global context.

2.3 Methodology

The researchers have used an integrated approach combining different research methods to identify best practices, gaps, and impediments to the available e-Systems: to generate knowledge and to record a clear overview of the present status of the use of e-Systems at the sub-national level and local authority domain. Accordingly, the primary and secondary data were collected, and appropriate quantitative and qualitative tools have been used for policy analysis, best practices analysis, and gap analysis.

2.3.1 Methodology for primary data collection

The primary data for this study was compiled to map available e-Systems, identify challenges, gaps as well as best practices. Accordingly, the following tools were used for collecting primary data.

a. Questionnaire Survey

   i. Screening survey questionnaire for LAs in the five (5) provinces which do not belong to the Capacity Development of Local Governments (CDLG) Project.

   ii. Detailed Questionnaire for all LAs in the North, North Central, Eastern and Uva Provinces.

   iii. Detailed questionnaire for selected LAs and selected provincial institutions in other five provinces mentioned in (i) is based on the screening survey questionnaire.

b. Key Informant Interviews (KII)

c. Focus Group Discussions (FGD) with key officials

Mainly two questionnaires were used for the survey. Initially, the screening survey questionnaire has been administered for obtaining information about the availability of e-Systems in all the LAs of five (5) provinces that do not belong to the Capacity Development of Local Governments (CDLG) Project. The screening survey questionnaire has been emailed/posted to all LAs in the respective five (5) provinces and followed up by the enumerators over the phone to obtain the necessary information. The head of the IT unit and the Municipal Commissioner or Secretary of the respective Council were the key respondents for the screening survey questionnaire. The screening survey questionnaire is attached to this report as Annexure 2.

The detailed questionnaire was focused on primary data on available e-Systems, functionalities of those systems, nature of the services offered (G2C, G2B, and G2G), system performance gaps and challenges at the respective institutional level. The detailed questionnaire designed for the primary data collection is attached to this report as Annexure 3. The best practices were also identified by using the questionnaire, by way of data analysis as well as a direct question from the respondents. The head of the IT unit and the municipal commissioner or secretary of the respective council were the key respondents to the detailed questionnaire. The questionnaire was initially field tested at Kaduwela MC and revised according to the findings of the pilot test.

The detailed questionnaire was administered in 134 LAs in the four provinces where CDLG Project is being implemented (i.e., North - 01 MC, 05 UC and 28 PS; North Central - 02 MC, 25 PS; Eastern - 03 MC, 04 UC and 38 PS and Uva - 02 MC, 01 UC and 25 PS). Furthermore, the detailed questionnaire was administered in the LAs that were selected through the screening survey and in the nine (9) provincial institutions listed below (a total of 81 provincial-level authorities in the nine provinces).

Considering the e-Systems availability, number and importance of the services offered based on G2C and G2B, contribution to the regional development, livelihood development, and potential of e-services introduction, the following nine provincial institutions from each province were studied with the questionnaire survey.

a. Department of Provincial Motor Traffic.

b. Provincial Education Department.

c. Provincial Department of Revenue.

d. Provincial Department of Lands.

e. Provincial Department of Local Government.

f. Office of the Deputy Chief Secretary Planning

g. Provincial Department Company Registration.

h. Office of the Deputy Chief Secretary, Human Resources, Training and Development.

i. Office of the Deputy Chief Secretary Finance.

Accordingly, 30 to 35 enumerators, one or two for each district, based on the number of LAs in the district, were employed for administering the questionnaires. Another 9 enumerators, one from each province, were employed for administering questionnaires at the provincial level. The enumerators were familiar with subnational level administrative and operational systems in their relevant districts. One day of training was provided for the enumerators to educate themselves on the objectives of the study. During the training session, enumerators prepared the plan for the data collection exercise. The performance of the enumerators was monitored by a Field Assessment Manager (FAM) who guided the enumerators on the quality of the data. FAMs were accountable for the quality and timely delivery of the questionnaire survey.

The enumerators utilized the mobile application program developed by the company (EML i-Survey) instead of the conventional survey conducting methods. The advantage of EML i-Survey is its ability to monitor the accuracy of the survey process and data in real-time and diagnose mistakes more efficiently. It uses tablet units or mobile phones as the terminal with a cloud-hosted server (Microsoft Azure), internet and the mobile app. The mobile app can collect data while online or offline, when the device has an internet connection, offline data will be synchronized. The data entry was in English language and the app can display in all three languages.

This method has offered the following benefits.

- Enumerators were able to complete the questionnaire form with minimum human errors.
- When the data collection is in progress the supervisors were able to monitor the location of the mobile units on Google maps using GPS.
- When data is entered into the mobile app, the accuracy verification system has captured the GPS location, time, and collector's information and updates the server accordingly.
- The collected data mediation has been done centrally in a standard format and if required, a manual verification process can be done.
- The system has created reports in real-time.

The enumerators were trained to navigate the EML i-Survey application during the one-day training session. They completed the pilot survey to familiarize themselves with the questions and the use of tablets or mobile phones for data collection.

The approval of the line Ministry of PCs and Local Government Affairs was obtained with the patronage of UNDP through the letter issued by the Secretary of the Ministry addressed to all heads of the relevant institutions soliciting their support to conduct the questionnaire survey. All the questionnaires were certified by the head of each institution, or a senior officer authorized by the head of the institution.

To further ensure the quality of the collected data, the two lead researchers were assigned to cross-check 10% out of the pool of completed questionnaires that has been chosen randomly.

The researchers have conducted Key Informant Interviews (KII)s with key officials, such as the Secretary/ Additional Secretary of the Ministry of PCs, Provincial Commissioners, Directors and Municipal Commissioners. Please refer the Annexure 4 for the outline of KIIs. Furthermore, the Focus Group Discussion (FGD)s are completed with key officials, including Secretaries, head of ICT branch and other related officials, and users of the existing e-Systems of the following local authorities and other respective institutions.

a. North - Jaffna MC, Karachchi PS, Provincial Ministry of Local Government
b. North Central - Anuradhapura MC, Thalawa PS, Provincial Ministry of Local Government
c. Eastern - Trincomalee UC, Kinniya PS, Provincial Ministry of Local Government
d. Uva - Badulla MC, Haputhale UC, Monaragala PS, Provincial Ministry of Local Government
e. Western - Colombo MC, Gampaha PS, Provincial Ministry of Local Government
f. Central - Kandy MC, Provincial Ministry of Local Government

These LAs and PCs are selected based on representing authorities in the spectrum of; well-developed and rural entities, higher and middle income earning to low-income earning entities, and working in single local language (Sinhala or Tamil) or bilingual. A set of guiding questions provided in the FGD are given in Annexure 5.

2.4 Methodology for secondary data collection

The secondary data plays a major part in analysis of legal and policy framework, benchmarking, identifying innovative systems, gaps, and performance analysis. To ascertain these requirements, the researchers have used the following secondary data sources for the analysis.

- Acts and enactments such as Electronic Transaction Act, Computer Crime Law and Data Protection Laws in effect and the e-Government policy published by the ICTA.
- The Governing Legislations of LAs such as Municipal Council Ordinance (MCO), Urban Council Ordinance (UCO), and Pradeshiya Sabha Act (PSA).
- Annual performance reports, and available audit reports related to the respective institutions.
- e-Government survey reports, other baseline surveys, reports on ICT usage, and ICT sector employment survey reports done by ICTA, Sri Lanka.
- Reports of Department of Census and Statistics and Central Bank of Sri Lanka.
- International journals and other publications for benchmarking.
- Comprehensive web content analysis on available web-based systems/ websites ~~which are~~ focused on the relevance and quality of information and how they are used by the citizens.
- UN e-Government Index- to understand the world situation.
- Global IT Report which feathered Networked Readiness Index.
- e-Government strategy and national policy to understand future plans.

2.4.1 Methodology for data analysis and presentation

In the data analysis process, statistical and logical techniques have been systematically applied for describing and illustrating the situations, associations and correlations associated with the implementation of e-Systems at subnational levels. The data tables were built based on the overall objective and the specific objectives to derive findings from the study.

In this study, data analysis has been done through qualitative and quantitative data analysis methods. The analytical frameworks are identified for the analysis of qualitative data related to policies, best practices, and gaps. Simple quantitative tools such as mean, and percentages were used for summarizing and interpretation of quantitative data.

A. Policy Analysis

The analytical framework designed for legal and policy analysis has focused on identifying legislative and strategic actions led by the national and provincial authorities for promoting and facilitating e-Governance and enhancing the use of e-Systems at subnational levels. Further, the proposed framework was designed to recognize potential policy options that could effectively support accelerated e-Systems implementation at subnational levels. During the analysis, policy impediments to the successful implementation of the e-Systems were also identified.

Table 2.4-1: Dimension for analysing the legislative and policy framework.

National Level	Legislations	Availability Relevance Effectiveness Feasibility Acceptability	Areas and coverage of legislation/ policies.	Legislative/ Policy impact on e-Systems at Sub National level
			Relevance to e-Systems implementation.	
			What effects does the policy have on e-Systems?	
	Policies		Is this policy technically feasible?	
			Do the relevant stakeholders view the policy as acceptable?	
Sub National Level	Statutes	Availability Relevance Effectiveness Feasibility Acceptability Impediment	Areas and coverage of legislation/ policies.	
			Relevance to e-Systems implementation.	
			What effects does the policy have on e-Systems?	
	Policies		Is this policy technically feasible?	
			Do the relevant stakeholders view the policy as acceptable?	
			What is the lacking/ blocking policies?	

Information for policy analysis process was predominantly collected through KII, FGD and secondary data sources.

B. Gap Analysis

The gap analysis focused on determining the gaps in institutions functioning under PCs and LAs to achieve the status of "One Stop Shop" by becoming a well-connected institution that offers the majority of services online. Under the gap analysis, a comparison was made between the current state with an ideal future state or goals, which highlights shortcomings and opportunities for improvement. The analytical framework has been used for gap analysis related to the implementation of e-Systems[9] (Annexure 11).

Information related to the current state was collected through a questionnaire survey, KII and FGD while the future state is set out through KII, FGD and benchmarking of international practices.

c. Functional Efficiency Analysis

The functional efficiency analysis has provided an understanding of the efficiency of e-Systems over the legacy system as well as absolute efficiency of the e-Systems that are currently being used at PCs and LAs. The efficiency was assessed based on the following variables,

i. Employee satisfaction
ii. Customer satisfaction
iii. Process efficiency
iv. Speed of system response
v. System availability

Furthermore, each of these identified systems has been benchmarked concerning similar e-Systems.

9 Gap analysis methodology for identifying future ICT related e-Government research topics – case of e-Government; Andreja Pucihar, at all, 20th Bled e-Conference e-Mergence:Merging and Emerging Technologies, Processes, and Institutions; June 4 - 6, 2007; Bled, Slovenia

D. Best Practices Analysis

As a major part of the data analysis, best practices were earmarked and listed for the benefit of the institutions which have similar functions. The following matrix explains the methodology used for the analysis of the best practices. (Refer Annexure 6 for more details)

Table 2.4-2 : Best practices analysis matrix

Criteria	Benefits	Process Defined	Maturity	Value Proven
Deemed Essential				
Repeatable				
Sustainable				
Innovative				

Accordingly, data collected through the questionnaire surveys, KII and FDG were applied to the above matrix and scores were made available related to the relevant practices.

CHAPTER 3 : LEGISLATIONS AND POLICIES GOVERNING e-Systems

3.1 The role of legislation and policies in the operation of e-Systems

The public sector has a long history of using ICT, institutions sought to gain efficiency through the simplification and automation of service delivery[10]. With the initiation of the use of Information Technology for storing and processing information in the 1970s and 80s, government institutions also began to use them, similarly for information recoding and processing purposes. Hence, consequent to technological advancement, Information Technology took over most of the processes and services that were handled manually in the public sector, adding more efficiency and new values to such processes and services. The new institutional environment with electronic services delivery mechanism was recognized as e-Government, and e-Government implementation has become a trend in developed and developing countries across the world during the past few decades. Due to the nature and diversity of the software and hardware infrastructure, the common use of data and information produced by different entities within the country and across the borders was one of the key challenges explored in e-Government implementation. Furthermore, the ability to use, change, manipulate and destroy data and information using similar technologies without any permission from the original owners was another key issue faced by the government entities in the initial stage of e-Government implementation. At this stage, the legislation and policy framework that prevailed was not able to handle the complex issues associated with electronic service delivery and the protection of the rights of service providers and system users. Therefore, to fill the gap, e-Government specialists identified the requirement of introducing new legislation for the uninterrupted implementation of e-Government systems. As Aroon P. Manoharan and Alex Ingrams stated in their article on "Conceptualizing e-Government from Local Government Perspectives" in the journal of State and Local Government Review; *"Alongside these technological developments, e-Government began to place a higher value on the integration of legal and political systems. The adoption of new technologies in government was accompanied by legislative changes to regulate their use"*[11].

When the government and private institutions are progressing through the stage of "presence" to "transformation" with the adoption of rapidly developing information technologies, the role to be played by legislation and policy becomes vitally important. In the "Information Technology Law and e-Government: A Developing Country Perspective", Sharif N As-Saber, Aashish Srivastava and Khalid Hossain illustrate the changing role of legislation and policy through a chart which was adopted from Gartner's Four Face Model[12] (Annexure 11).

In the process of strengthening the sub-national level democracy and governance, while trusting and assigning greater development responsibilities, it is important to uplift the environment for discharging such responsibilities more responsively, efficiently, and effectively. The power of ICTs would support the subnational level autonomous government bodies such as PCs and LAs to perform their responsibilities productively and to provide better services to the citizens. The Handbook on ICT for Local Government, published by the e-Governance Academy has stated that *"At the local level, e-Governance and the appropriate use of ICT can enhance and support economic and social development, particularly in empowering officials and municipal representatives, ensuring linkages, networking, timely, efficient, transparent and accountable services. e-Local governance means exploiting the power of ICT to help transform the accessibility, quality and cost-effectiveness of public service and to help revitalize the relationship between customers and citizens and the public bodies who*

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10 Sprecher, M.H. (2000) Racing to e-Government: Using the Internet for Citizen Service Delivery. Government Finance Review, 16, 21-22.

11 As Aroon P. Manoharan and Alex Ingrams stated in his article on "Conceptualizing e-Government from Local Government Perspectives" https://www.researchgate.net/publication/323849645_Conceptualizing_e-Government_from_Local_Government_Perspectives

12 Information Technology Law and e-Government: A Developing Country Perspective", Sharif N As-Saber, Aashish Srivastava and Khalid Hossain, https://www.researchgate.net/publication/237329822_Information_Technology_Law_and_e-Government_A_Developing_Country_Perspective1

work for their benefit"[13] Highlighting the requirement of legislation and policy framework to achieve the above objectives, the handbook further discusses the legislative and policy requirements, especially related to Serbia, stating that *"Privacy protection and data handling, intellectual property rights, contract law, electronic signature law, electronic commerce law, telecommunications law and many others, need to be enacted to provide a secure and stable environment attractive".[14] Further, the manual explained that as per European research findings, more than 77% of the services of LAs in developed countries are offered through e-Systems and often local government portal is the first stop to reach the central government services. This level of impressive outcome is a result of "ICT use, and implementation is based on optimally arranged regulations and international standards that create a stable and predictable legislative environment with laws that are formulated, transparent, non-discriminatory and technologically neutral"*[14]. Accordingly, as e-Systems usage is a borderless phenomenon, there is a requirement for harnessing territory-specific legislation, regulations, and policies along with international practices.

With the enhanced use of the e-Systems allowing national government and subnational level bodies to autonomously communicate and transact with the citizen, businesses, and other government agencies electronically, a variety of regulatory and policy issues have arisen in the countries where e-Systems are widely implemented. The United Nations Economic Commission for Europe details the issues into the five main categories in its publication on Information and Communication Technology Policy and Legal Issues for Central Asia- A Guide to Policy makers[15]. Those categories are "

A. *Legal infrastructure considers some of the key legal and regulatory facilitators for electronic commerce, from adherence to law reform principles such as 'technology neutrality', to regulatory structures and market liberalization.*
B. *Legal certainty examines the legal status of electronic communications and forms of contracting, specifically the need to explicitly recognize the validity, enforceability, and admissibility of electronic means of executing legal acts.*
C. *Legal security examines the security risks inherent in an electronic environment and considers the methods used to overcome these, in particular the use of digital signatures and certification services.*
D. *Legal protection, which reviews intellectual property rights and how such intangible property is protected in an online environment, as well as the consumer protection issues which the Internet raises.*
E. *Legal deterrence, which examines the development of cybercrime and the regulatory approaches to criminalizing such harmful conduct and ensuring that law enforcement can investigate and prosecute offenders."*

The factors that are in the detail discussion of the Guide are equally valid in the implementation of e-Systems at the national level as well as subnational level in any of the countries. The following table summarizes the key factors that should have been the focus of legislative and policy reforms for the successful implementation of e-Government and e-Systems at all levels.

13 ICT for Local Government-Handbook, Published by e-Governance Academy, 2007, p.4 . https://ega.ee/wp-content/uploads/2015/02/project_ICT_for_Local_Government.pdf
14 The Handbook on ICT for Local Government, published by the e-governances Academy, 2007, p17, https://ega.ee/wp-content/uploads/2015/02/project_ICT_for_Local_Government.pdf
15 Information and Communication Technology Policy and Legal Issues for Central Asia- A Guide to Policy makers, The United Nations Economic Commission for Europe, p. ix, https://unece.org/DAM/ceci/publications/ict.pdf

Table 3.1-1 : Important areas for reforms of legislation and policy

Key areas /Issues	Detail points of consideration
LEGAL INFRASTRUCTURE FOR ICT	Legal principles
	Regulatory structures for ICT and actors
	Sector liberalization
	Harmonizing ICT laws
LEGAL CERTAINTY	Legal recognition of electronic messages
	Requirements of writing, original document and signatures
	Retention of data messages
	Recognition of foreign electronic documents and signatures
	Admissibility of electronic evidence
	Formation and validity of electronic contracts
	Recognition by parties of data messages
LEGAL ICT SECURITY	Managing ICT security risks
	Digital Signatures
	Data Protection
LEGAL PROTECTION	Trademarks
	Copyright
	Consumer protection
LEGAL DETERRENT	Regulating ICT crime
	International cooperation

In the establishment of a comprehensive legal and policy framework for supporting electronic transactions and electronic services delivery, these issues need to be addressed. Otherwise, proper implementation of e-Systems would not be possible, and hence, the systems would collapse in the long run.

3.2 Legislation and policies governing e-Government and e-Systems in Sri Lanka

There are two types of legislation, regulations and policies adopted by the central government for empowering and supporting online transactions and e-services in Sri Lanka. The first type of legislation and policies have been enacted or approved merely for providing services through e-Systems. The Computer Crime Act No. 24 of 2007, Electronic Transaction Act No. 19 of 2006 and the e-Government Policy fall under this category. The second type of legislation and regulations are laws enacted previously to support prevailing manual systems which were later changed to suit electronic transactions through amendments or regulations. Intellectual Property Act No. 36 of 2003, Payment and Settlement Act No. 28 of 2005 and Births, Marriages and Deaths Registration Act No. 17 of 1951 are examples of the second category.

The first attempt to the establishment of a policy framework for handling information technology lead development was made by the Natural Resources, Energy and Science Authority of Sri Lanka (NARESA) by drafting the National Computer Policy of Sri Lanka in 1983. In the year of 1984, under Act no 10 of 1984, the Computer and Information Technology Council of Sri Lanka (CINTEC) was established to drive the necessary information technology legislation, policies, and initiatives of the country. However, there was no progress in the legal and policy area to establish a conducive environment for propagating e-Government and e-Business activities due to the absence of a powerful implementer for nearly about 2 decades. After the establishment of the Information and Communication Technology Agency in 2004, replacing the CINTEC, the national legal and policy framework in Sri Lanka was fast-tracked based on the foundation laid in the early 80s. Thereafter several legislations such as Electronic Transaction Act No.19 of 2006, Computer Crimes Act, No. 24 of 2007 and e-Government Policy in 2009 were introduced to regulate e-Government and ICT-related affairs. At the same time, several policy directives were issued by the Secretary to the President, directing government institutions

to adhere to e-Government principles to make government information available and accessible electronically to citizens through multiple channels. The e-Government policy launched in 2009 was a comprehensive set of policies and guidelines, that directs the government institutions to have the services electronically available and accessible to all citizens via multiple channels in a citizen-friendly manner. Through the eGovernment policy introduced in 2009, the government institutions were directed to improve/re-engineer the government processes to be citizen-centric and to use e-Government applications to enhance the efficiency of service delivery. It has also been directed to eliminate duplication in ICT infrastructure, information collection, government processes, and ICT solutions within and across government institutions. The policy also emphasizes the importance of using ICT to achieve, measure, monitor, and publish defined service levels for all government services. According to the e-Government policy directives, it is necessary to use ICT to address the needs of marginalized communities. Furthermore, there are policy guidelines to implement processes and systems in government institutions to be highly responsive and interactive using ICT and enable citizen engagement through electronic means for consensus-driven, public policy and decision-making processes wherever authorized. The policy also aimed at strengthening rule of law using ICT and establishing and implementing a proper enabling operational framework for successful e-Governance. The policies that were introduced initially have been revised in 2009 and 2020 considering the rapid changes that were happening in the technological environment and society. With the gradual development of e-Systems in the public sector as well as private sectors such as health, banking, and tax payments, the need for personal data protection arose and Personal Data Protection Bill ("PDP Bill" - September 24, 2019) has been drafted for proper approval of the legislature.

There are laws enacted especially for protecting e-Systems and electronic transactions such as Computer Crime Act and Electronic Transaction Act. Furthermore, other Acts enacted for specific purposes have been strengthened for facilitating e-Government and e-Business activities. Examples of some of these Acts are the Payment and Settlement Act, Intellectual Property Act, and Births Marriages and Deaths Registration Act. These Acts promote and facilitate the use of e-Systems for the establishment of efficient and effective citizen services delivery mechanisms. A comprehensive set of e-Government policies have also been introduced to the government procurement guidelines for facilitating the procurement of e-Systems and ICT equipment. Furthermore, government procurements are facilitated by e-Systems instead of the traditional procurement process through these guidelines.

3.3 Status of adoption of e-Government Legislation, Statutes and Policies to LAs

The legal and policy framework should support the transformation of services of LAs by making them more accessible, more responsive, more transparent and more cost-effective while opening doors for citizen participation at the local level decision-making process. Nevertheless, the legal and policy infrastructure should be capable enough to protect personal information. With enhanced use of e-Systems at the subnational level for citizen services delivery, it has become necessary to adopt laws for tackling cybercrimes, and unauthorized access to the e-Systems for more reliable and stable operation of e-Systems.

Currently, there are several legislations in force to facilitate the electronic service delivery mechanisms and e-Systems at the national level. However, at the subnational level, neither a PC nor a LA has initiated any legislation (statutes), or policies related to e-Government.

However, PCs and LAs are not empowered to constitute separate statutes or by-laws relating to criminal procedures or other functions related to Central Government. The adoption and ensuring the use of related legislations, regulations, and policies of the Central Government and embracing the coherent and gap-filling statutes and policies are the best and fastest ways of creating regulatory and policy frameworks for the implementation of e-Systems at the Provincial and Local Authority levels.

In 2014, the Ministry of LG and PCs introduced an action plan for 2012-2014 on establishing National Policy on LG. The goal of the action plan was *"to make local government authorities an integral part of the system of*

representative government with the highest possible level of democratic decentralization and local self-governance backed by adequate corresponding powers and resources[16]*". The focus of the National Policy on LG was "to arrange for technical advice, training and guidelines to create a strong network of cities, towns and villages a set of strong, capable and sustainable local government institutions*[16]" through enabling sectoral legislations and policies (Annexure 11).

Amongst other targets, the National Policy framework sets targets for four areas directly related to the implementation of e-Government and e-Systems at PCs and LAs. The four areas are:

A. Legal reforms
B. Identification of necessary cadres and HR requirements
C. Training and professional development
D. Re-engineer the business processes of LG
E. Introduce appropriate automation of LG administration office systems.

Under the National Action Plan on national policy on LG, it was expected to devise necessary institutional mechanisms and legislative enactments. Accordingly, the action target has been set out to "harmonize all relevant legislations, both main and subsidiary, to empower local governments to effectively carry out the functions and duties corresponding to its new status as a distinct tier of government[16]". However, the action statement is general, and it has not specifically identified the legislation and policies to be reviewed and harmonized. Consequently, it is not clear whether there was any plan to adopt and harmonize national legislations and policies on e-Government and e-Systems implementation to subnational level administrative bodies. As per the information concluded by the survey, there are contradictory elements such as PCs / LAs not adopting the National e-Government legislation and policies to accept electronic documents and electronic signatures.

The National Action Plan discussed creating necessary cadre provisions and services for Local Government administration under its action item no. 1.4.1.[16]However, the National Action Plan has overlooked the importance and requirement of identifying and creating ICT professional cadre positions at least to maintain the existing systems. Even today, the unavailability of cadre provisions to recruit professionals for LAs is a major drawback for the implementation of e-Government and e-Systems in these institutions.

Rationalization of all-island LG cadre formation, structure, qualifications, training and upgrading of the professional quality of LG services and reviewing it annually[16] is another focus of the National Action Plan. It seems that under the Action Plan, the requirement of ICT-based skill training for the implementation of e-Systems at LAs has not been identified.

Re-engineering the business processes of LG and proposing guidelines for necessary changes in the physical and behavioral environment, particularly by simplifying licensing, regulatory and similar procedures to minimize delays and increase staff efficiency and client-friendliness are discussed under item no. 6.1.5 of the National Action Plan. This is a very important and directly related area in the implementation of e-Government and e-Systems at PCs and LAs, since digitalization of existing messy and duplicating manual processes is not accepted in e-Government implementation. However, there is no evidence for such re-engineering efforts initiated by PCs and LAs, even after several years of implementation of the National Action Plan. Nevertheless, in the National Action Plan, the re-engineering task is not linked with the process automation, other than with Management Information System.

Under item no. 6.2, the National Action Plan sets targets for the implementation of ICT systems at LAs. It says "Install and continually upgrade IT facility to operate electronic Management Information Systems incrementally

[16] National Policy on Local Government- An Action Plan for 2012-2014, Ministry of Local Government and Provincial Councils, http://www.mpclg.gov.lk/web/images/Gazettes/action_plan_for_2012-2014.pdf

in all Local Government Authorities (LGAs) and tie them up with the ongoing process re-engineering efforts for change management. Set up Local Area Computer Networks (LAN facility) within each Local Government Authority (LGA) to provide access to senior managers to find out at what stage of the process of the expected work is resting and at any given time to develop a data bank that maps local needs, amenities, road and water supply networks to help local planners and managers with information requirements for local development planning[17]". The drafting team of the National Action Plan may not have had sufficient understanding and knowledge of the e-Systems requirements of LAs. They have focused their attention only on the establishment of MISs and no direction to have ICT-enabled citizen and business services, online transitions and citizen participation in the decision-making process which are the priorities of the National Action Plans of many other countries in the world.

There has been another effort to prepare an Action Plan for LAs in 2016 with the involvement of the Finance Commission[17]. Unfortunately, this has only been limited to the enhancement of revenue in LAs. Thereafter no effort has been recorded in any attempts to adopt national legislation/policies on e-Government for the successful implementation of e-Systems at subnational levels.

3.4 National Level Legislations and Its Impact on the Provincial Councils and Local Authorities

Table 3.4-1 : Electronic Transaction Act No. 19 of 2006

Dimensions	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Availability	"Electronic Transaction Act No 19th of 2006 is an Act to recognize and facilitate the formation of contracts, the creation and exchange of data, messages, electronic documents, electronic record and other communications in electronic form in Sri Lanka: and to provide for the appointment of certification authority and accreditation of certifications of a certification service provider; and to provide for matters connected therewith or incidental thereto"[18].	The effect of the Electronic Transaction Act No. 19 of 2006, seems to be applied only to Government Departments, offices, Bodies, or agencies owned or controlled by the Government or Statutory body in a particular manner. "8. (1) Where any written law for the time being in force requires— (a) the filing of any form, application, or any other document with any Government department, office, body or agency owned or controlled by the Government or a statutory body in a particular manner;"[19] Therefore, there is a gap in the provisions of this Act related to PCs and LAs. This gap could be filled by adopting provisions through Statues. It is also noted that awareness among the provincial officials and officials of the LAs is very poor about the provisions of the above Act.
Acceptability	Electronic Transaction law has been properly drafted considering the National level requirements and is well accepted by the judiciary system of Sri Lanka. However, there is a knowledge and awareness gap among the public officials and citizens of the country.	The Provision of the Act is applicable to a subnational level as well. However, necessary empowerment should be carried out.

17 Preparation of Action Plan for Enhancement of Revenue at local authorities, The Finance Commission, 2016 http://fincom.gov.lk/preparation-of-action-plan-for-enhancement-of-revenue-at-local-authorities/

18 Electronic Transaction Act No. 19 of 2006, P.1, https://nca.gov.lk/files/ETA-E.pdf

19 Electronic Transaction Act No. 19 of 2006, P.4, https://nca.gov.lk/files/ETA-E.pdf

Dimensions	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Relevance	The provisions of the Act to convert the paper files and documents to the electronic filing and document systems are highly relevant to the public services in delivering citizen services efficiently and effectively. As per the provision of the Act, a paper based manual filing system could be converted to electronic forms. The electronic document that has been initiated with proper authentication and securities will have the same value of similar nature as paper documents in front of Court of Law. Nevertheless, under the act there is a provision for using "Digital Signature" as an alternative to the manual signature of the public officers for communication, authentications, approvals, orders and other legal documentation purposes. Hence, this act is highly relevant for implementation of e-Systems under the initiatives of e-Government in the public sector.	The provision of the Act to accept electronic documents and other transactions is very much relevant to the PC and LAs in providing citizen and business services efficiently and effectively. However, if these provisions are to be applied for sub national level all PCs have to formulate statutes to that effect in terms of Article 154 G (1) of the Constitution. Such statutes could provide provisions for LAs to implement aforesaid legal provisions relating to e-Governance in LAs.
Effectiveness	An effective law must be enforceable. In order to enforce Electronic Transaction Law effectively, digital system development must happen at every level of public institution and as electronic transactions would become a daily necessity. At the same time, development of human resources to implement, use and maintain the systems is mandatory and equally, the system users and benefiters should also be knowledgeable and equipped to use the system. Currently, effectiveness of the law is not satisfactory as necessary infrastructure and other enables are not adequately in place.	Once provincial statutes are formulated, such legal provisions could be effectively enforced by the subnational governing entities. Currently, since there are provincial statutes which stipulate the requirement of manually signed documents, provisions of the Electronic Transaction Act. Usage of digital documents is not fully effective in the PC Level and LA Level.
Feasibility	For implementation of the provisions of the Electronic Transaction Act, there should be knowledge and awareness among the users and infrastructure for facilitating electronic transactions. During the survey, it was revealed that knowledge and awareness among the PC level officials and officials of the LA about the provisions of the Electronic Transaction Act is very poor. Also, during the survey, it was revealed that there is no sufficient software and hardware infrastructure at the subnational level, particularly in the LAs to implement the e-Systems. It is necessary to amend the prevailing laws to accommodate electronic documents. There are provisions in some of the Acts to change the legal provisions through introducing and empowering regulations. For example, provisions to issue the certificates in the prescribed formats under the Births, Marriages, and Deaths Registration Act have changed through regulations to accommodate the certificates issued by the e-Systems.	Currently, there is less feasibility to implement the provisions of the Electronic Transaction Act due to the facts explained in the analysis. However, through remedial actions such as proper awareness building and knowledge creation campaigns and the introduction of new e-Systems to the provincial institutions and local authorities, the gap would be narrowed down to a satisfactory level.

Table 3.4-2 : Computer Crime Act No 24 of 2007

Dimensions	Description and Analysis	Impact on e-Systems Implementation at Subnational Level
Availability	The Computer Crimes Act No. 24 of 2007 provides for the identification of computer crimes and stipulates the procedure for the investigation and enforcement of such crimes. As per the provisions of the Computer Crimes Act, attempts for unauthorized access to a computer, computer program, data or information is a criminal offense which is subjected to the procedure of court of Law. It also contains a provision to deal with unauthorized use of computers regardless of whether the offender had authority to access the computer.	This is an act enacted at National level. The provisions of this act could be used by PCs and LAs when crimes are transpired related to computers and e-Systems for public services delivery.
Acceptability	Computer Crime law has been properly drafted considering the National level requirements and has been enacted by the National Legislature and is enforceable at any level.	After its enactment, the law has become a part of the general law of the country. Criminal law is common to both national level and subnational level. It can be enforceable at PCs and LAs level without the support of other statutes or regulations.
Relevance	When paper-based documents, files, systems, and procedures are converted to electronic format and made available to the wide spectrum in the society through internet and other means, unauthorized access to those documents, files systems and procedures, for the sake of robbing information or change, alter, delete or adding records or make the entire system defunct is a criminal offence under this act. This law is relevant to the protection of the system's beneficiaries of the systems and other stakeholders.	As PCs and LAs have begun to initiate e-Systems for citizen services delivery, this law is much more relevant to them. It has been found that in certain LAs fraudulent activities were done by the staff through altering the records of e-Systems. In such situations, legal proceedings would need to be taken following the provisions of the Computer Crime Act.
Effectiveness	This Act is enforceable in an incident where the law is breached. As this is pertaining to Criminal Law, the law enforcement and prosecutions should be done by a Police Officer/other authorized officer through the Law. However, there is a knowledge gap among Law Enforcement Officers to conduct the investigation procedure. If the law is violated, they must be able to be brought to justice.	The Law is enforceable through Police or other authorized officers if breaching of Law transpired at PCs and LAs level.
Feasibility	The Act would be feasible for enforcement provided that the enforcement authority is knowledgeable and professional. There is a requirement to amend other applicable laws and regulations. e.g., Birth certificate has been defined under the Births and Deaths Registration Act No. 17 of 1951.	The support of the Law Enforcement Agencies that are under the Central Government shall be obtained.

Table 3.4-3 : Payment and Settlement Systems Act, No. 28 of 2005, Payment Devises Frauds Act No 30 of 2006 and Intellectual Property Act No 23. of 2003

Dimensions	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Availability	The Payment and Settlement Systems Act. No. 28 of 2005 (PSSA) provides for the regulation, supervision and monitoring of payments, clearing and settlement systems, the regulation of providers of money services and the electronic presentment of cheques in Sri Lanka. Online payments through debit and credit cards and mobile-based payments have been facilitated through the regulations published under the Act. The following regulations are related laws for the electronic use of money. Mobile Payments Guidelines No. 1 of 2011 for the Bank-led Mobile Payment Services PAYMENT DEVICES FRAUDS ACT, No. 30 OF 2006 This is an act to prevent the possession and use of unauthorized or counterfeit payment devises. Intellectual Property Act No 36 of 2003 Concerning the protection of Intellectual Property Rights (IPR), the Intellectual Property Act No. 36 of 2003 replaced the Code of Intellectual Property Act No. 52 of 1979. The IP Act of 2003 contains several new features in relation to the protection of software, trade secrets and integrated circuits in the sections of 204 and 205.	This is an act enacted at National level. The provisions of the Act could be used by PCs and LAs for accepting online payments and counter based card payment for the services that charge fees by the PCs and LAs. Furthermore, Public Finance Circular 447 On Payment to government institutes through electronic Media Over the counter payment through Cards Online payment Secretary to the Finance The provision of Intellectual Property Act is important for PCs and LAs to protect their rights on data and systems developed internally by themselves. This is also an Act enacted by the Central Government. However, PCs and LAs could use the provisions of the respective institutions by adding conditions to bidding document agreements and other legal documents. Also, PC and LAs could register IPR on their names if the product is fully designed and implemented by themselves.
Acceptability	The Payment and Settlement Systems Act has been properly enacted by the national legislature and effective for making any payment for public sector at any level and private sector as well.	Both of the above Acts are a part of the general law of the country. It can be enforceable at PCs and LAs level without the support of other statutes or regulations.
Relevance	Provision of this Act is much useful for offering fee based public services online.	As PCs and LAs have begun to initiate e-Systems for citizen services delivery, these laws are much relevant to them. PCs and LAs could offer fee charging services online using the provisions of payment and settlement Act, enhancing convenience to the citizen. As PC and LA level have their own software development and significant amounts of data generated provisos of the Intellectual Property Act are relevant to them.
Effectiveness	Provision for online payment is to support complimentary mechanism of payments for services. However, in public sector due to the lack of related policy decisions, online payment method is not effectively used. Provisions of Intellectual property Act could be effectively used if Intellectual Properties are generated in the PC and LA sectors.	The provision for online payment could effectively be used at PCs and LAs level in offering fee-based services to the public. However, currently the provisions of this Act have not been used at all by most PCs and LAs. Furthermore, there is no software and hardware infrastructure capable enough to offer online services at PCs and LAs to make online payments effective. As no remarkable products are generated within PC and LA systems, currently the provision of this Act is less effective to the PCs and LAs.

Dimensions	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Feasibility	Payment and Settlement Law is highly feasible for implementation provided that necessary infrastructure, software and human resources are available. Intellectual Property Law is also highly feasible to implement if such properties are generated.	Highly impactful in implementation of e-Systems at PCs and LAs levels. Currently less useful as no Intellectual Properties are generated relating to e-Systems implementations at subnational level.

Table 3.4-4 : e-Government Policy

Dimensions	Description and Analysis	Impact on e-Systems Implementation and Subnational Level
Availability	The e-Government National Policy was launched in 2009 with the approval of the Cabinet of Ministers and this set of policies is still valid as no subsequent set of overall policies were introduced during the last 12 years. This set of policies and procedures guide government institutions at all levels to achieve overall development within institutions and in the delivery of government services using ICT. It is to assist in benchmarking each institution's activities against the Policy, which will enable institutions to identify the areas which need attention and where rectification needs to be carried out. It will also ensure consistency in ICT activities and practices. The Policy articulates the minimum requirements expected of government institutions, and government institutions could add on to this and create their own institutional ICT policies and procedures, within this National Policy framework.	The National policy directives are common for PCs and LAs.
Acceptability	e-Government policy is common to all government institutions, and it has followed the proper procedure of policy formulation. The policy statement contains the policy as well as guidelines to be followed in achieving the relevant policy.	This is a part of general government policy. It can be enforceable at PCs and LAs levels by adopting the same policy at PCs and LAs levels. However, none of the PCs or LAs has taken steps to formally adopt the policy though these institutions. Currently, they are following some of the guidelines stipulated through policy. No effort has been made to follow the entire set of policies
Relevance	The Policy document covers most of the aspects related to the implementation of e-Systems. It highlights and guided use of provisions of other existing laws, procedures and guidelines in implementation of e-Systems. ICT management, ICT related procurement and contractual issues, communication infrastructure, networking and connectivity, web presence, Government network, and Human Resources Management are the key areas addressed by the policy and guidelines in detail.	In order to implement e-Systems at PC and LA levels, this National policy and guidelines are relevant. However, knowledge of the provisions of policy and guidelines has not properly penetrated to the authorities as well as officials of the PCs and LAs.

Dimensions	Description and Analysis	Impact on e-Systems Implementation and Subnational Level
Effectiveness	The policy was not highly effective as most of the government institutions were not following the policy directives due to the various reasons. The gaps in technology, connectivity knowledge and resources are some of them.	The policy has not been implemented effectively at PCs and LAs levels.
Feasibility	The implementation feasibility of policy was at average level.	As there are highly technical tasks to be accomplished in filling policy objectives and guidelines, PCs and LAs require extensive external support from agencies such as ICTA.

Table 3.4-5 Other circular instructions

Name	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Use of Electronic Documents and Communication for Official Use	A circular issued by the Secretary to the President directing Secretaries to the Ministries to accept and use the Electronic Document and emails for official duties.	Less effective as user awareness, knowledge and infrastructure are not available at PCs and LAs levels
Use of emails and ICT in general for Government Business	A circular was issued by Secretary to the President in 2008, directing Secretaries to the Ministries to use the e-mails for official communication. However, as per the circular instruction the scanned PDF image could be e-mailed to the respective entities instead of sending the letters using normal postal services. In this case it was noticed that only the medium of delivery has changed. However, in the absence of proper infrastructure for "Digital Signatures", there weren't any other alternatives available in 2008.	Less effective as user awareness, knowledge and infrastructure are not available at PCs and LAs levels

Table 3.4-6: Legislation yet to be enacted for smooth operations of e-Systems

Name	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Data Protection Law	Data Protection Legislation defines measures to protect personal data of individuals held by Government Departments, banks, telecom operators, hospitals and other personal data aggregating and processing entities. It aims to regulate the processing of personal data, safeguard the rights of citizens and regulate the dissemination of unsolicited messages using personal data. However, this law has still not been enacted by the Government of Sri Lanka. In the absence of Data Protection law, the gap has been filled to some extent by several other data protection-enabled legislations which are effective for specific business sectors, such as the Banking Act, No. 30 of 1988, the Telecommunications Act, No. 25 of 1991, the Intellectual Property Act, No. 36 of 2003, and the Registration of Persons (Amendment) Act, No. 8 of 2016. These legislations do not, however, provide a specific definition for the term 'data,' nor relevant provisions for the implementation.	In the absence of Data protection Law, it would create doubt among the citizen about secrecy of their personal information. This will be a negative factor for the implementation of e-Systems at PCs and LAs level because officials of PCs and LAs collect personal information as well as details of private properties of individuals for discharging variety of services. E.g., Health data, Land data, Property assessment related data etc.

Name	Description and Analysis	Impact on e-Systems implementation at Subnational Level
Cyber Security Law	The Cyber Security Law is necessary for preventing, mitigating, and responding to cyber security threats and incidents arising nationally and internationally. The computer crimes arising locally could be handled through Computer Crimes Act to some extent. However, with the increase of the internet penetration and online services delivery frauds, international cyber threats, and incidents have to be handled through a proper Cyber Security Law.	Absence of Cyber Security Law has negative impact over propagating and implementing online services.
Statute for avoiding violations of existing provisions of Local Government Legislations.	Currently in almost all LAs warrant costs are being added to the quarterly assessment rates bill without issuing a warrant. This practice is highly illegal, but e-Systems of Rates recovery used to automatically recover this undue amount of money from the Rate payers.	Thereby, the wrong payable balance is carried forward continuously in LAs records. Due to this fraudulent e-practice rate payers have become helpless all over the country.

3.5 The current level of knowledge and awareness on law, related to e-Systems implementation among key leaders in the system at subnational level

Table 3.5-1: Key Informant

Subject area	Level of Acceptance							
	Poor (0,2)		Fair (4)		Good (6)		Excellent (8,10)	
	Num.	% (out of line total)	Num.	% (out of line total)	Num.	% (out of line total)	Num.	% (out of line total)
Extent of relevancy of available legislations and policies to implement e-Systems	8	57%	4	29%	1	7%	1	7%
Extent of effectiveness of available legislations and policies	7	50%	4	29%	3	21%	0	0%
Extent of implementation feasibility of available legislations and policies	6	43%	5	36%	2	14%	1	7%
Extent of acceptability of available legislations and policies to the employees and the services recipients.	6	43%	3	21%	5	36%	0	0%
Extent of ability of adoption/ implementation of available legislations and policies	7	50%	4	29%	3	21%	0	0%
Willingness to have an open data policy	2	14%	4	29%	0	0%	7	50%

Table 3.5-2: FGD

Issue	Not aware		No		Yes		Total
	Num.	%	Num.	%	Num.	%	
Whether there is necessary legislative and policy framework is in place for the implementation of e-Systems	0	0%	36	100%	0%	0%	

3.6 Gaps related to e-Government legislation and policy implementation

Subnational level government institutions, particularly the LAs are currently under intense pressure from their service recipients for better and more efficient service delivery. The experiences that the citizens receive from rapid globalization, fiscal, social, and technological changes and changing local situations, i.e., the ability to obtain various services online such as bank transactions and ordering commodities online have been the main reasons for citizens to expect efficient service delivery in the public sector. The service recipients are demanding a citizen-centric, efficient, transparent, effective, one-stop-shop nature and availability of services on a 365*24 basis. The introduction and use of e-Government is the most desirable solution for filling the gap between what is available and demanded. The first and foremost step towards fully-fledged e-System implementation is the establishment of a proper legislative and policy framework. In achieving this status, the PCs and LAs have several issues and policy gaps as noted below.

a) Lack of knowledge and understanding of the requirement of legislative provisions and e-Government Policies among others.
   i. Political Leadership.
   ii. Official Leadership.

b) Unavailability of supporting and promoting laws and policies for e-System implementation.

c) Not adopting national laws and policies through statutes or circulars. The service delivery using E-Systems in subnational level has not received due attention by political leadership and administration to adopt national laws and policies. For an example the following applications are either functional in marginal levels or not functional at all.
   i. Email Communication.
   ii. Electronic Signature.
   iii. Electronic Contracts.
   iv. Electronic documents for evidence and legal procedures.
   v. e-Procurement.
   vi. Use of electronic payment, card payment, mMoney payments.

d) Requirement of protection of IPR of data and other inputs has not been identified.

Furthermore, the following key gaps need to be addressed at the national level for enabling the adoption of such laws at the subnational level.

a) Lack of personal data protection laws.

b) Lack of cyber security laws.

CHAPTER 4 : CURRENT STATUS OF e-SYSTEMS AT LOCAL AUTHORITIES – SUMMARY OF FINDINGS

4.1 Profile of the Selected Sample for Study

The total number of LAs in the current structure of LG in Sri Lanka is 341 with 24 Municipal Councils (MCs), 41 Urban Councils (UCs) and 276 Pradeshiya Sabhas (PSs). For this study, the survey was carried out in 265 LAs in the 9 provinces including all 25 districts. This sample contains 15 MCs, 28 UCs and 222 PSs. The sample size of the study is 78% of the entire LA network of the Island; with the sample size of MCs at 62.5%, UCs at 68.2% and PSs at 80.4%. Reflecting on a remarkable survey population as aforementioned gives an accurate picture of the e-Government status of the LA system in the country.

Further, the study covers the four provinces affiliated to the UNDP-assisted CDLG Project viz. Eastern, Northern, North Central and Uva and the remaining 5 provinces viz. Central, North Western, Sabaragamuwa, Southern, and Western. The survey constituted 122 LAs from the four provinces affiliated with the CDLG project and 143 LAs from the remaining five provinces. In the 12 districts within the four provinces affiliated to the CDLG project a total of 7 MCs, 10 UCs and 105 PSs were accounted for. The rest of the five provinces accounted for the remaining 13 districts taking stock of 8 MCs, 18 UCs and 117 PSs. 43 LAs were represented from the Southern Province, the highest number of LAs recorded from a single province in the study. These 43 LAs accounted for 16.2% of the total sample size constituting 3 MCs, 3 UCs and 37 PSs. In comparison, Sabaragamuwa province represented the lowest number of LAs recording 7.9% of the total sample size. In Sabaragamuwa province 21 LAs were accounted for constituting one MC, one UC and 19 PSs.

Notably, the Northern and Eastern Provinces have shown considerably higher contributions to the survey with 33 and 37 LAs respectively. Among other provinces, North Western Province, North Central Province, Uva Province, Western Province and Central Province have the moderate number of representations with 29, 25, 27, 28 and 22 LAs respectively.

Table 4-1.1, Figure 4.1-1 Figure 4.1-2 illustrate the distribution of the LAs by type of LAs with their percentages among the provinces.

Table 4.1-1: Distribution of sample by provinces

Type of LA	Provinces																		Total	
	CP		EP		NCP		NP		NWP		SGP		SP		UP		WP			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
MC	1	25%	2	67%	2	100%	1	100%	1	100%	1	100%	3	100%	2	100%	2	29%	15	62.5%
UC	3	50%	4	80%	0	0%	5	100%	3	100%	1	33%	3	75%	1	100%	8	57%	28	68.3%
PS	18	49%	31	84%	23	92%	27	96%	25	86%	19	76%	37	88%	24	96%	18	64%	222	80.4%
Tot.	22	47%	37	82%	25	93%	33	89%	29	88%	21	72%	43	88%	27	96%	28	57%	265	77.7%

The distribution of the sample by the province as detailed in the above table is another interesting dimension of the study. The highest total LA representation is recorded in Uva Province with 96% and the lowest from Central province at 47%. The CDLG Project-supported provinces have shown moderately higher values such as Northern Province 89%, Eastern Province 82%, Uva Province 96%, and North Central Province 93%. The remaining two provinces recorded a fair representation of 88% in North Western Province and 57% in Western Province.

Figure 4.1 1: Distribution of Sample by province

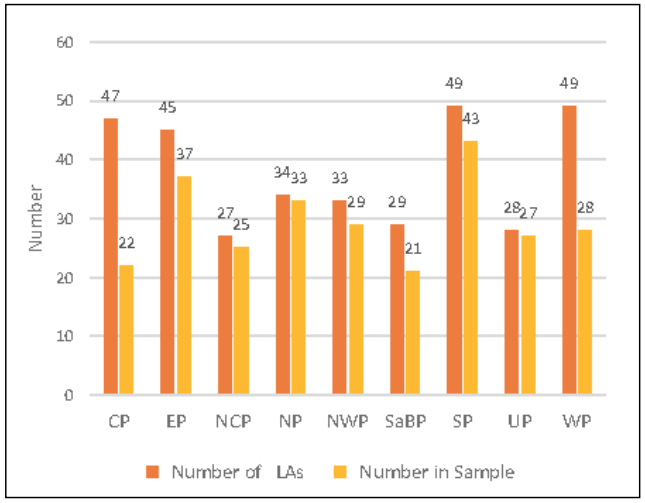


Figure 4.1-2: Number of LAs Available Vs. number in Sample

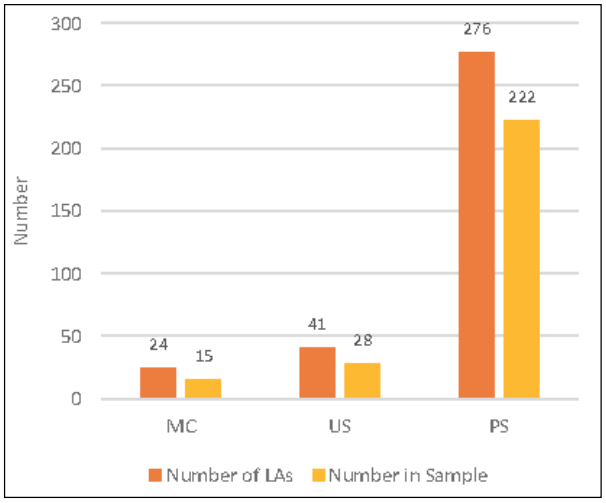


Figure 4.1-3: Number in MC, UC, and PS Vs. number in Sample

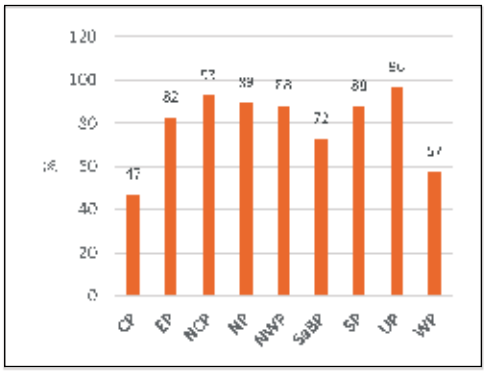


Figure 4.1-4: Percentage of LAs in sample

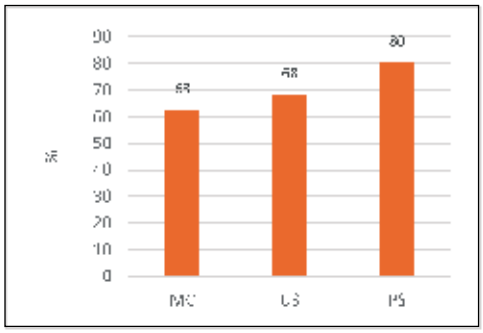


Figure 4.1-5: Percentage of MC, UC, and PS in sample

The distribution pattern of LAs by their type in the sample and size of the population are indicated in Figures 4.1-3 and the percentage of LA representation in the sample is shown in Figures 4.1-4 above.

Highlights of sample distribution by type of LAs.

a. Pradeshiya Sabhas represent 83.7% of the total sample size. In other words, 222 PSs are represented out of 265 LAs surveyed. Furthermore, this sample size is 80.4% of the total number of PSs in the country.

b. Urban Councils represent 10.6% out of the total sample size which is 265. However, the sample size of UCs which is 28 compared to the total number of UCs on the Island, which is 41, amounts to 68.2%.

c. Municipal Councils represent 5.7% out of the total sample of LAs which is 15 out of 265. The sample size of MCs represented in comparison to a total of 24 MCs in the country is 62.5%.

d. Out of the total number of LAs surveyed 33.3% fall under the provinces supported by the CDLG project implemented by the UNDP.

Table 4.1-2 : Coverage of sample in CDLG project supported provinces

Type of LA	Provinces												Total		
	EP			NP			NCP			UP					
	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no
MC	3	2	67%	1	1	100%	2	2	100%	2	2	100%	8	7	87.5%75%
UC	5	4	80%	5	5	100%	0	0	0%	1	1	100%	11	10	91%
PS	37	31	84%	28	27	96%	25	23	92%	25	24	96%	115	105	91%
Total	45	37	82%	34	33	97%	27	25	93%	28	27	96%	134	121	90%

There is a total of 134 LAs in the four provinces the CDLG project is implemented. In this study 122 out of the 134 LAs were evaluated, covering 90 % of the LAs. Similarly, MC representation is 87.6% accounting 6 MCs out of the total of 8 Municipal Councils in the respective four provinces. The corresponding situation for UCs is 91% accounting 10 Ucs out of 11 in these four provinces. A similar reflection is visible in relation to PSs as well, because 91% of the sample i.e., 105 out of 115 PSs belonging to the CDLG Project supported provinces.

The other notable feature is that there are five instances where 100% of sample coverage achieved due to co-terminus state of actual number of LAs and the sample size of similar Type of LAs in Northern, North Central and Uva Provinces (MCs and UCs). It should be noted there is only one instance, in North Central Province with 0% due to absence of UCs in the NCP.

Figure 4.1-6 : a Coverage of sample in CDLG project supported province

Table 4.1-3 : Other provinces summary - Sample coverage

LA Cat.	Provinces															Total		
	Central Province			North Western Province			Sabaragamuwa Province			Southern Province			Western Province					
	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no	Total No of LAs	No. in Sample	% of Sample out of Total no
MC	4	1	25%	1	1	100%	1	1	100%	3	3	100%	7	2	29%	16	8	50%
UC	6	3	50%	3	3	100%	3	1	33%	4	3	75%	14	8	57%	30	18	60%
PS	37	18	49%	29	25	86%	25	19	76%	42	37	88%	28	18	64%	161	117	73%
Total	47	22	47%	33	29	88%	29	21	72%	49	43	88%	49	28	57%	207	143	69%

There is a significant weightage in the study from the other five provinces which are outside of the provinces in the CDLG Project. This is because the e-Systems availability and application of such services in those provinces are considerably higher. The MC representation in the sample is 50% as the sample size of 8 MCs out of 16 in these five provinces, reflecting the total of 24 MCs in the country is 66.6%. UC representation in the survey is 60% because it is 18 out of 30 UCs in the respective five provinces. The overall UC representation is 73% since 30 UCs out of 41 on the island are covered in the sample. The PS representation is 73% because the sample size is 117 out of 161 PSs in the five Provinces. It should be noted that the percentage of PSs in the five provinces compared to the nine provinces is 58.3%.

There are four instances where 100% representation is recorded in NWP, SubP and SP in relation to UCs and MCs.

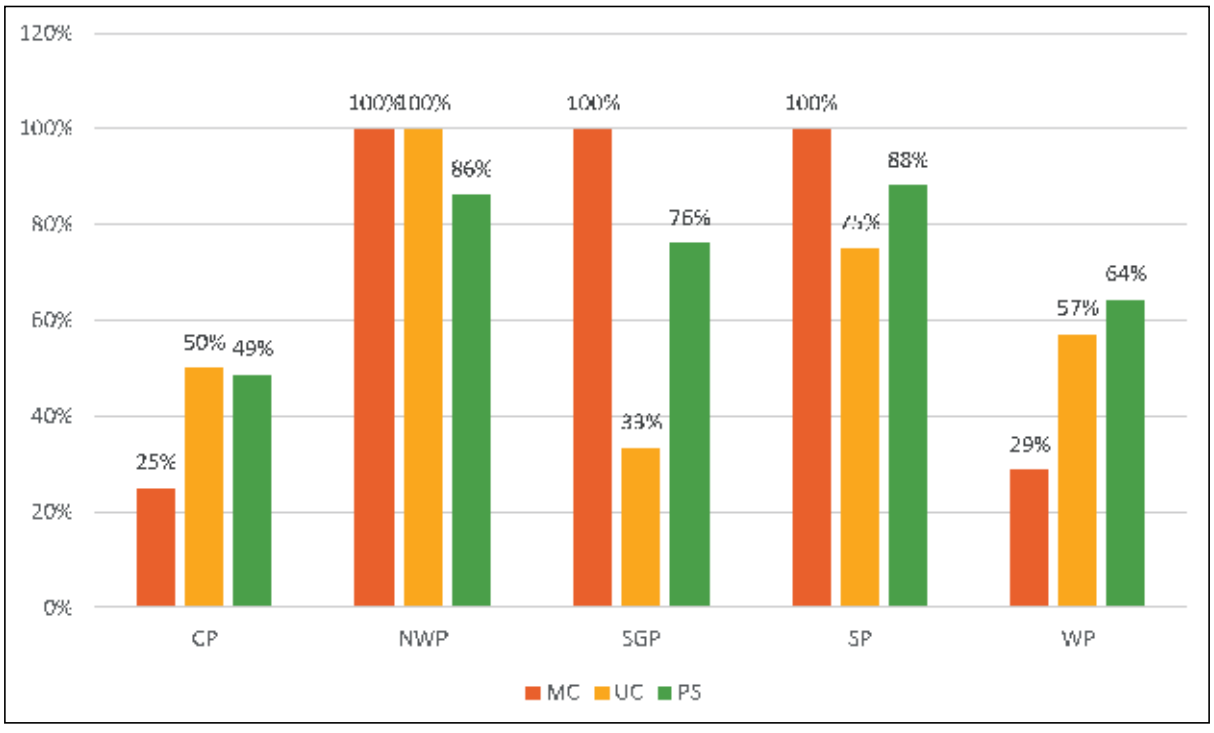


Figure 4.1-7 : Coverage of sample in other provinces

Table 4.1-4 : Distribution of sample by working languages
(Medium (Language) of Work)

Type of LA	Sinhala		Tamil		Bilingual	
	No of LAs	% of LAs in Sample	No of LAs	% of LAs in Sample	No of LAs	% of LAs in Sample
MC	12	80%	3	20%	0	0%
UC	18	64%	7	25%	3	11%
PS	160	72%	43	19%	19	9%
Total	190	72%	53	20%	22	8%

Figure 4.18 Distribution of sample by working language (Medium of Work)

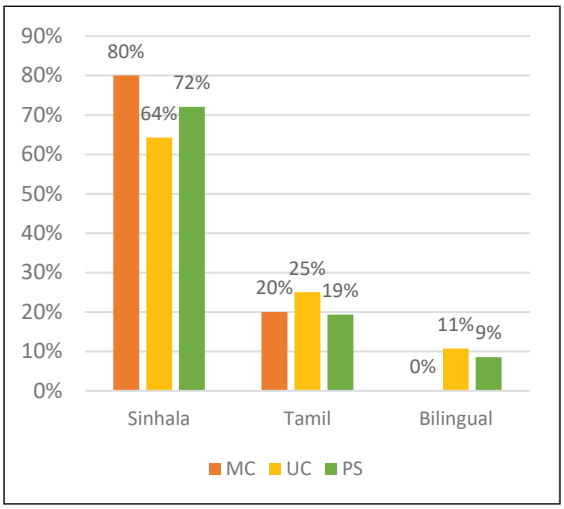


Figure 4.1-9: Percentage of language use of in MC, UC, and PS

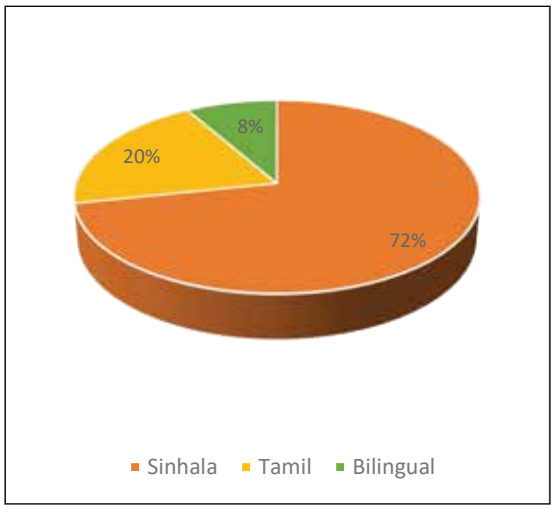


Figure 4.1-10: Language use percentage of different Languages in MC, UC, and PS

The distribution of language medium of work in the given sample seems to be uneven and in all types of LAs, the applicability of the Sinhala language is 72%, the Tamil language is 20% and bilingual usage is only 8%. In terms of MCs, Sinhala and Tamil usages are 80% and 20% respectively and bilingual usage is 0%. Regarding the UCs, Sinhala and Tamil applicability are 64% and 25% with 11% of bilingual usage. This pattern is continued in PSs as well and it has Sinhala and Tamil 72% and 19% with 9% bilingual usage.

The data gathered remarks that bilingual usage is at a critical level in almost all LAs and it should be brought to the attention of higher authorities in the LG sector and policymakers of the country to resolve the current circumstances. The overall bilingual applicability is 8% while MCs record 0%, UCs 11%, and PSs 9% in the sample. The provisions of language policy promote the application of trilingual facilities in public institutions, particularly in LAs where there is a diverse clientele. The other disadvantage of this practice is customer receipts, bills, permits etc. are issued in a single language and thereby a considerable segment of clients are faced with difficulties in understanding the documents provisioned by the LAs.

The Provincial perspective of the language medium of work in LAs is based on the findings of Table 4.5 below. The nature of ethnic diversity prevailing in the country is reflected in this data table. Accordingly, 80% of MCs, 64.2%of UCs, and 72% of PSs use the Sinhala language while 20% of MCs, 25% of UCs and 19.3% of PSs use the Tamil Language. Bilingual usage among MCs is recorded at 0%, in UCs 10.7%, and in PSs it is only 8.5% at the Provincial level distribution.

Table 4.1-5 : Overall language of work summary - Province wise

Type of LA	Languages used	Provinces									Total
		CP	EP	NCP	NP	NWP	SGP	SP	UP	WP	
MC	Sinhala	100	0	100	0	100	100	100	100	100	12
	Tamil	0	100	0	100	0	0	0	0	0	3
	Bilingual	0	0	0	0	0	0	0	0	0	0
UC	Sinhala	67	25	0	0	67	100	100	100	100	18
	Tamil	0	75	0	80	0	0	0	0	0	7
	Bilingual	33	0	0	20	33	0	0	0	0	3
PS	Sinhala	89	19	96	0	88	100	97	92	94	160
	Tamil	0	58	0	93	0	0	0	0	0	43
	Bilingual	11	23	4	7	12	0	3	8	6	19
MC	Total	1	2	2	1	1	1	3	2	2	15
UC	Total	3	4	0	5	3	1	3	1	8	28
PS	Total	18	31	23	27	25	19	37	24	18	222
Grand Total		22	37	25	33	29	21	43	27	28	265

The above situation is further confirmed by following Figures.

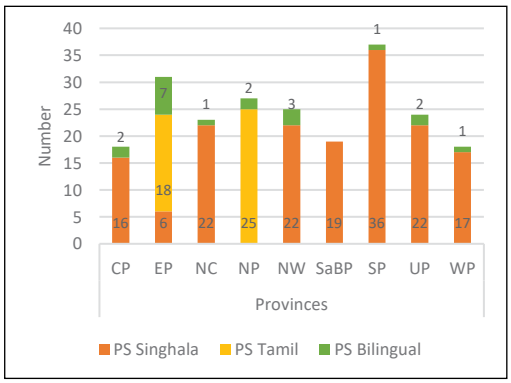


Figure 4.1-11: Number of PS in different languages categories

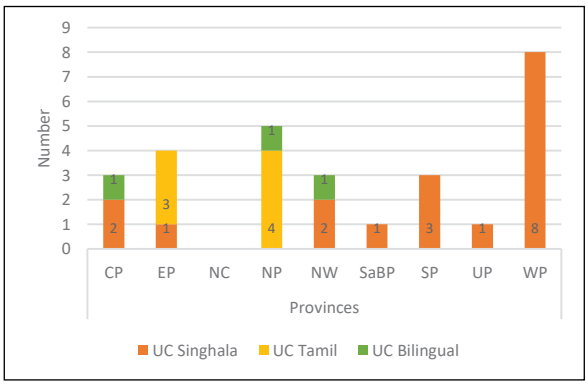


Figure 4.1-12 : Number of UCs in different languages categories

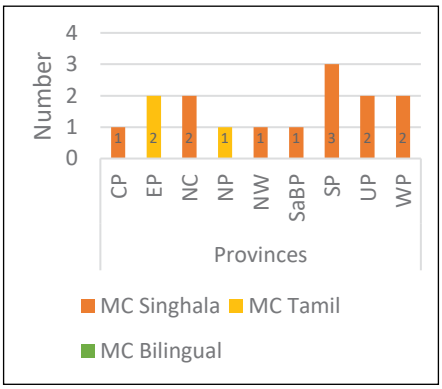


Figure 4.1-13: Number of MC in different languages categories

Table 4.1-6 : Distribution of sample by number of employees

Type of LA	Number of Employees								Total	
	1 to 50		51 to 100		101 to 200		more than 200			
	No	%	No	%	No	%	No	%	No	%
Municipal Councils	0	0	0	0.0	2	13.0	13	87.0	15	100%
Urban Council	0	.0	7	25.0	13	46.0	8	29.0	28	100%
Pradeshiya Sabhas	44	19.0	113	51.0	57	26.0	8	4.0	222	100%
Total	44	16.6	120	45.3	72	27.2	29	10.9	265	100%

The distribution of sample by the workforce of LAs has indicated that 16.6% are in the region of 1 – 50 level of employees, 45.3% of all three types of LAs have 51 -100 employees and 27.2% are in the category of 101-200 employees and only 10.9% of LAs have recorded more than 200 employees in the year 2020.

Table 4.1-6 indicates that 87% of MCs have more than 200 staff members and 13% of MCs between 101 -200 level, both 1-50 and 51 – 100 staff category record 0% in MCs. The status of UCs has a different configuration. No UC records employees in the 1 – 50 categories whereas 25% of UCs have 51 – 100, 46% have recorded 100 -200 staff level, and 29% of UCs have more than 200 employees. In the purview of PSs 20% belong to the 1 -50 category, 51% belong to the 51 – 100 category, 26% to the 100 – 200 category and only 4% record more than 200 employees. This indicates that 96% of PSs and 74% of UCs have less than 200 employees.

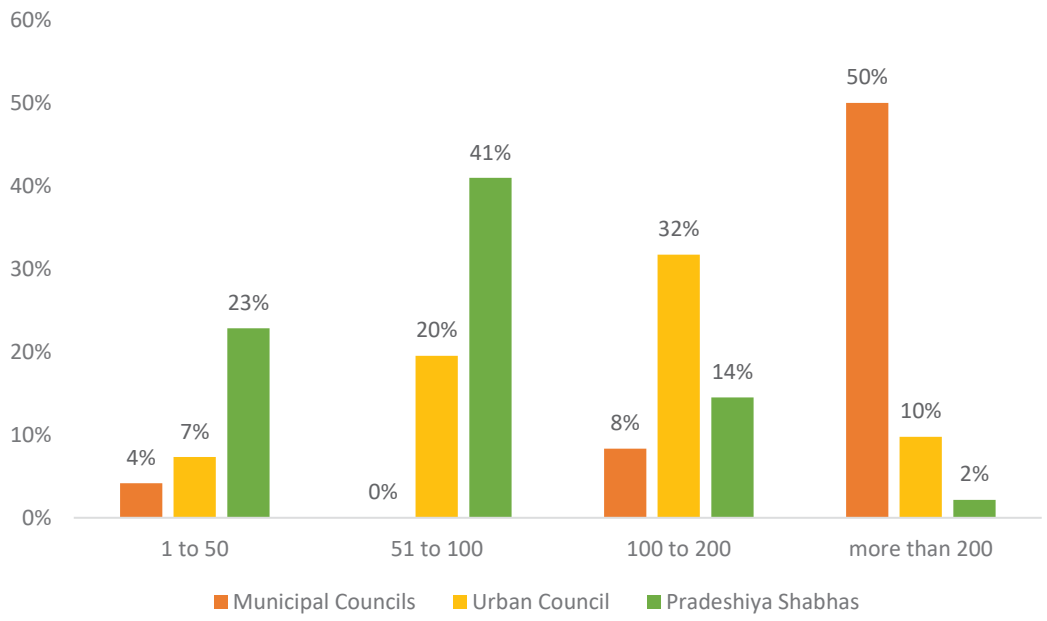


Figure 4.1-14 : Distribution of sample by number of employee population

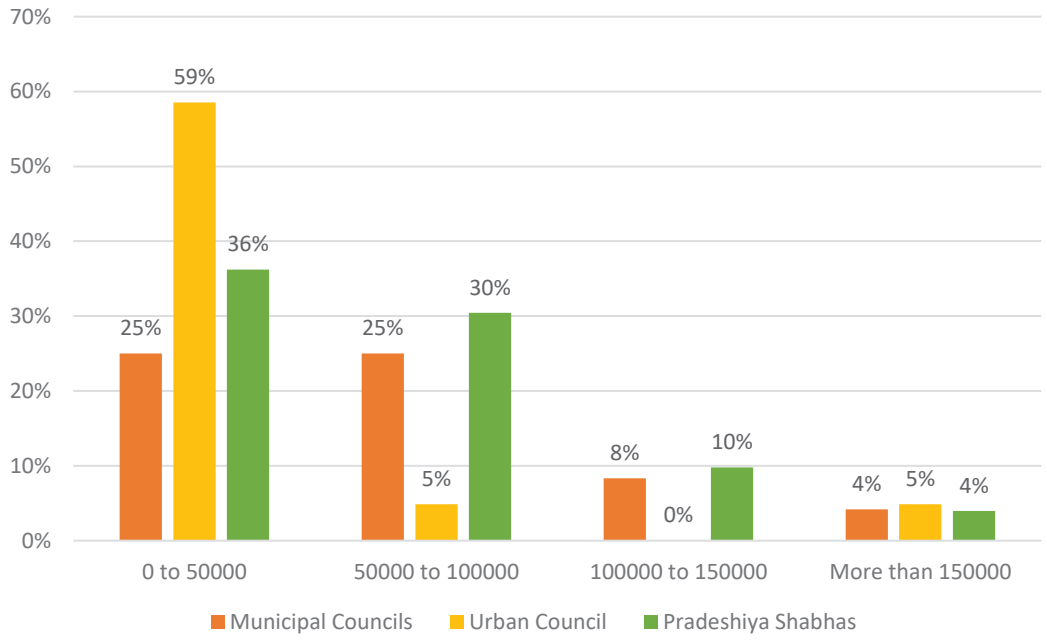


Figure 4.1-15 : Overall size of population - Type of LA wise

Distribution of sample by the size of population served

Demographic distribution of population served in LAs has been scattered giving more weightage comparatively to less populated LAs. 38 % of the sample represents LAs which have less than 50,000 population. 27% of the sample represents LAs which have a 50,000 – 100,000 population. The third category of LAs which have a 100,000 – 150,000 population represents only 9% of the sample. The large-scale LAs in megapolis constitute 4% of the sample.

The tendency of this pattern shows that 59% of UCs are relatively small in physical extent as well as the demographic level and therefore, UCs' population is frequently less than 50,000. Further, 5% of UCs record 50,000 – 100,000 population, 0% in 100,000 – 150,000 and 5% in 150,000 population.

50% of MCs are in the region of less than 100,000 and 12% of MCs record over 100,000 population in this sample.

Concerning PSs 66% of them have less than 100,000 population and 14% have recorded over this limit according to the sample.

Table 4.1-7 : Distribution of Sample by revenue estimates in the annual budget 2020

Type pf LA	Less than 50 Mn		50 Mn to 100 Mn		100Mn to 200Mn		More Than 200Mn		Total	
Municipal Councils	0	0%	0	0%	2	13%	13	87%	15	100%
Urban Councils	2	7%	5	18%	11	39%	10	36%	28	100%
Pradeshiya Sabhas	53	24%	79	36%	62	28%	28	13%	222	100%
Total	55	20.8%	84	31.6%	75	28.4%	51	19.3%	265	100%

The distribution of the sample by revenue estimates in the Annual Budget 2020 of LAs indicates an important picture of their financial capability in the year 2020. Out of the total sample, 20.8% of all types of LAs have less than Rs. 50mn annual budget and 31.6% represent an estimated revenue of Rs.50 -100mn, 28.4% recorded Rs.100 – 200 million and only 19.3% have estimated the annual revenue of more than Rs. 200mn

This distribution remarks that 60% of subnational level local bodies operate between an annual budget of Rs.50mn and Rs. 200mn. Among this category 13% of MCs, 57% of UCs, and 64% of PSs are represented.

Another notable finding is that 87% MCs, 36% UCs and 13% PSs have estimated revenue of more than Rs.200mn in the year 2020.

All types of LAs are bound to deliver public services at least up to a satisfactory level and therefore, the fund allocation in the essential service delivery is a very strenuous task for the LAs. Hence, systems upgrading, digitalization, etc. would become less important priorities in many LAs in the country. Particularly, small scale LAs are finding it very difficult to prioritize more weightage in making system improvements. However, without emphasizing the improvement of service delivery efficiency through the application of new technology in subnational governing entities, they would not be able to cater the increasing service delivery demand sustainably and effectively.

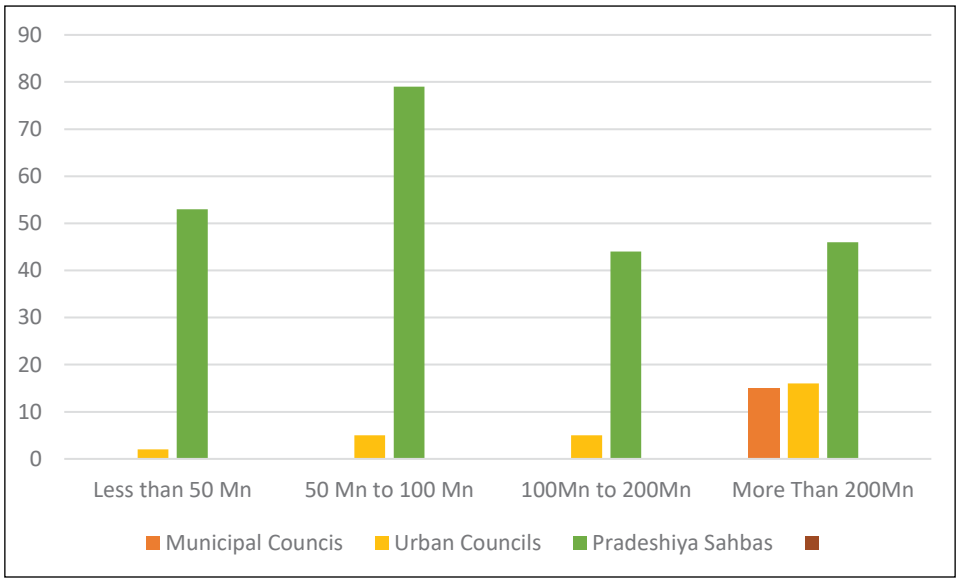


Figure 4.1-16 : Distribution of sample by annual budget allocation

4.2 ICT Hardware, Connectivity, and other Infrastructure Availability

Implementation of any e-Systems would be mainly dependent on the availability of necessary hardware and software infrastructure, network connectivity, and professional manpower. Therefore, under the survey, the information on available and useable ICT hardware infrastructure and network facilities including information on connectivity were separately collected and analyzed, and it has been presented in this section of the report.

ICT hardware and infrastructure availability would pave the way for fast-tracked replication of currently available e-Systems and swift implementation of any new e-Systems. Furthermore, LAs which already have the infrastructure would eventually have the capacity to manage such hardware, networking, and other infrastructure. Therefore, LAs which have the hardware infrastructure are the most suitable immediate candidates for the introduction of any new e-System. Nevertheless, it is also important to understand the prevailing circumstances of LAs which do not have hardware infrastructure and, hence, should plan a proper strategy for implementation of e-Systems at different levels of the LAs.

Whenever applications are used for citizen services, networked hardware infrastructure is essential for supporting a multiuser environment to cater to each service point of the workflow such as initial data entry, approvals, payments, issues of outcome etc. In such a work environment, the availability of common databases

for all in the chain of workflow is imperative. Provisioning in-house server infrastructure or external cloud server infrastructure are the two options available to host the e-Systems and to enable the processing of large volumes of data involved in the service delivery and the operational workflows with high reliability and robust performance. Therefore, it is vital to examine the server hardware availability and usage in this study for exploring the readiness of LAs in adopting e-Systems for citizen services and the enhancement of internal work performance. Table 4.8 provides information about the current availability of server hardware in LAs.

Table 4.2-1 : Availability of server hardware

Type of LA	1 Server		2 Servers		3 Servers or more		Total LAs having servers		Average age of Server Computers (Years)
	Number	%	Number	%	Number	%	Number	%	
Municipal Councils	6	40.0	2	13.0	0	0.0	8	53.3	6
Urban Council	9	32.1	1	4.0	1	4.0	11	39.3	3
Pradeshiya Sabhas	34	15.3	3	1.5	2	1.0	39	17.6	4
Total	49	18.5	6	2.3	3	1.0	58	21.9	Avg. 4.2

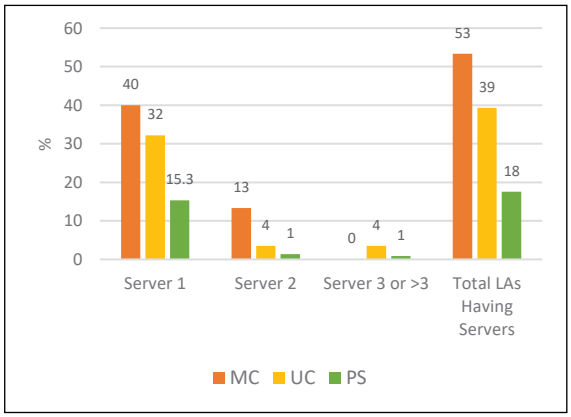


Figure 4.2-1 : Server infrastructure availability by MC, UC and PS

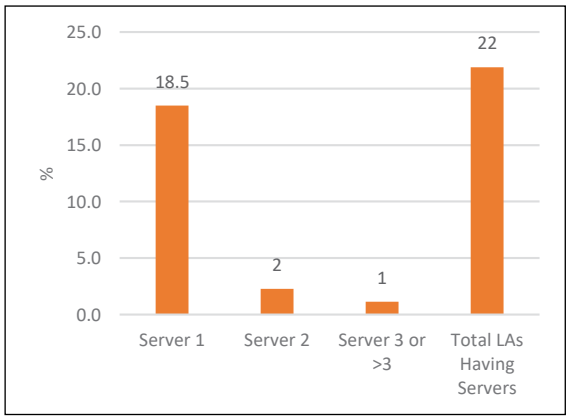


Figure 4.2-2 : Total server infrastructure availability

Out of 3 groups of LAs, MCs and UCs have invested comparatively more on the servers while PSs show little interest in investing in the same. However, when considering the use of a minimum of one server or more, MCs have reached 53.3% while UCs have reached 39.3%. Only 17.6 % of PSs have invested in one server or more for the use of hosting the software applications and databases. This reveals the low readiness of the LA system for implementation of e-Systems in their respective entities.

The data also shows that out of the LAs with servers, the majority have only one server. Accordingly, 18.5% of LAs have one server, 2.5% have two servers and only one of LAs has three or more servers. Notably, among the three categories 13% of MCs and 8% UCs record that they have more than one server. This data reveals that most of the LAs are hosting their software application and data in one server. The same server is used for user management and security purposes too. Furthermore, it shows that there is no onsite live backup facility or disaster recovery facilities.

The important finding from the research is that currently available e-Systems are hosted in very primitive server hardware with limited control over the application components, user levels and databases. Multiple e-Systems are hosted and running on one server which may potentially result in single-point failure. As a standard practice, it is important to segregate each server type as a separate physical node to implement better performance and high availability. Maintaining a single server for multiple purposes will only reduce the

cost of procurement but fails to maintain business continuity in the event of a possible technical failure such as hardware failure, system crash, virus attack, etc. Therefore, in conclusion, current e-Systems have a high risk of failure and therefore LAs may have to maintain manual information in parallel to the e-Systems.

Another vital fact to be considered is that these servers are almost obsolete as per the average age calculation. The maximum lifetime of a server is around 6 to 8 years. From the study, it has been revealed that the average age of a server in the LA system is 4.2 years. Even though MCs have more server availability, they have been used for more than 6 years without any interest in upgrading them. This further confirms the high level of risk in the available e-Systems.

Furthermore, the lack of server availability has forced LAs to maintain their data and other valuable information on standalone desktops. In case of backups, they should house separate backup drives or automated backup systems, so that due protection is provided, and unauthorized access does not compromise the information. Any hardware failure will create operational issues due to a lack of redundancy and may result in the possible loss of data. On the contrary, using a server beyond its end of life will certainly pose a greater risk for the hosted systems and the failure rate will also be high.

The survey also explored whether cloud storage services or separate on-premises disaster recovery services are being used for data storage to complement the available server hardware infrastructure. Table 4.2-2 presents data related to the use of cloud storage solutions and disaster recovery facilities outside the institution as the primary or the secondary remote facility.

The data reveals that LAs show less interest in using cloud solutions for e-Systems applications and hosting data generated and handled through these applications. In overview, only 6% of LAs are using the cloud environment whereas 13% and 14% of MCs and UCs have been respectively recoded as cloud uses. In PSs the cloud usage is 5%.

Since most of the e-Systems which are currently being used are client-server applications, there is no technical requirement to necessarily host it in a cloud. From the perspective of the LAs, it is an additional monetary burden for cloud rent and the cost of connectivity. It was also recorded that in most cases, cloud usage is mainly for web hosting. However, very few LAs use the cloud for hosting their web-based applications, such as the Garbage Vehicle Tracking system.

Table 4.2-2 : Usage of clouds and disasters recovery availability

Type of LA	Cloud Usage		Disaster Recovery Availability	
	No	%	No	%
Municipal Councils	2	13%	2	13%
Urban Council	4	14%	3	11%
Pradeshiya Sabhas	11	5%	8	4%
Overall	17	6%	13	5%

Out of the total number of LAs in the sample only 5% have been recorded for using a disaster recovery mechanism if the live system is totally defunct. Lack of disaster recovery infrastructure implies possible operational downtime (risk on business continuity) and loss of data/information in case a risk of system failure materializes. This shows that current hardware infrastructure arrangement in the LAs are neither supporting for reliable and continuous services delivery nor favorable conditions for a new system implementation.

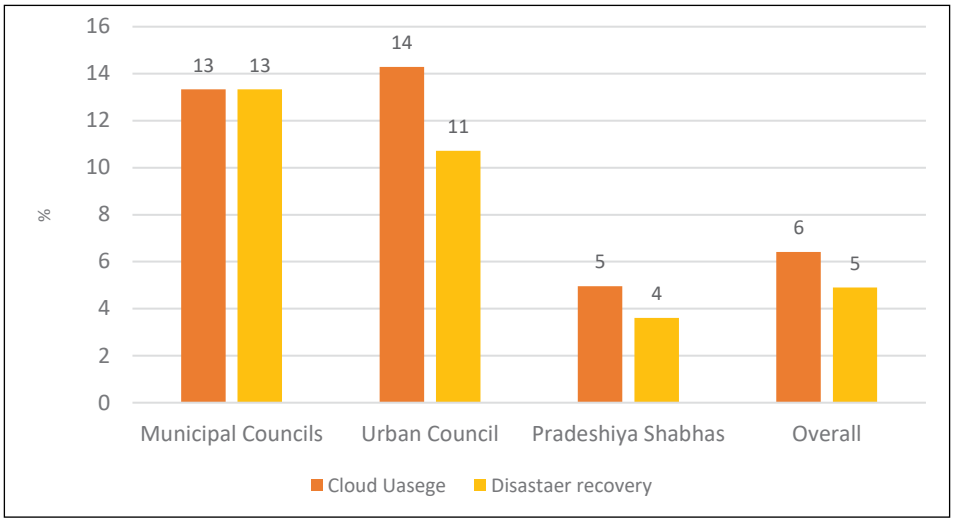


Figure 4.2-3 : Usage of Cloud Service and Disaster Recovery Availability

It is also observed that LAs are not reaping the benefits of the current trend of cost-effective Software as a Service (SaaS) based solutions instead of on-premises solutions which creates additional overheads to maintain and for continuous upgrades.

In the context of software development and implementation, various software application systems have been developed using different software stacks. When a software application system is to be deployed in a particular institution or cloud, if the same stack of software such as Operating Systems, databases and web development tools are available, the software could be deployed without any major revisions. Therefore, it is useful for understanding the currently available server Operating Systems and other software stacks for the hassle-free deployment of new software or replication of currently available software. Table 4.2-3 presents the status of server Operating Systems in the LAs that were studied.

Table 4.2-3 : Type of OS Platforms used in server computers

Type of Platform	Servers by OS	
	Number	%
Windows Servers	53	91%
Linux	4	7%
Unix	0	0%
IBM	1	1%
Others	0	0%
Total	58	100%

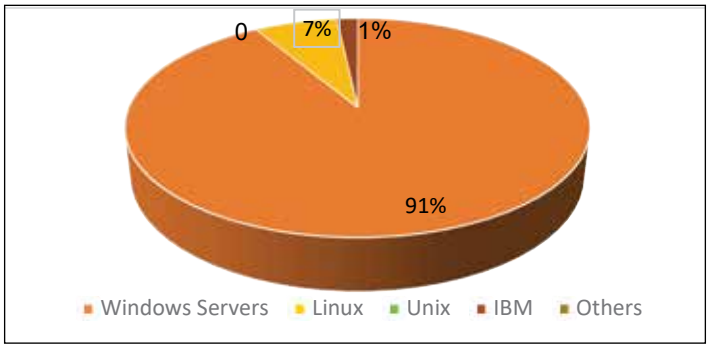


Figure 4.2-4 : Servers by Operating System

According to the server data, more than 91% of the servers in LAs are using Microsoft Windows Operating System which uses a proprietary and user-based licensing model. Only 7% use the open platform OS Linux. The use of proprietary-based operating systems will add more overhead expenses to LAs when it comes to upgrading their servers to the latest versions. Furthermore, the LAs will have to purchase proprietary databases and other supplementary applications at an extra cost. This will result in extra budget allocations on top of the annual licensing and maintenance fees which could potentially be an economically unfeasible option for LAs. Therefore, for LAs it would be worthwhile to move into open-source stack whenever possible in their future system implementations.

Availability of a warranty and maintenance agreement for server hardware ensures the robust operation of server hardware infrastructure while guaranteeing reliability for hosting the software application and databases for providing the citizen services. Table 4.2-4 presents the information on the current availability of warranty and/or maintenance agreements by the service providers.

Table 4.2-4: Status of maintenance of servers

Warranty /MA Types	LAs with warranty for OS	
	No	%
Warranty/Maintenance Agreement available	6	11%
No warranty or Maintenance agreement	37	63%
Not Aware about Warranties/Maintenance agreement	15	26%

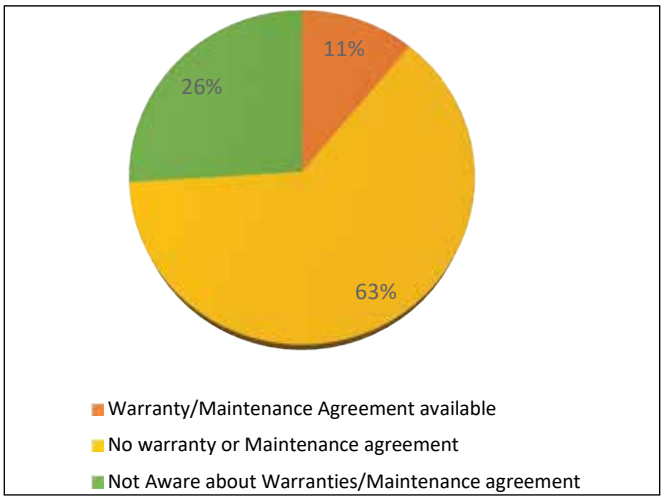


Figure 4.2-5 : Status warranty and maintenance

It was noted that more than 63% of LAs do not have any warranty/maintenance agreement. On the other hand, 26% of LAs do not have any idea about warranty/maintenance agreements.

As a standard, there is a 3- year warranty applicable for a server from the date of purchase. This warranty is usually applicable for high-cost parts such as processors, Memory, Hard Disk, etc... If LA officers are not keen on an applicable warranty, suppliers will reduce the duration at the time of procurement. Furthermore, if LAs are unable to maintain the warranty logs, it could create possible overheads in case of a server malfunction. Moreover, if officers try to repair a server that is already under warranty period, the respective supplier will not accept any warranty claims. Hence, it is vital to have sound knowledge about the warranty and to make maximum use of the warranty granted by maintaining proper logs and educating officers who are in charge of the servers/PCs.

In order to explore the possibility of introducing new software applications and/or replication of existing applications without adding new hardware or with minimum addition of new hardware, understanding the current availability of storage capacity and the use of the available capacity of server hardware is vital. Table 4-12 presents information on the current usage of storage capacity in server hardware.

Table 4.2-5 : Server capacities used

Server Capacity levels	Number of LAs		Average Capacity Usage
	No	%	%
> 1TB	30	51%	74%
1 To 5 TB	26	45%	68%
5 to 10 TB	1	2%	65%
More than 10 TB	1	2%	50%

The notable information here is that majority of servers (51%) have a storage capacity of less than 1 TB. When considering storage capacities of modern servers, this equipment could be in the category of very low-end servers. Otherwise, these computers could be high-end desktops which are used as the servers with the server Operating Systems. In either situation, servers of this nature are not to be recommended for hosting applications and data for the operation of citizen services as hardware storage would not be adequate to cater the growing data stocks. Since server capacities are low, it will result in poor performance in the long run increasing turnaround time for operations. It is very much required to maintain this kind of servers very frequently to remove temporary logs and archive other non-critical data to maintain the required capacity.

However, out of the available servers, around 49% are higher capacity servers that can be used for future application hosting.

In terms of the capacity usage of the servers, low-end servers have been used to their full capacity or more. There is no adequate space for any new software applications and databases on those servers. Also, due to capacity issues, LAs would not fully use the available features of the software products and continue to use manual paper-based documents instead of digital documents.

With regard to the high-end servers, usage of existing storage capacity is about 50-60%. However, there are only 2 to 3 such servers in the overall sample of the LAs.

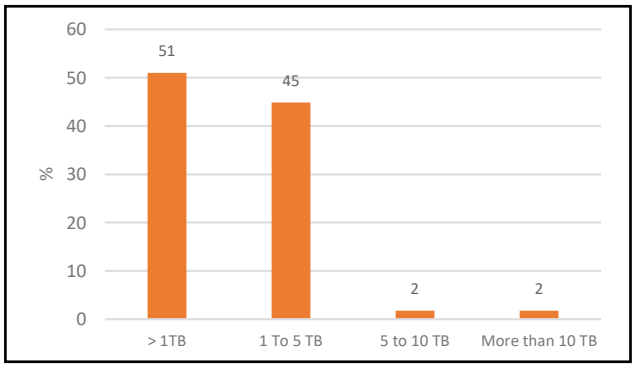


Figure 4.2-6 : Storage capacity of servers

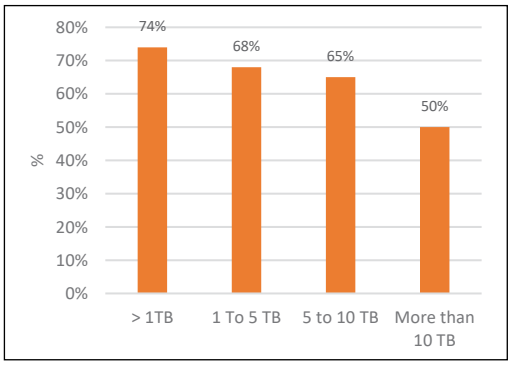


Figure 4.2-7 : Average usage of available server capacities

In the journey of digitalization of LAs, it is vital to examine the status of the availability of computer networks, and internal connectivity as almost all new e-Systems are designed for a multi-user environment with the capacity for online services. Table 4-13 records the status of the availability of network infrastructure and internet connectivity.

Table 4.2-6 : Status of networking and internet connectivity

Connectivity Type / Type of LA	LAN		WAN- ADSL/ Other Connectivity		VPN/LGN		Any other connections	
	No	% Out of Sample	No	% Out of Sample	No	% Out of Sample	No	% Out of Sample
MC	9	60%	6	40%	0	0%	0	0%
UC	24	86%	12	43%	2	7%	2	7%
PS	180	81%	83	37%	3	1%	5	2%
Total	213	80%	101	38%	5	2%	7	3%
Average Data Speed MBPS	100		78		100		77	

Out of the total LAs, 80% record that Local Area Network (LAN) infrastructure is currently available in their office premises. Having only a LAN configuration will meet the basic operational need to run the system within a single premise and on-premises server set up or the desktops connected. It also provides the necessary support for running the client-server software application systems, which is beyond running the standalone applications by a single person using a single standalone computer.

Only 43% of LAs have internet connectivity with an average speed below 100 Mbps. The connectivity comprises predominantly ADSL (38%) and a few other connection types. It was observed that the availability of Lanka Government Network (LGN) or other strong Virtual Private Network (VPN) connections are at 2% which is negligible. It will create difficulties when connecting to services of LA available online, causing possible loss of opportunity and low service level efficiency. On the other hand, it will be impossible to expand the operations to implement online and mobile-enabled services such as tax collections, vendor ticketing in fairs maintained by the respective LA, etc. Further, a LAN setup will not assist to continue the LA operation by enabling remote working arrangements (Work from home) due to COVID-19 or any other disaster situations.

The LAs need to provide secure and reliable connectivity for hosting and serving e-Systems and relevant applications to the end user. The recommended and preferred connectivity solution is Virtual Private Network (VPN) to enable dedicated, secure, and reliable access to e-Systems. But most of the LAs have only basic connectivity packages such as ADSL or other commodity broadband solutions.

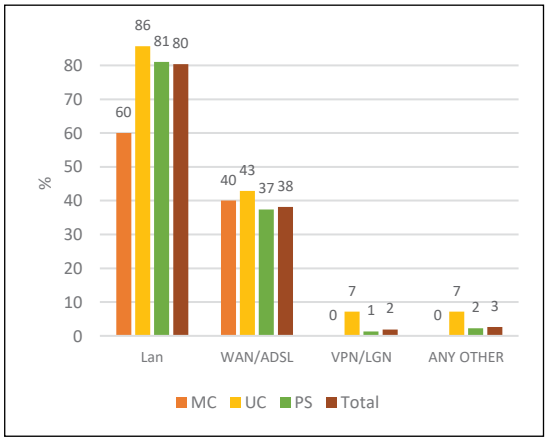


Figure 4.2-8 : Type of internet connectivity

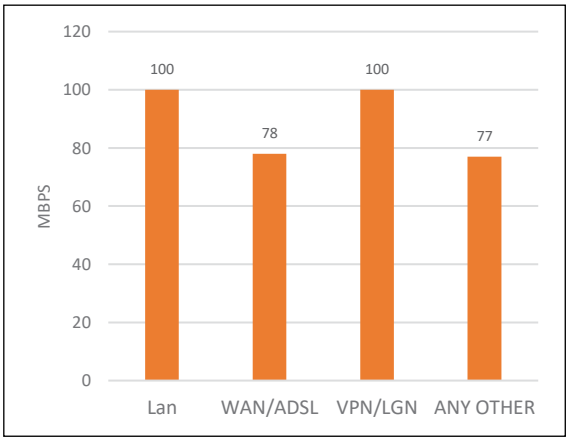


Figure 4.2-9 : Average internet connectivity speed MBPS

Switching to cloud-enabled low-cost solutions will not be feasible for LA if they continue to use LAN or have low-speed internet connectivity. Hence, it will be vital to expand the connectivity infrastructure by extending the services of LGN to the LAs to provide online and mobile service delivery mechanisms for citizens' convenience.

The availability of client hardware, such as desktops and laptops are mandatory for the implementation of the e-Systems at LAs. Table 4-14 presents the data related to the availability of client hardware, the status of the connection to a network and the average age of client hardware.

Table 4.2-7 : Availability of client hardware

Type of Hardware (Laptop / Desktop)	Operating System	Total number of units			Number of units under warranty /MA		Average age
		Total number of units	Total number of units	% Networked	Number of units under warranty /MA	%	
Laptop	Laptop Windows	638	247	39%	189	30%	1.5
Laptop	Laptop_ Linux/Ubuntu	0	0	0	0	0	0
Laptop	Laptop_MAC OS	0	0	0	0	0	0
Laptop	Laptop_Other	0	0	0	0	0	0
Desktop	Desktop_ Windows	4891	2500	51%	653	13%	2.7
Desktop	Desktop_Linux/Ubuntu	0	0	0	0	0	0
Desktop	Desktop_MAC OS	0	0	0	0	0	0
Desktop	Desktop_Other	0	0	0	0	0	0

Almost all laptops and desktops are using Windows OS. Only 12% of units are laptops and a majority are desktops. Nearly 50% of the client computers are connected to the network. 30% of laptops are under warranty and only 13% of desktops are under warranty. As per the above data the average age of Desktop computers show that most of the devices are aged within 1.5 years. This means that the devices are procured within the mentioned timeline. Similarly, the laptops have about 2.7 years of operation. This trend shows that most computers have fairly new hardware configurations.

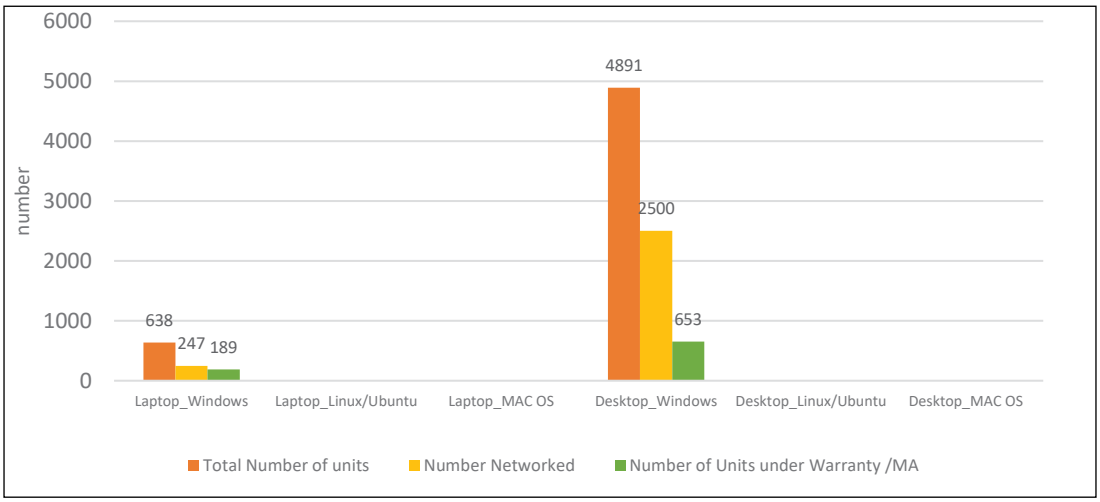


Figure 4.2-10 : Number of client computers by Operating System

Use of proprietary software for an OS will incur a possible licensing cost to the LA specially when upgrading to the latest OS platform. Further, it will cost more when procuring the units due to the OS license. Hence, an alternative to seeking an open OS will be a critical factor to reduce the cost of IT infrastructure. On the contrary, by looking at the availability of warranty and the lifespan of the client computers, both desktops and laptops may have been purchased without a warranty or a warranty period below 2 years. In this context, it will create additional costs for maintaining such units in the long run. In addition, the availability of laptops is in minimal capacity (12%), which will result in difficulties in enabling mobile services or remote working arrangements (Work from home operations).

When considering the average number of client hardware for a single LA, it has been reported that 2.4% of laptops and 18.5% of desktops are available within a single entity on average. Accordingly, there is a possibility of introducing new e-Systems without much trouble with client hardware. However, there is a necessity for upgrading desktop hardware consequently.

Availability of office software and productivity software is another variable to investigate, as the use of this software for official work defines the ability and familiarity of the use of computers by the workforce in the LAs. Furthermore, office software and productivity software play a significant role in the implementation of e-Systems. Table 4-15 shows the status of the use of office software and productivity software in the LAs.

Table 4.2-8 : Use of office software productivity software

Productivity Software	Proprietary	Open Source	% of Officers Who Use Software
Word Processing	99%	1%	17.64%
Spreadsheet	99%	1%	16.31%
Presentation	100%	0%	7.89%
Desktop publishing	99%	1%	3.41%
Database Software	100%	0%	2.91%
AutoCAD/ Drafting Software	100%	0%	1.14%
Email	37%	63%	4.86%
Video Conferencing	71%	29%	1.88%
Any Other	63%	38%	0.47%

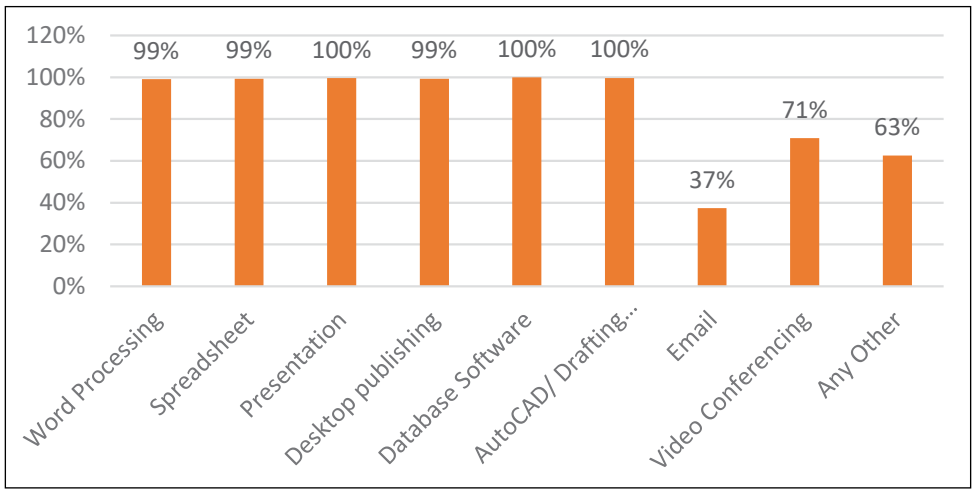


Figure 4.2-11 : Usage of proprietary productivity packages

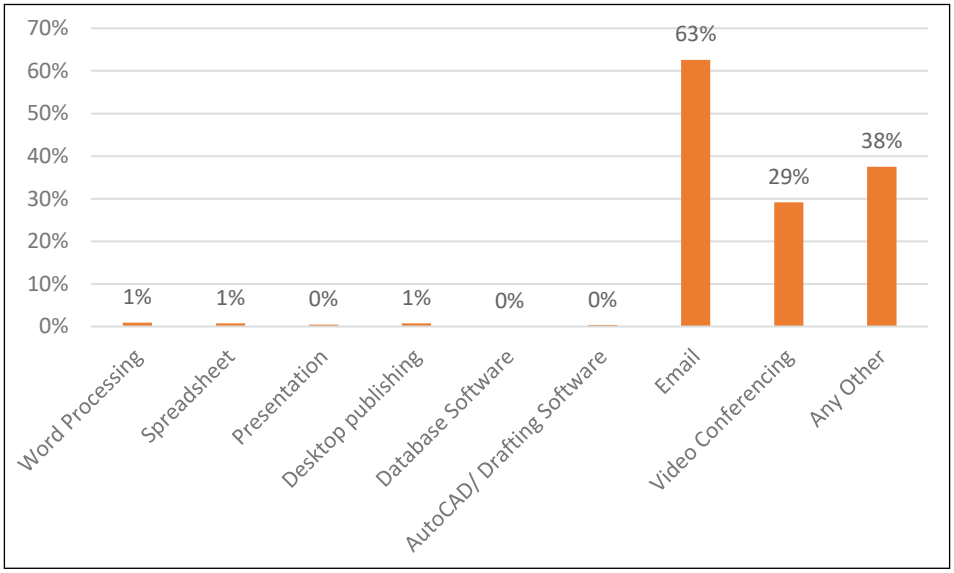


Figure 4.2-12 : Usage of open productivity packages

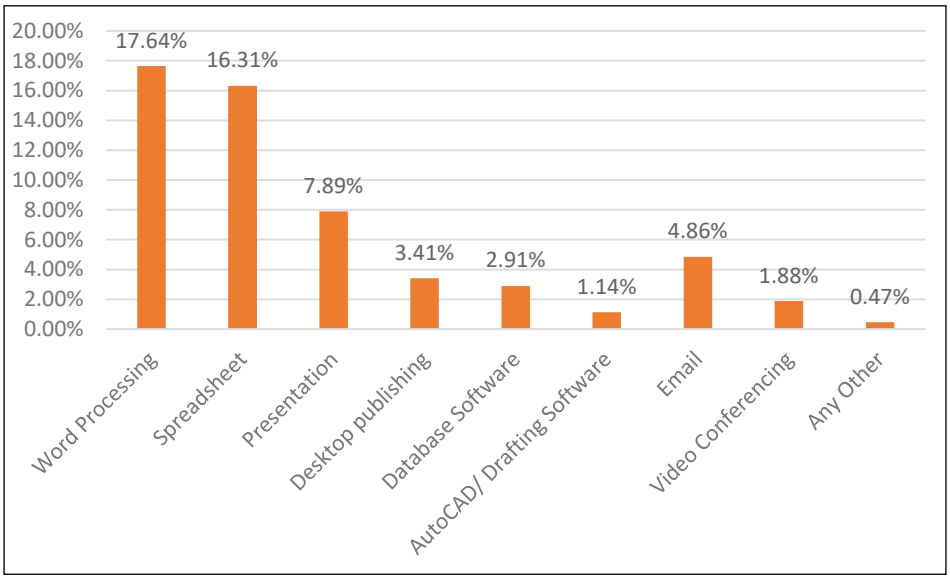


Figure 4.2-13 : Usage of productivity packages by staff

The present software usage of each LA is more focused on proprietary-based packages. The majority of the software packages used are word processing, spreadsheets and presentations software for office use. This personifies the feasibility of successfully implementing e-Systems as LAs are competent in using software packages.

4.3 ICT professional and HR Availability

Implementation of any e-System would further be dependent on the availability of required professional staff within the LAs. Any e-System project will finally be run and managed by these professionals so that lack of knowledge and capability will affect successful implementation. Therefore, under the survey, the information on the availability of human resources and their qualifications were separately collected and analyzed and it has been presented in this section of the report.

Table 4.3-1 : ICT professional human resources availability in LAs

Profession	Available	Not Available	Total	Available	Not available
System Analyst	5	253	258	2%	98%
Programmers/Software Engineers	2	256	258	1%	99%
Database managers	0	258	258	0%	100%
Data entry officers	16	242	258	6%	94%
Network managers	0	258	258	0%	100%
ICT Technical Officers	10	248	258	4%	96%
Other (IT Related)	27	231	258	10%	90%

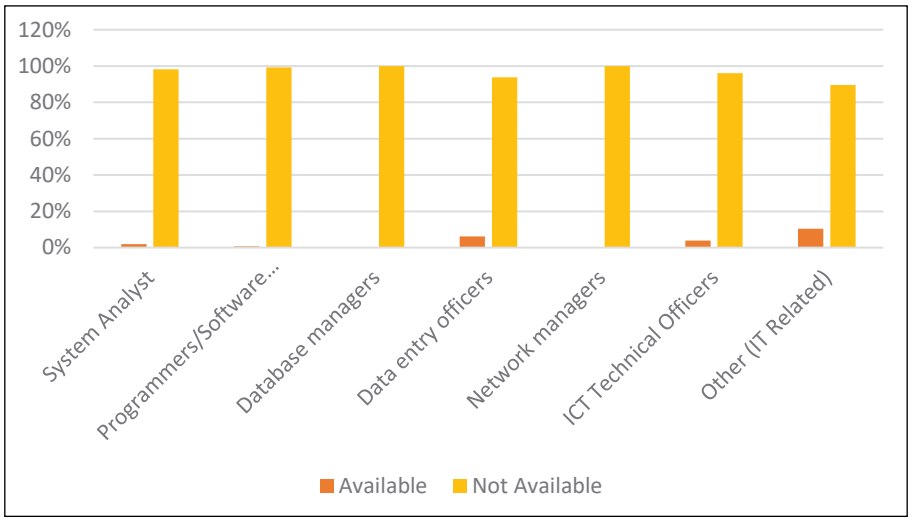


Figure 4.3-1 : Human resources availability in LAs (ICT professionals)

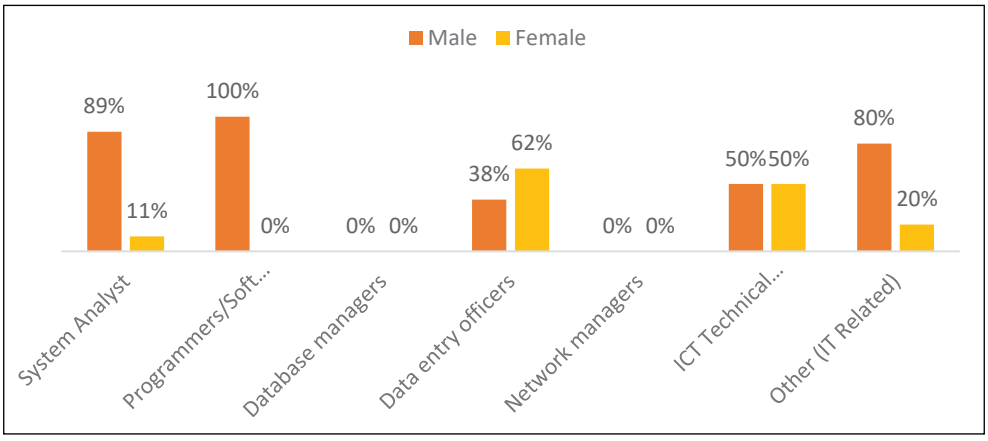


Figure 4.3-2 : ICT professionals by gender

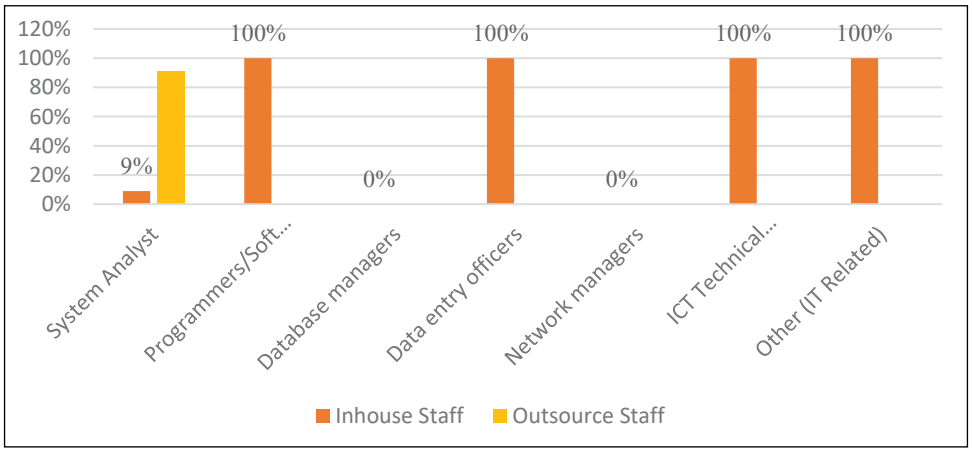


Figure 4.3-3 : ICT professionals - In-house vs Outsource

Only 60 out of the 258 LAs in which the survey was conducted have ICT Professionals/Skilled staff, who are mainly employed for data entry works. The availability of professional ICT staff cadres such as software engineers, database managers, network managers, etc. is at a very negligible level in the LAs. The majority of female staff (90%) are occupied in data entry work. The majority of staff are occupied with infrastructure maintenance. There are a few LAs who have outsourced services from professionals, but it doesn't constitute a considerable level in comparison.

Since the LA's primary focus is to provide public services as per their core mandate, maintaining skilled ICT staff in-house will not be a cost-effective approach. The exclusive allocation of a skilled cadre for ICT-related tasks can be considered at a minimal level. However, the negative aspect of not obtaining professional services from skilled staff is risky as the low-level staff input for complex technical issues may lead to service issues when implementing e-Systems. Hence LAs should look for obtaining professional services by outsourcing the work depending on the circumstance. In addition, LAs can plan to obtain consultancy services so that their internal staff can further provide improved services with the guidance of industry experts.

Table 4.3-2 : Qualification of professional Human Resources

Designation	Number of LAs with Professionals and Skilled workers	Certificate/ NVQ Number	Certificate level %	Diploma Number	Diploma level %	Bachelors Number	Bachelor's degree %	Masters Number	Master's degree	Total	Average Number of Years of Experience
System Analysts	3	1	33	0	0%	2	67%	0	0%	3	8.5
Programmers/ Software Engineers	1	1	100	0	0%	0	0%	0	0%	1	2
Database managers	0	0	0	0	0%	0	0%	0	0%	0	0
Data entry officers	13	7	47	4	27%	4	27%	0	0%	15	4.3
Network managers	0	0	0	0	0%	0	0%	0	0%	0	0
ICT Technical Officers	7	4	57	3	43%	0	0%	0	0%	7	11
Any other related	11	5	46	5	46%	1	9%	0	0%	11	4
Total	35	18	48.6	12	32.4	5	13.5	0	0	37	5.03

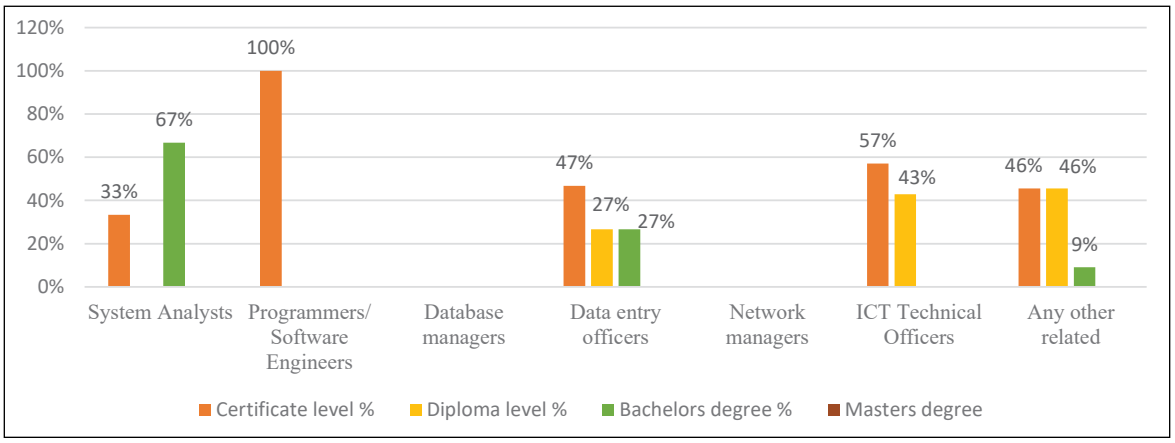


Figure 4.3-4 : ICT professionals by qualification

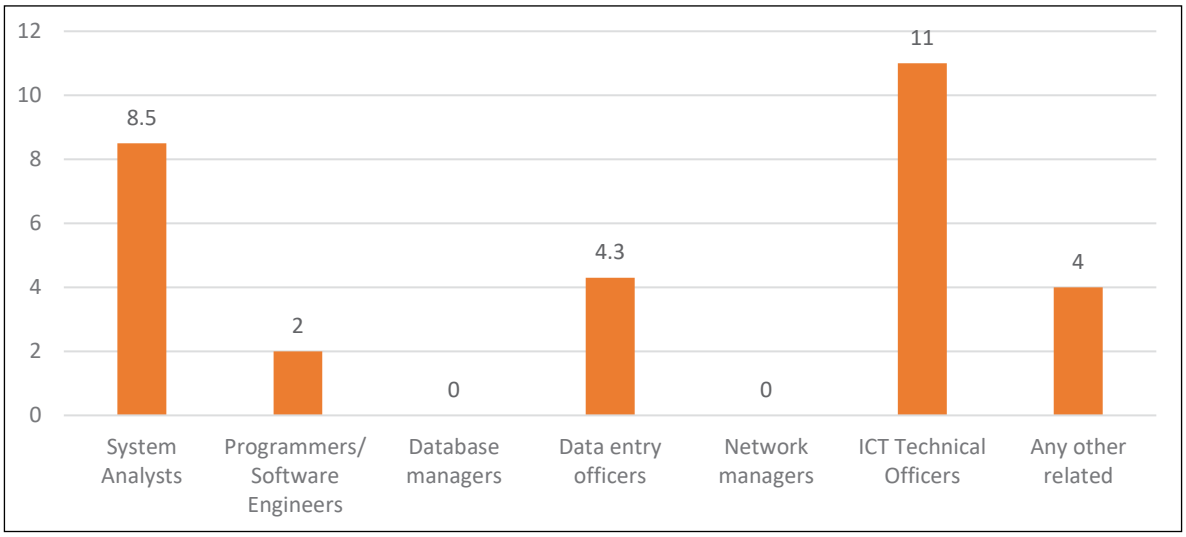


Figure 4.3-5 : Average number of years of experience ICT professionals

The majority of the staff (49%) who work as ICT professionals in a LA have a certificate or National Vocational Qualification (NVQ) level. 32% of them have Diploma level qualifications. Only 14% of the workforce have a bachelor's degree and no one has a master's degree. The degree holders who are engaged in Data Entry operations have predominantly majored in Arts background rather than a specialization related to IT. The number of years' experience is quite reasonable, in terms of understanding the nature of e-Systems and adapting to the context within the LA to provide efficient service delivery.

Considering qualification levels, it is very doubtful that respective LAs can get a due level of service from the available staff. Attracting industry-caliber resources can be a tedious task for LA due to many reasons.

1) The very lower level of salaries compared to the market salary structures
2) Lack of career development opportunities
3) Lack of focus on ICT improvements

Hence LAs need to rethink their strategic direction over implementing e-Systems for their public services along with adapting to improved HR administration policies and practices to attract industry-caliber resources. This movement will guarantee to attract professional staff with due qualifications so that LAs can obtain the best outcome from the staff allocated for a specific job. This should be aligned with the outsourcing strategy so that staff utilization can be maximized further.

4.4 e-Systems Availability and Usage

One of the key objectives of the study is to find out the availability of e-Systems for handling the services and the pragmatic usage of these e-Systems for performing the services at LAs. Considering the nature of the services and its consumers, mainly, two categories of e-Services have been identified. The first category of e-Services is to provide the services of local authorities to citizens and the businesses which are called Government to Citizen Services (G2C) and Government to Business (G2B) services. In this case, any services made available online, and services offered in-house, which were improved fully or partly through e-Systems such as property tax payment systems were considered as G2C and G2B services. The second category of e-Services is Government to Government(G2G) services which enhance the internal efficiency of the work of the government institutions such as payroll and accounting systems.

From the point of view of the citizen, G2C services and G2B services are the most important services of local authorities. These e-Systems could enhance citizen friendliness, service performance, and transparency by reducing room for malpractices in the delivery of such services. Table 4-18 below explains the current distribution of G2C and G2B services in the 261 local authorities which was surveyed under a sample survey. (Out of total local authorities in the of each category, the sample represents 46% of Municipal Councils, 63% of Urban Councils and 81% of Pradeshiya Sabhas).

Table 4.4-1 : Availability and usage of G2C and G2B systems

Type of LA	Number of LAs in Sample	Using G2C and G2B 1 to 3 services		Using G2C and G2B services (>=4)		Not using/not available G2C and G2B Services	
		Number of LAs	% out of Sampled Type of LAs	Number of LAs	% out of Sampled Type of LAs	Number of LAs	% out of Sampled Type of LAs
Municipal Councils	15	11	73.3%	2	13.3%	2	13.3%
Urban Council	28	18	64.3%	0	0.0%	10	35.7%
Pradeshiya Sabhas	222	78	35.1%	0	0.0%	144	64.9%
Total	265	107	40.4%	2	0.8%	156	58.8%

Accordingly, only 41.2% of local authorities are using some kind of e-Systems for providing G2Cand G2B services while 58.8% of the local Authorities are not providing a single G2C or G2B service to the citizen through e-Systems currently. However, the vast majority of LAs are using only 1 to 3 citizen services and it is 40.4% of the total sample. The LAs which are not using the e-Systems for citizen services are discharging their services through traditional manual systems.

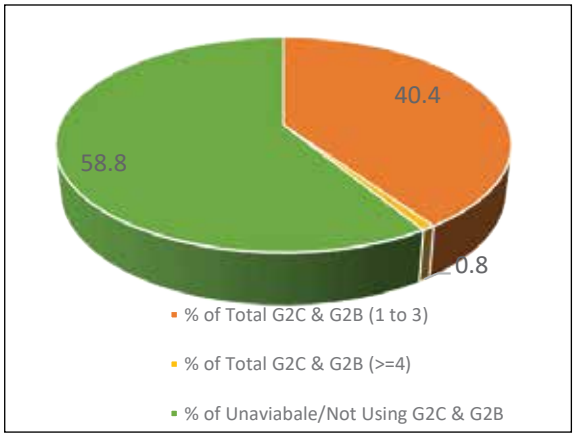


Figure 4.4-1 : Status of G2C and G2B systems usage by all LAs

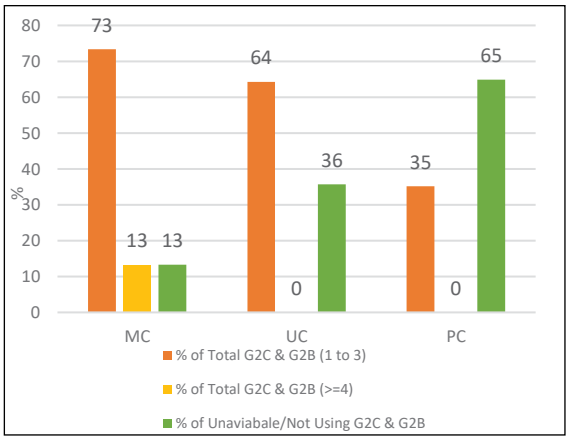


Figure 4.4-2 : Status of G2C and G2B e-Systems usage by type of Las

It has been noted that the main reason for reporting an overall lower percentage of use of e-Systems for citizen services is a result of the representation of 83.8% of the sample by the Pradeshiya Sabhas.

With regard to the MCs and UCs, the use of e-Systems for citizen services shows encouraging data and it is 86.6% and 64.3% respectively. However, the usage of e-Systems at PSs for citizen services is at a very low level and it has been recorded as 35.1%.

However, when considering the LAs that have some kind of G2C and G2B citizen service, 40.4% (107 LAs) have 3 services or less than 3 services. It is important to note that only 0.8% (2 LAs) have 4 or more than 4 G2C and G2B services.

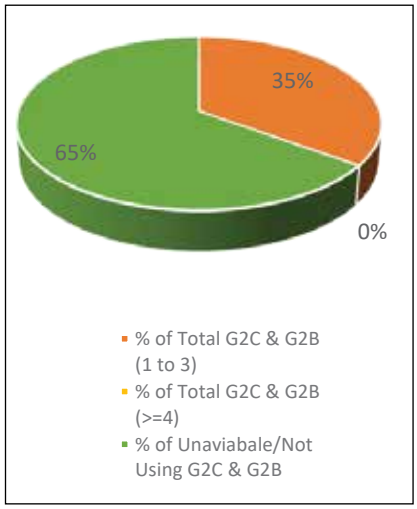


Figure 4.4-3 : Status of G2C and G2B e-Systems usage in by PSs

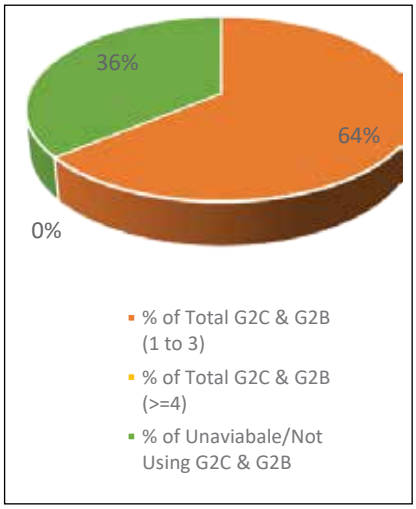


Figure 4.4-4 : Status of G2C and G2B e-Systems usage by UCs

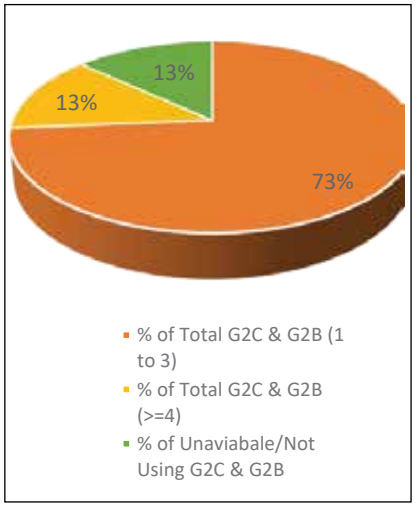


Figure 4.4-5 : Status of G2C and G2B e-Systems usage by MCs

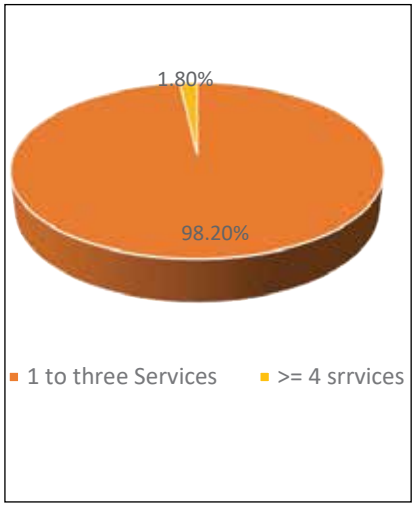


Figure 4.4-6 : Comparison of LAs with 1 to 3 and >=4 number of total G2C and G2B services

In terms of the enhancement of institutional performance and overall government systems performance, the G2G services play a major role. The key G2G e-Systems are mainly being used for handling the processes related to accounting, finance management, payroll management, inventory controlling, attendance management, fleet management, etc. Table 4-19 illustrates the current usage of G2G e-Systems.

The majority of LAs are using a minimum of one or more G2G systems for enhancing the internal performance of the institutions. The survey findings show that in overall, 73% of LAs are in this category while only 27 % of LAs are not using any e-Systems for delivering their G2G functions.

Table 4.4-2 : Availability and usage of G2G systems

Type of LA	Number of LAs in sample	Using G2G 1 to 3 services		Using G2G >4 services		Not using/not available G2G services	
		Number of LAs	% Out of Sampled Type of LAs	Number of LAs	% out of Sampled Type of LAs	Number of LAs	% Out of Sampled Type of LAs
Municipal Councils	15	11	73%	4	27%	0	0%
Urban Council	28	22	79%	4	14%	2	7%
Pradeshiya Sabhas	222	142	64%	11	5%	69	31%
Total	265	175	66%	19	7%	71	27%

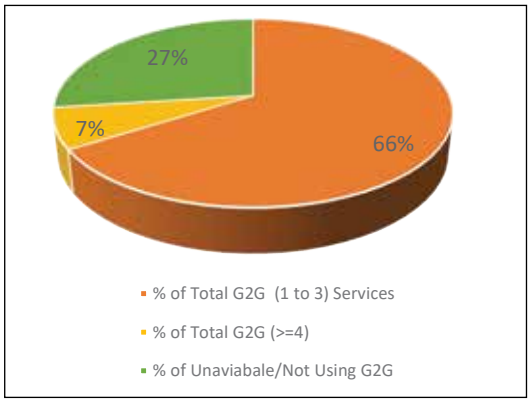


Figure 4.4-7 : Status of e-Systems usage by all LAs

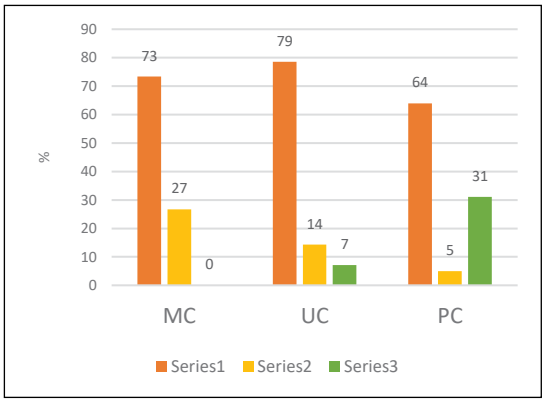


Figure 4.4-8 : Status of G2G e-Systems usage by type of LAs

The usage of e-Systems for G2G services is at a highly satisfactory level at the Municipal Councils and Urban Councils. It has been reported that 100% of Municipal Councils and 93% of Urban Councils are using at least one e-Systems for their official work. At the Pradeshiya Sabha level, usage is slightly low, however at an encouraging level of 69%.

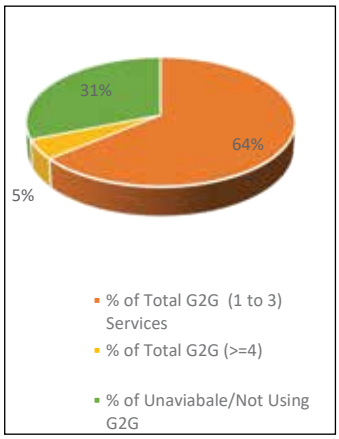


Figure 4.4-9 : Status of G2G e-Systems usage in by PSs

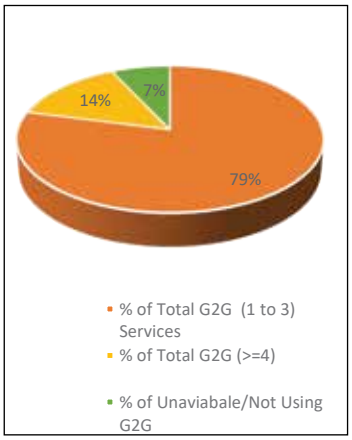


Figure 4.4-10 : Status of G2G e-Systems usage by UCs

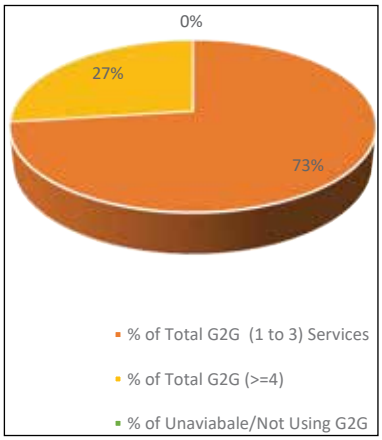


Figure 4.4-11 : Status of G2G e-Systems usage by MCs

When considering the number of services available in a single entity, overall, 66% of LAs have only 1 to 3 G2G Services, only 7% have 4 or more than 4 services and 27% of LAs do not have any G2G services offered through an e-System. However, if spartanly taken, the LAs that have some kind of G2G service (194 LAs) out of which 90.2% (175 LAs) of LAs have 3 services or less than 3 services. Meanwhile, 9.8% (19 LAs) of LAs already deliver 4 or more than 4 G2G services.

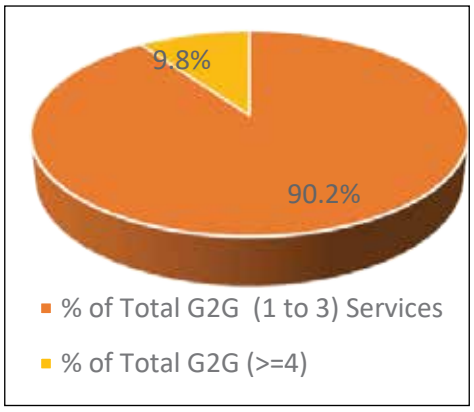


Figure 4.4-12 : Comparison of LAs with 1 to 3 and >=4 number of total G2G services

The above analysis has been focused on the usage of the e-Systems for the services delivery process.

However, as per the information collected through the survey, it has been revealed that some of the LAs are not using the e-Systems, though software applications and systems have been made available to them. Table 4.4-3 presents the status of usage of available e-Services in the three categories of Las

Table 4.4-3 : Number LAs in each category as per availability and usage of e-Services

Type of LA	No. of LAs Available G2C and G2B Services	No. LAs Using of G2C and G2B Services	% of Available Vs. Usage - G2C & G2B	No. LAs, Available G2G Services	No. of LAs Using G2G Services	% of Available Vs. Usage - G2G
Municipal Councils	14	13	93%	15	15	100%
Urban Council	20	18	90%	27	26	96%
Pradeshiya Sabhas	81	78	96%	171	153	89%
Total	115	109	95%	213	194	91%

With respect to the usage of already available G2C and G2B e-Systems, it has been revealed that overall, 95% of LAs are using the available e-Systems and only 5% of LAs are not using the available G2C and G2B systems with them. However, it is important to note that out of the total sample (265 LAs) only 43.4% of LAs have G2C and G2B e-Systems. Moreover, on average 91% of available G2G e-Systems are used by each of the three categories of LAs while on average 9% of LAs are not using any available e-System. The important factor to highlight here is that there are G2G e-Systems available in the 80.4% of sampled LAs (265) representing all three categories. In the perspective of Municipal Councils and Urban Councils, out of the total sample, 100% and 96.4% respectively have some G2G e-System.

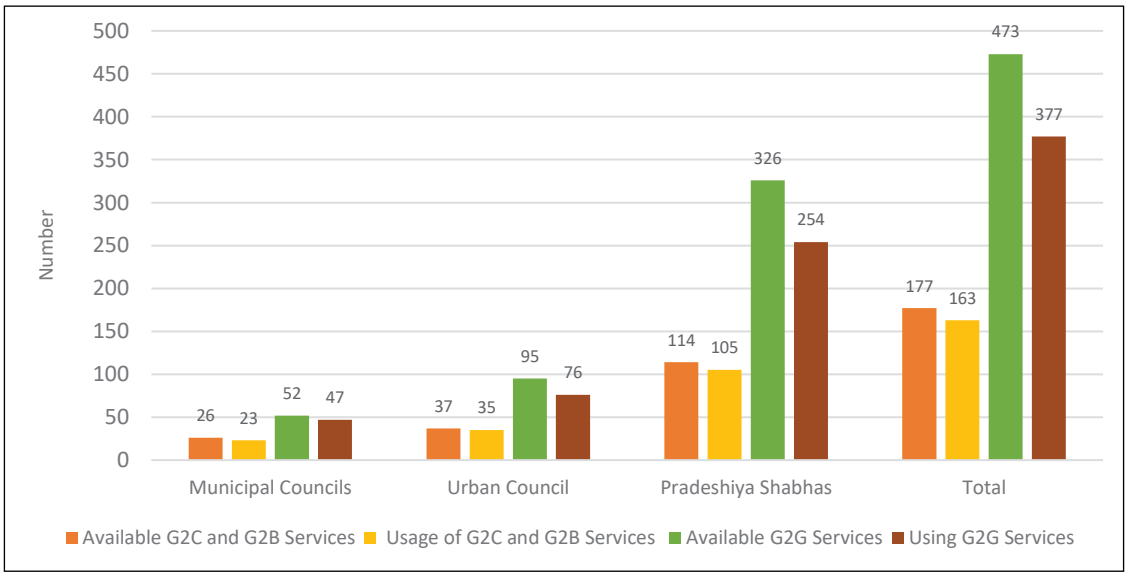


Figure 4.4-13 : Available e-Systems vs. using G2G/G2B and G2G e-Systems

Also, it was noted that 100% of the municipalities have some e-System for extending the services to citizens and/or enhancement of its internal efficiencies. The municipalities have better income and other resources such as necessary human resources and robust connectivity. Also, the people living in these cities have better education, high competency to use ICT and can afford the technology. Therefore, in terms of customer perspective, municipalities could put the technologies into use than the rurally and remotely located Pradeshiya Sabhas.

From a services perspective, Table4.4-4present the information on services (e-Systems) availability versus the usage of such services. Accordingly, only 92% of the available G2G and G2B e-Systems are used by LAs for-citizen services. Moreover, on average 80% of the available G2G services are used by the LAs for enhancement of their internal performance. As per the information collected, lack of necessary computers, servers, and other equipment, issues with data connectivity, and lack of trained staff to use the e-Systems are the main reasons for not using about 8% of G2C and G2B and 20% of available G2G e-Systems. However, it was also noted that unavailability of strong e-Leadership, direction and willingness to use due to complexities of some of the e-Systems have been attributed to the gap of available e-Systems and real usage of them.

Table 4.4-4 : Status of the available total number of services in each category of LAs Vs. services used in all the provinces

Type of LA	Available G2C and G2B Services	Usage of G2C and G2B Services	% of Available Vs. Usage - G2C & G2B	Available G2G Services	Using G2G Services	% of Available Vs. Usage - G2G
Municipal Councils	26	23	88%	52	47	90%
Urban Council	37	35	95%	95	76	80%
Pradeshiya Sabhas	114	105	92%	326	254	78%
Total	177	163	92%	473	377	80%

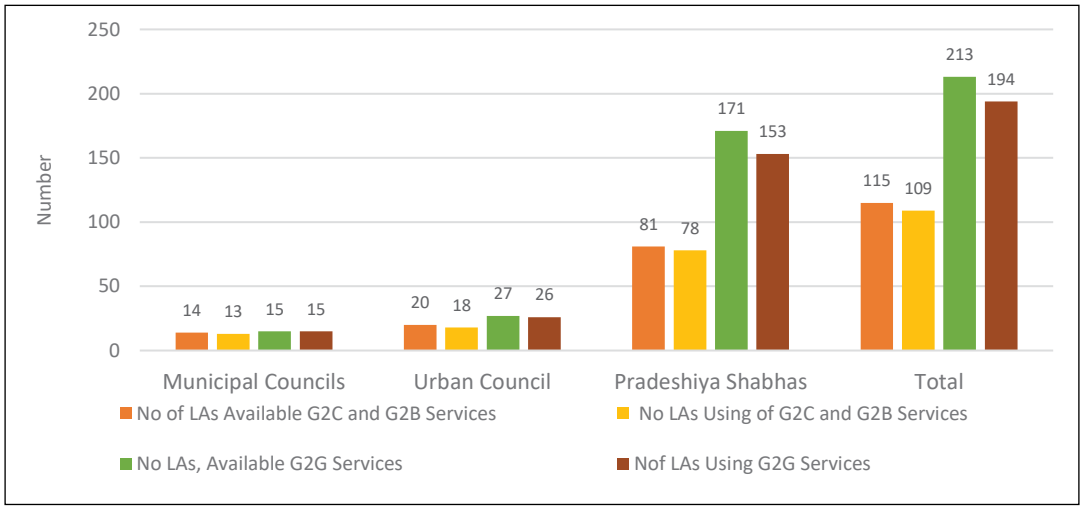


Figure 4.4-14 : Status of available total number of services vs. using G2G services

The information was analyzed based on the provinces, to understand the demographical distribution and situation of the e-System usage in the four UNDP-funded provinces the project assisted compared to the other five provinces outside the UNDP project area. Table 4-22 presents the usage of G2C, G2B and G2G e-Systems by the LAs in the aforementioned four provinces. Accordingly, an overall 78.9% of the LAs are using one or more systems. In terms of MCs and UCs the usage of e-Systems is 100%. However, it is 63.8% concerning the PSs. Most of these PSs are remotely located and have financial and other resource issues. When comparing the four provinces, overall, Eastern province, North Central province and Uva province record more than 68% in usage of e-Systems, however, the Northern province records only 63.6%. (Please note that 10 LAs in the sample failed to respond).

Table 4.4-5 : Usage of e-Systems in the provinces of UNDP project area

Type of LA	Provinces												Total		
	EP			NP			NCP			UP					
	No. of LAs	No. of LAs using e-Systems	% of LAs using e-Systems	No. of LAs	No. of LAs using e-Systems	% of LAs using e-Systems	No. of LAs	No. of LAs using e-Systems	% of LAs using e-Systems	No. of LAs	No. of LAs using e-Systems	% of LAs using e-Systems	No. of LAs	No. of LAs using e-Systems	% of LAs using e-Systems
MC	2	2	100	1	1	100	2	2	100	2	2	100	7	7	100
UC	4	4	100	5	5	100	0	0	0	1	1	100	10	10	100
PS	31	21	67.7	27	15	55.6	23	15	65.2	24	16	66.7	105	67	63.8
Total	37	27	73	33	21	63.6	25	17	68	27	19	70.4	122	84	68.9

In the four provinces, it was noted that 100% of the MCs and UCs have some e-System for extending the services to citizens and/or enhancement of its internal efficiencies. However, usage of e-Systems at PS level is comparatively low in all four provinces. It has been recorded as 67.7%, 65.2% and 66.7% in the Eastern, North Central, and Uva provinces respectively. The lowest percentage of 55.6% has been recorded in the Northern province.

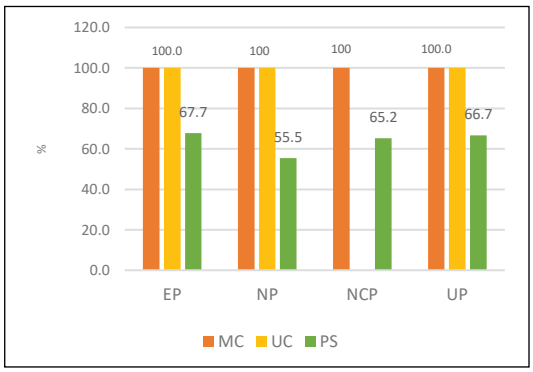


Figure 4.4-15: LAs Using G2G/G2B and G2G e-Systems for services in UNDP project Area

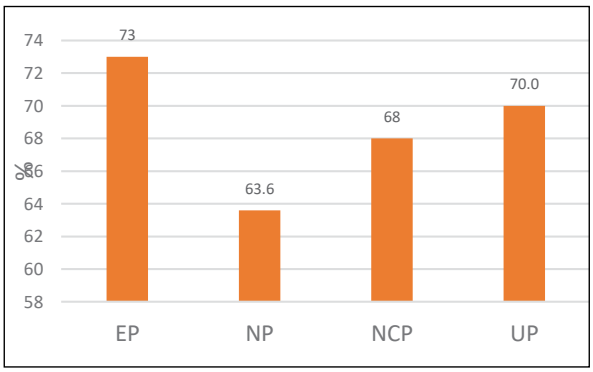


Figure 4.4-16 : % of LAs in three categories that use G2G/G2B and G2G systems in the four provinces

Usage of e-Systems in the five provinces outside the UNDP project area has also been shown in Table 4.4-6. As the four provinces in the project area, 100% of Municipalities in the five provinces outside of the UNDP project are using e-Systems. However, with respect to the UCs, it is different as 83% of Urban Councils are using one or more e-System. It is also important to note that 80% of the PSs also have one or more services operating through e-Systems. On average 83% of the LAs have one or more services, operating through e-Systems.

However, usage of e-Systems in Sabaragamuwa province is comparatively low and it records only 35%. The usage of e-Systems at the LAs in the Central, North- Western and Southern provinces are 86%, 90% and 88% respectively. Notably, in the Western province, almost all LAs in the sample has recorded the usage of one or more e-Systems for G2C, G2B or G2G services. It is also observed that usage of e-Systems in the MCs and UCs are exceptionally higher than the PSs in these 5 provinces.

Table 4.4-6 : Usage of e-Systems in the provinces outside to the UNDP project Area

Type of LAs	Provinces															Total		
	Central Province			North-Western Province			Sabaragamuwa Province			Southern Province			Western Province					
	No. in Sample	No. with e-Systems	% with e-Systems	No. in Sample	No. with e-Systems	% with e-Systems	No. in Sample	No. with e-Systems	% with e-Systems	No. in Sample	No. with e-Systems	% with e-Systems	No. in Sample	No. e-Systems	% with e-Systems	No. in Sample	No. with e-Systems	% with e-Systems
MC	1	1	100	1	1	100	1	1	100	3	3	100	2	2	100	8	8	100
UC	3	2	67	3	3	100	1	1	100	3	3	100	8	8	100	18	15	83
PS	18	16	89	26	24	92	18	6	33	37	32	86	18	18	100	117	96	82
Total	22	19	86	30	27	90	20	7	35	43	38	88	28	28	100	143	119	83

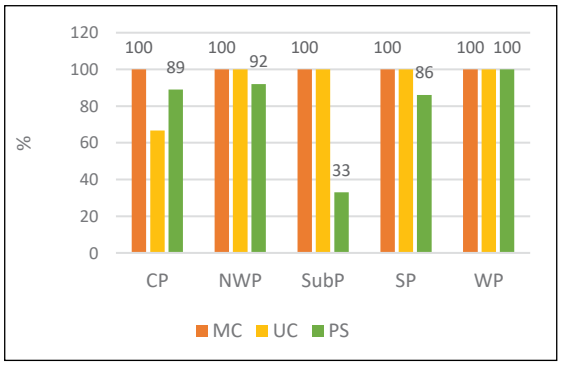


Figure 4.4-17 : Using G2G/G2B and G2G aprovinces

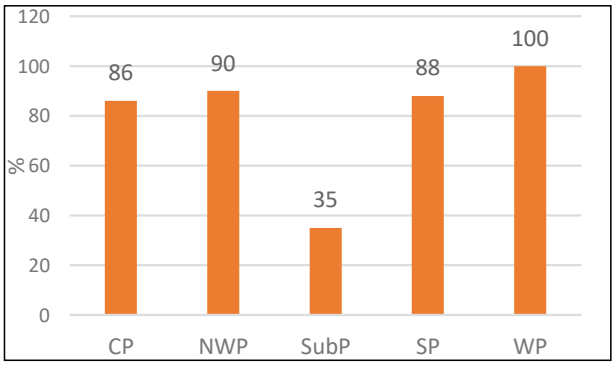


Figure 4.4-18 : Using G2G/G2B and G2G systems comparison in CP, NWP, SGP, SP and WP provinces

The other important aspect is the number of e-Services operated by the LAs. Table 4.4-7 illustrates the information on available and using G2C and G2B services. Concerning the G2C and G2B services, the most prominent service is the Property Tax Payments. However, only 27.5 % of LAs are offering this service through e-Systems. It was noted that most of the MCs and UCs are using e-Systems for this service, however, it is a negligible number in the PSs. Secondly, the most important G2C and G2B service was the Public Library system for managing and lending books. The percentage of LAs using this service is 17.7%. The third most important G2C and G2B service is hosting a Website by LAs, mainly for providing information. As a percentage, only 15.5% of LAs are operating up to date websites. It was found that in 2 places, live information is provided through a website for services such as the movement of garbage collection vehicles. Furthermore, it was reported that Nuwara Eliya, Chillaw and Wennappauwa UCs are ready to offer online services with online payment abilities. In North- Western Province, the PC and Local Government Department has taken initiative to develop web-based software application system with online payment ability which is still in the testing phase out of a few LAs in the province. There is no other notable e-System in the LA system for offering G2C and G2B services. It was also noted that most of the available G2C and G2B e-Systems are used, and the percentage of usage is over 90% against the availability of such services.

Table 4.4-7 : Prominent G2C and G2B e-Systems in the project area

Name of Services	Availability		Usage		% of Availability vs. usage
	No of LAs having services	% of G2C/ G2B out of total number of LAs (265))	No of LAs using services	% of Total G2C/G2B out of total number of LAs (265)	
Property tax payment	76	28.7%	73	27.5%	96%
Garbage collection	2	0.8%	2	0.8%	100%
Building approval	0	0.0%	0	0.0%	0%
Public library system	55	20.8%	47	17.7%	85%
Grievance redressal system	0	0.0%	0	0.0%	0%
Building and shop rent payment	1	0.4%	1	0.4%	100%
Web Site	44	16.6%	41	15.5%	93%
Front Office Management Software	1	0.4%	1	0.4%	100%
Total	179		165		

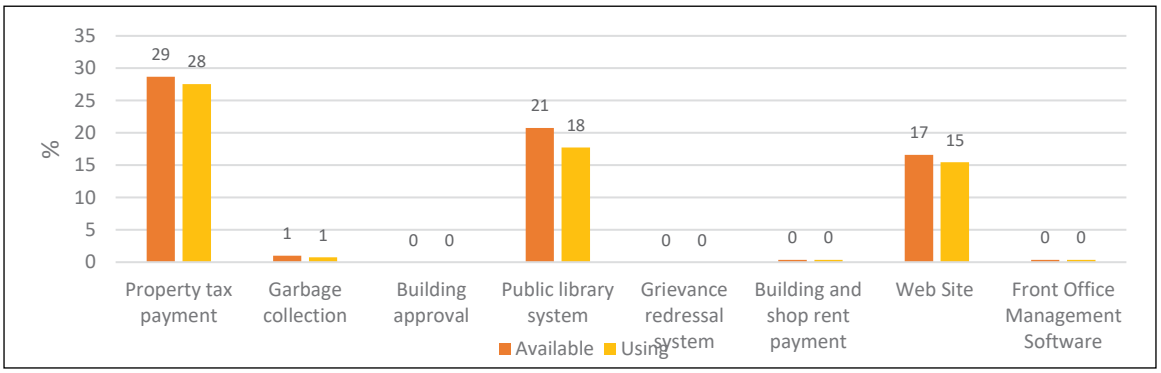


Figure 4.4-19 : Prominent G2C and G2B e-Systems (availability and usage out of total number of 265 in the sample)

Table 4.4-8 below, presents the information on the availability and usage of G2G services in the LAs where the survey was conducted. Among the G2G services, the most prominent service is Payroll. The payroll software has been developed by the Ministry of Finance and is made available to all government entities, including LAs without any cost basis. Furthermore, it does not need complex hardware infrastructure, not even connectivity. With a standalone computer, the service can be operated. The application system is a proven system, and it is very simple, no bugs and no errors are found. It provides accuracy and higher efficiency. Therefore, the majority of the LAs are using this e-System for the preparation of their employee salaries. The payroll is used in 67% of the LAs. In the majority of LAs Payroll is the only e-System available for operating the services.

The accounting application system is the other important G2G e-System used in LAs according to the study. However, different LAs are using different commercial accounting software applications and the finicalities available in these applications vary. Out of the LAs which are using the accounting software system, a few uses the software named CIGAS developed by the Ministry of Finance. The majority use commercial accounting software developed by private vendors. However, though accounting applications are available at 19% of LAs, only 15% of LAs are using the application system for handling their accounting activities.

Among the other G2G systems, 10% of the LAs are using inventory control e-Systems and 11% are using software applications for employee attendance control. Also, it was noted that a considerable number of LAs are using attendance management/fingerprint system and as a percentage, it is 20% out of the LAs in the sample. Other than the above e-Systems, there are few other e-Systems which are negligible as a percentage.

Whenever e-Systems are available at LAs, usage of such systems has been recorded at highly satisfactory percentages and the recorded usage is more than 80%.

Table 4.4-8 : Prominent G2G e-Systems in the project area

Name of Services	Available		Using		% of Availability Vs. usage
	No of LAs	% of G2G out of total sample (265)	No of LAs	% of Total G2G out of total sample (265)	
Accounting Systems/Financial Management Systems	51	19%	30	11%	59%
Payroll	200	75%	177	67%	89%
Inventory control	28	11%	27	10%	96%
HR management	17	6%	15	6%	88%
GIS software	15	6%	14	5%	93%
Application tracking system	14	5%	12	5%	86%
Vehicle fleet management system	17	6%	16	6%	94%
Road and infrastructure planning	12	5%	10	4%	83%
Management Information Systems	9	3%	1	0%	11%
Project Management Applications	6	2%	5	2%	83%
Workflow Management System	3	1%	0	0%	0%
Que Management System	5	2%	0	0%	0%
Store Management	21	8%	18	7%	86%
Procurement Management	7	3%	0	0%	0%
Training Management	15	6%	0	0%	0%
Attendance Management	53	20%	52	20%	98%
Total Services	473		377		

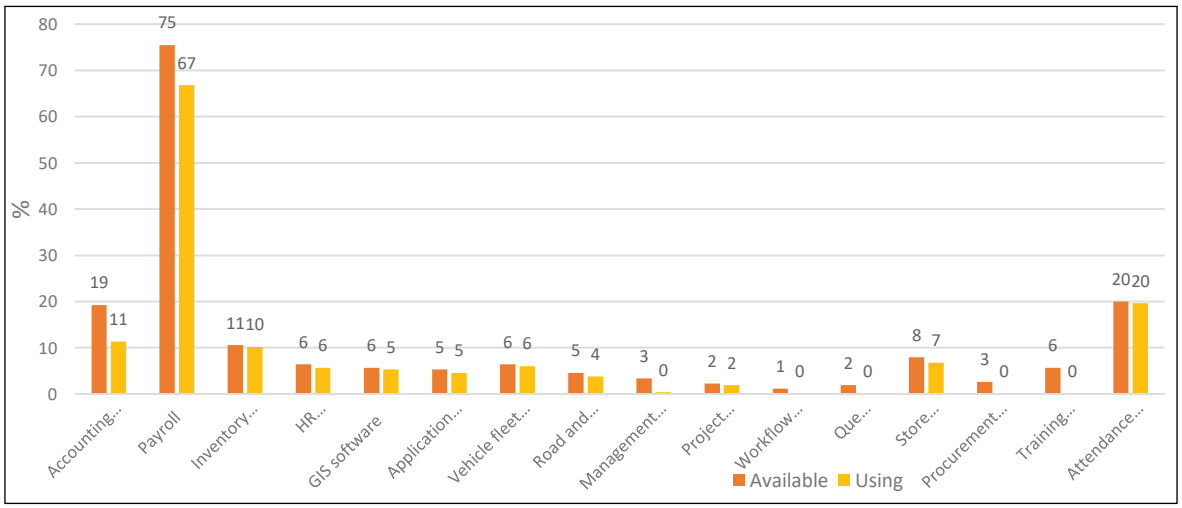


Figure 4.4-20 : Prominent G2G e-Systems (Availability and Usage out of total number of 265 in the sample)

The study reveals that none of the current e-Systems have interoperability with each other. They are independent, siloed software applications and common use of functionalities and, exchange of common data among the applications for performing its functionalities is not possible. These applications are using its databases for processing data and information for the delivery of relevant services. For example, the payroll cannot obtain information from the human resources system and attendance system, and it cannot provide information to the accounting system. Furthermore, the majority of the software applications have been developed based on client-server architecture. Therefore, directly consuming the services of one application by another application

is not possible. Unfortunately, the development and use of web services for interoperability cannot be done through client-server architecture-based applications. There are a few applications such as property tax systems and inventory systems that are developed based on web services architecture. These applications are providing and using the web client facility and it is not clear whether there are provisions for connecting with other applications through the web services.

However, under the intervention of ICTA, a suit of application systems handling several G2G, G2B and G2G services were developed and has been deployed in 40 LAs from 2012 to 2016. This integrated application system has been developed after conducting a proper system study, and business process re-engineering (BPR) study with the support of the LA system. However, due to implementation, resources, human resources, and connectivity issues, and lack of support from the developer and ICTA, almost all LAs which were given the application are now not using this application system for operating its services.

In terms of the software development approach, it has been revealed that in most of the cases, an adjusted agile application development approach has been used. Most of the popular application systems such as Payroll, CIGAS, Property Tax Payment system have been developed without going through a proper software development life cycle. The Payroll and CIGAS accounting packages were commenced by the Ministry of Finance and Sri Lanka Institute of Development Administration in 1990 as Disk Operating System (DOS) based applications using the knowledge and experience of government officers, on a trial-and-error basis. After nearly three decades, these application systems remain as Windows-based client-server application systems. Some of the LAs use commercially developed business accounting packages, which have been customized for the requirement of the LA. In this case, the software applications could be identified as siloed applications based on the client-server architecture and at the implementation, no proper BPR process has been implemented. In terms of Property Tax Payment Application system, different LAs are using different applications developed by different commercial vendors. The Property Tax payment application System is also a siloed application system and individual vendors have implemented this application without proper system study or BPR study. The developers of these software applications have not considered the necessity of providing online or mobile-based services directly to the citizen such as online and mobile payment mechanisms which could have been easily implemented. It is a notable issue that some of the LAs using these commercial products have a vendor lock-in issue as no clear conditions have been drafted in the signed contracts to protect the rights of the LA in using these software applications.

The Public Library System, based on "Koha" open-source software application could be easily implemented in public libraries since this is one of the key software application systems that has web-based architecture, and it can be successfully adapted by considerable number of LAs. This software application has been implemented by private vendors by customizing, "Koha," an open sources Library application system. However, the customization and support services to different LAs are done by different software vendors. The other interesting web-based application in the LA system is the Garbage Vehicles Tracking system. However, this application is only used by one Municipality at the moment. Other than the above-mentioned major applications, all the other e-System applications have been developed by commercial vendors. There are a few in-house developments as well. However, none of them have followed proper steps of the software development lifecycle such as system study, BPR study, system architecting, implementation of software quality assurance process, system testing, user accepting testing, security level testing and henceforth. Therefore, these software applications have numerous weaknesses such as not supporting all functions in a process, frequent breakdowns, efficiency of the systems, displaying error messages and bugs during operations, wrong calculations, and security threats.

In view of the above, it is imperative to intervene in the LAs system to introduce e-Systems for providing services more efficiently and effectively. There should be interrelated application suits providing different services using common databases where data interoperability is possible.

However, it was noted that a very few software application systems currently being used in the LAs cloud be replicated immediately with some improvements to suit the users' requirements. The Koha Public Library

System is one such application software system. It will also be useful to study the CAT 2020 software application suite which comprises of 28 software modules to support the same number of services being implemented by the North Western PC, in order to explore the possibility of replicating the system in other provinces if successful. The Garbage Vehicles Tracking system implemented by Kaduwela MC is also a prospective system to replicate in other MCs and UCs.

4.5 System security and stability

The absence of provincial or district level IT coordinating mechanisms has resulted in constituting no proper systematic security arrangement programs in LAs. LAs decide the system security arrangements usually on the instructions of the vendors or their agents. Another reason for aggravating this situation is because in many instances there are no qualified IT professionals in any of the LAs. This has resulted in very poor and unsatisfactory e-System security arrangements prevalent in a majority of the LAs in the sample.

Table 4.5-1 : Availability and adequacy of security systems

Nature of Security	Availability of Security		Adequacy of Security	
	No. As per survey	% out of total sample	No. As per survey	% out of total sample
Number of LAs that have security arrangement	18	8.9%	3	2.0%
Number of LAs having Physical Security for Data Center	12	5.9%	2	1.0%
Number of LAs having Disaster Recovery center	7	4.0%	2	1.0%
Number of LAs having alternative connectivity	13	6.4%	3	2.0%
Number of LAs having shadowing arrangement for HR	5	3.0%	1	1.0%

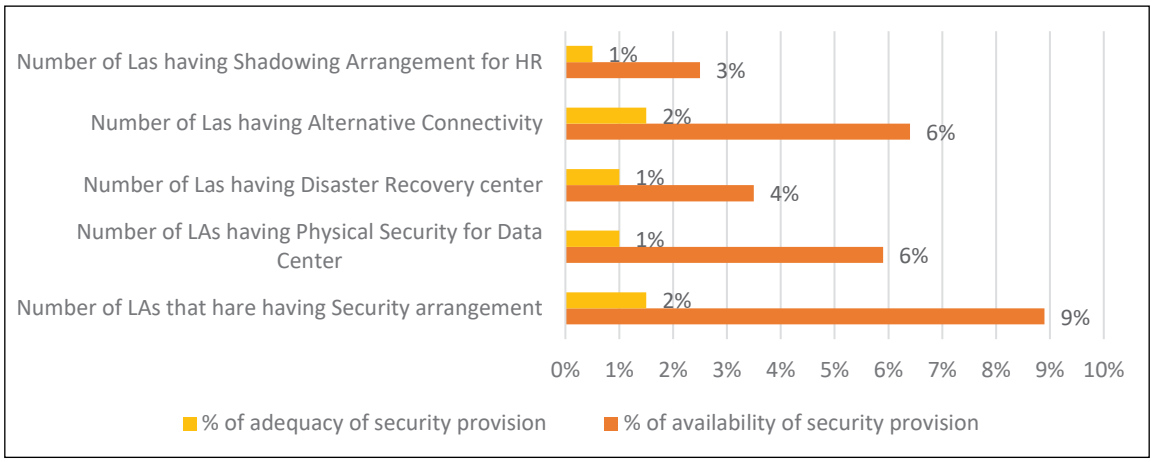


Figure 4.5-1 : Availability and adequacy of security provision

4.5.1 Availability and Adequacy of Security Provision

According to the above table 4.5-1 some security arrangement is available for 8.9% of LAs in the sample whereas only 2% of LAs have security arrangements adequately as per the views of the system users. Physical security for data centers is available only in 5.9% of LAs in the sample but the adequacy level is recorded as 1%. Regarding the disaster recovery process, only 4% of LAs have such recovery centers. However, only 1% of LAs have accepted that they have adequate security from using disaster recovery centers. The number of LAs with

alternative data connectivity is 6% in the sample, whereas the adequacy level is only 1%. Finally, the number of LAs which have shadowing arrangements for HR is 3% of LAs and the adequacy level is 1%. The above situation indicates that there is a very low priority over e-System security in all types of LAs in the country.

Table 4.5-2 : e-Systems with backup arrangements

Name of the System	No of LA with backup arrangement for the e-Systems	No of Las with backup policy	Backup Schedule				Number of LAs with Assigned Backup Responsibility
			Daily	Weekly	Monthly	Occasionally	
e-Puranaguma - Property tax	3	3	1	1	1	0	3
Payroll	2	2	2	0	0	0	2
Koha	3	3	3	0	0	0	3
CIGAS	4	4	1	0	3	0	4

The following observations could be made from the data indicated in table 4.5-2 above.

a. A very negligible number of LAs have paid attention to keeping backups and having backup policies. Thereby, the number of LAs with backup arrangements and backup policies for most popular software applications such as Property tax, Payroll, Koha and CIGAS are recorded only in 12 LAs out of the 265, which is nearly 5% of the sample.

B. Backups are not taken at required intervals; recorded data indicates that there is no rational procedure for backup arrangements.

C. Therefore, all the above systems are at very high risk.

Table 4.5-3 : Media of Backup (Nature of Backup Storage)

Name of the System	No of LAs with backup arrangement for the e-Systems	No of LAs with backup policy	Backup Schedule			
			Daily	Weekly	Monthly	Occasionally
Cloud Storage	3	3	2	0	0	1
Hard Drive Based Backup	5	5	1	0	2	2
Third-party Storage	8	8	2	1	0	2

The following observations could be made from the data indicated in table 4. 5-3 above.

a. Cloud is the most reliable media for backup storage. But a very minimum number of LAs use cloud for backup under the current situation.

b. Generally, hard disk backup should be kept in a separate location to ensure meaningful system security coverage. But in many instances, hard disk backups are kept at the same location as the LAs.

c. Third party storages have the security risk of unauthorized use of data and information. Therefore, it is necessary to sign proper non-disclosure agreements with the parties concerned to avoid the misuse of data and information.

Table 4.5-4 : Firewall Usage

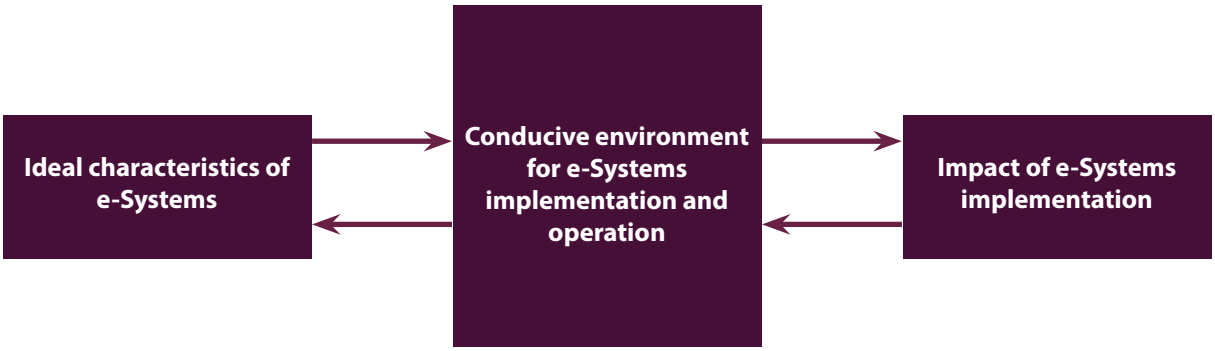
Type of Firewall	Availability out of 202 LAs	
	Number of Servers	Percentage
Hardware	11	5%
Software	47	23%
Both	10	5%
Not Available	134	66%
Total	202	100%

a. Majority do not have firewalls although they have LANs.

b. Risk for hacking is very high with respect to the online systems.

4.6 Functional efficiency of e-Systems in the local authorities

The prime focus of implementing e-Governance systems is to improve public service delivery, enhance operational aspects of public institutions and promote transparency and accountability of administration. This section focuses on the functional efficiency of e-Governance systems implemented in the LAs. Functional efficiency is not just a measure of performance of the e-Systems against the intended objectives. Functional efficiency relies on the characteristics of e-Systems, a conducive environment for e-System implementation and operational environment and the alignment with the objectives by measuring the impact. The below diagram depicts the conceptual framework having three dimensions such that they are interrelated. Mainly, the conducive environment for e-System implementation is critical in adapting the ideal e-System and establishing the yardsticks for measuring the impact in positive terms.



This chapter covers the formulation of characteristics of a model for ideal e-Systems and postulates the conducive environment where the e-Systems shall perform the operational tasks and service delivery in an enhanced way in comparison to the manual systems. The functional efficiency will be derived based on the primary and secondary data collected from the 265 Local Government Authorities from the 9 provinces of Sri Lanka. In addition, administrative efficiency will also be accounted for to ensure improvement in the routine operational aspects of LAs. Similarly, other governance aspects were also studied to realize the impact of the well-implemented e-Systems.

Table 4.6-1 : Formulation of ideal characteristics of the e-Government systems to compare against the existing manual system

Characteristics of E-Systems	Detailed specifications on the characteristics
A. User interface, accessibility, and satisfaction	Friendly, affordable, efficient interface for service delivery and operations management
	Participatory and direct communication (e-participation/e-dialogue) enabled in the system to improve citizen engagement.
	Overall user satisfaction and instilling democratic values in e-Government systems
	Availability of multi-lingual and accessibility provision for persons with disabilities
	Regular documentation and quality management
B. Mode of service provisioning	Multifaceted service provisioning (information dissemination, service delivery, operational workflow automation, transactional facilities, data repository and processing, communication channels)
	Reduction in transaction time when compared to manual paper- based operations in the institution. Moving forward towards paperless office.
	Level of integration of system components with relevant institutions and stakeholders
	Exercise of professionalism and ethics in the operations
	Extensive monitoring and evaluation mechanism
C. Performance, reliability and security	Trust level of the e-Government systems and the security mechanism incorporated in the system. Security of personal information and informational safety.
	Responsiveness and the transaction time in accessing and completing the tasks in the e-Government systems
	Updated credible information and with relevant applicable logics

According to the proposed ideal characteristics in Table 4.6-1 on the e-Systems, there is a greater chance of successful implementation and utilization of the system for routine operations and service delivery if e-Systems are adopted following three dimensions. An e-System with a simple, friendly user interface will enable the system operators and the system users to access and manage the system with minimal interaction. The simple design of the e-System will reduce the administrative complexities and the system will be easily adaptable for the citizen to access their services. The e-Systems with the provision of facilities for interaction and engagement with the end users will easily gain trust and ensure the users have more confidence and increase their satisfaction levels. The availability of multi-lingual support for users with different language preferences and with accessibility features to provide inclusive access to persons with disabilities will also be an added advantage to the system to reach multiple audiences.

An ideal e-System will include provisions for various functional features to cater to the needs of the institution to internally manage the operations and to provide efficient service delivery. Comparatively, e-Systems will outweigh the paper-based manual systems in the institutions and will reduce the transaction time and reduce the amount of paper usage thereby moving towards green, paperless operations. Also, the e-Systems will enable connectivity with other relevant institutions by seamlessly integrating the services and operations. Moreover, the e-Systems will incorporate relevant mechanisms to ensure security features including privacy and cyber threat management. This will in turn increase trust in the system from the end user's point of view. The e-Systems will have high responsiveness to the user requests and process the transactions with increased speed in terms of performance. The e-Systems will incorporate updated, reliable and credible information to support the decision-makers and the end users to gain access to the system with confidence.

4.6.1 User Interface, Design, Accessibility and Satisfaction levels in the e-Systems

The user interaction with the e-System must be straightforward with only the necessary features to navigate and use the system for productive purposes. The feedback from the users should be used to improve the system user interface in an iterative development process. Figure 4.6-1 shows the demography of the e-System users against the average number of staff in the LAs and the average number of computer users (The average number of Staff has been taken from the data of the Local Government Staff survey 2018 by the Department of Census and Statistics). The demography of e-Systems users across MCs, UCs and PSs shows that the users are limited in numbers compared to the staff population in the LAs.

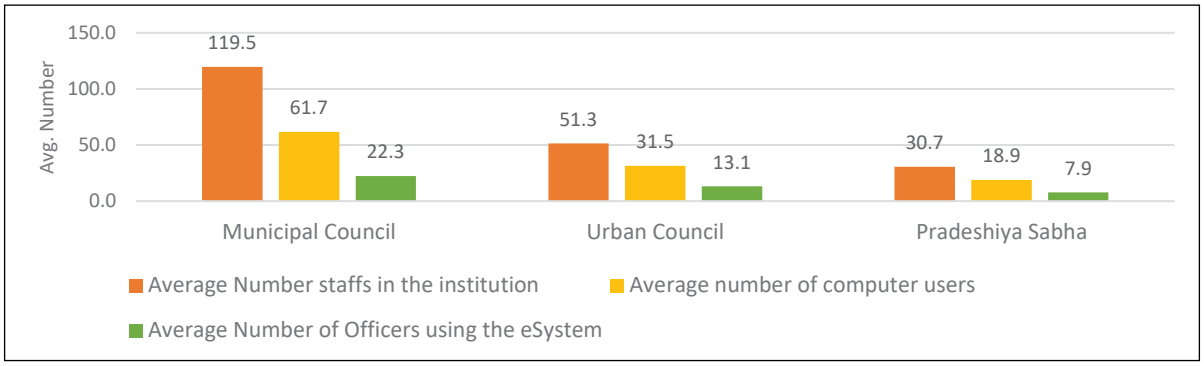


Figure 4.6-1 : Demography of e-Systems users in the local authorities

The number of computer users and the number of e-System users are very minimal due to the limited footprint of technology infrastructure and the unavailability of specific human resources in the Local Government Sector. As per the data presented in Figure 4. 6-2, the computer users out of staff are 51.6% for MCs and it is about 61 % concerning the UCs and PSs. However, out of those computer users, only 36.1% are using e-Systems in MCs and about 41% of the computer users are in both UCs and PSs. When considering the total average number of office staff, it was revealed that only 18% to 25% of office employees are using e-Systems for performing their daily duties.

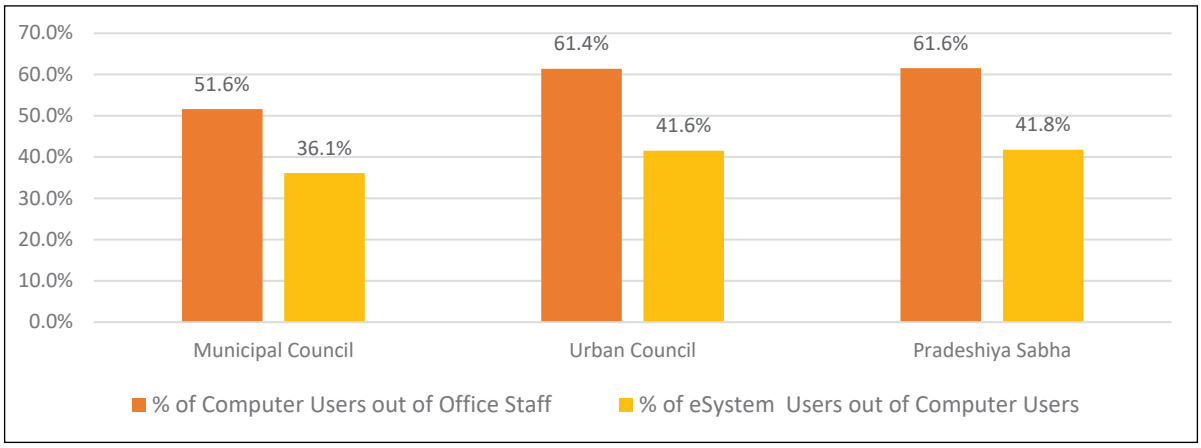


Figure 4.6-2 : Percentage of computer users and e-Systems users in local authorities

4.6.2 Mode of service provision - Service build and provisions in the e-Systems

The modality of system build plays a major role in the stability and reliability of the system. It clearly shows the standards and protocols that are followed in developing e-Systems during the initial planning phase and executed towards the development and delivery of the e-Systems. Three key aspects, namely, system study,

Business Process Reengineering (BPR) study, BPR implementation, and system architecting are considered in the planning phase as the foundation for the modality of the system building. The status of the aforementioned criteria is presented in Figure 4.6.3.

The application architecture and the client-side access was major criterion in deciding the reliability of the e-Systems. The application architecture was the initial decision made by the system development team as per the requirements of the system study. The application architecture was a high-level topic to explore in the study since the institutional respondents were unaware of such technical specifications.

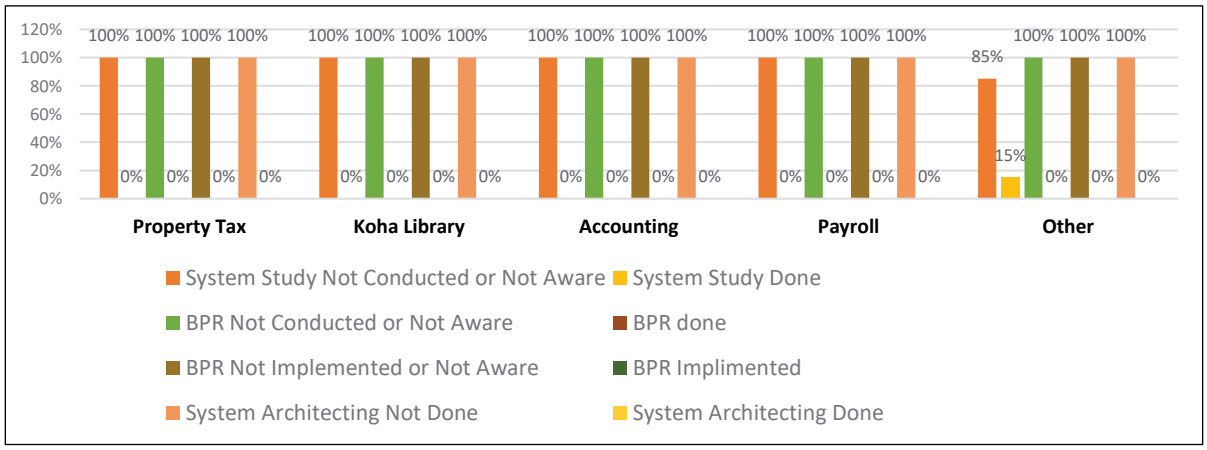


Figure 4.6-3 : Status of System Study, BPR study, BPR Implementation and system Architecting

As per the data presented in Figure: 4.6.3 which provides visibility on the modality of systems being built and it is evident that almost all the e-Systems have been built without considering the requirement of a system study, BPR study, BPR implementation, and system architecture. However, since the respondents of the survey are current employees, some of them would not have proper knowledge of the methodology adopted in the system development which happened several years ago. Therefore, there may be a gap in this analysis due to some of the current employees being unaware of the system development process. Also, Koha Library Information a Management System which is an open-source product has been built following the proper steps as per the literature available on the internet[20]. However, it appears that the proper steps have not been followed in the local customization process. Some of the G2G e-Systems (i.e., CIGAS and Payroll provided by the Ministry of Finance of the central government), and the systems mandated to be used by LAs are required to create a cascading layer of data provision for upstream reporting. Therefore, in this case, the system development approach is not very visible to employees of LAs.

4.6.3 Software development approach and quality standards

Software development approach and quality standards dictate the reliability of the e-System functionality and ensure the system will withstand changes in the administrative procedures over time. Predominantly the quality standards create a solid foundation for the e-System to manage the core functionality and also to cater to future expansions and changes.

It was clear from the responses from the survey that the waterfall software development approach was practiced as the respondents had a certain level of knowledge on the matter. It is also clear that the majority of LAs were using centrally developed e-Systems like CIGAS and Government Payroll, where the system development approach is not very much visible to LAs.

[20] Koha, Library Software, https://koha-community.org/documentation/other-docs/

At the same time Figure 4.6-4 shows that the waterfall method is the preferred mode of software development approach followed by all types of LAs.

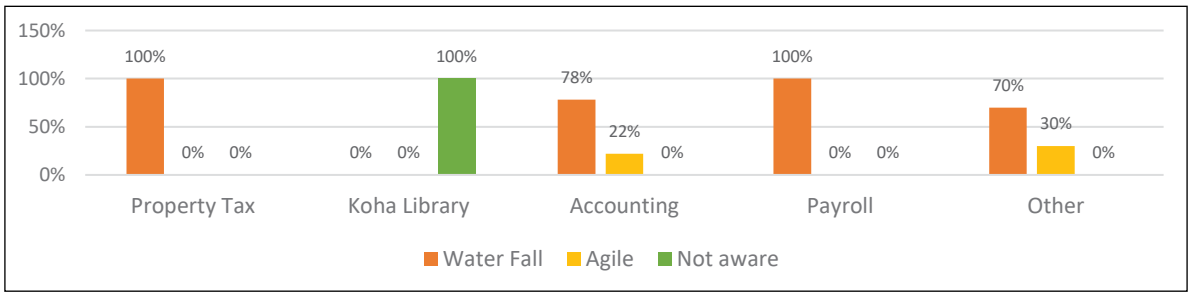


Figure 4.6-4 : Software Development Approach

Similarly, the quality standards were also to be considered when building and implementing e-Systems in LAs. Figure 4.6-5 represents the status of Quality Assurance and the level of software testing conducted to ensure the quality standards of the e-System. It is clear from the graph that attention to quality assurance and software testing was very limited, hence, the quality standards of the e-Systems seem to be unreliable. Also, note that there are instances where a limited level of software testing has been done on the e-Systems. Hence, this resulted in reduced quality products where the Software Testing facets were mostly unknown to the LA users. On UAT, there is no evidence that test cases were built by the development team and tested by the end users.

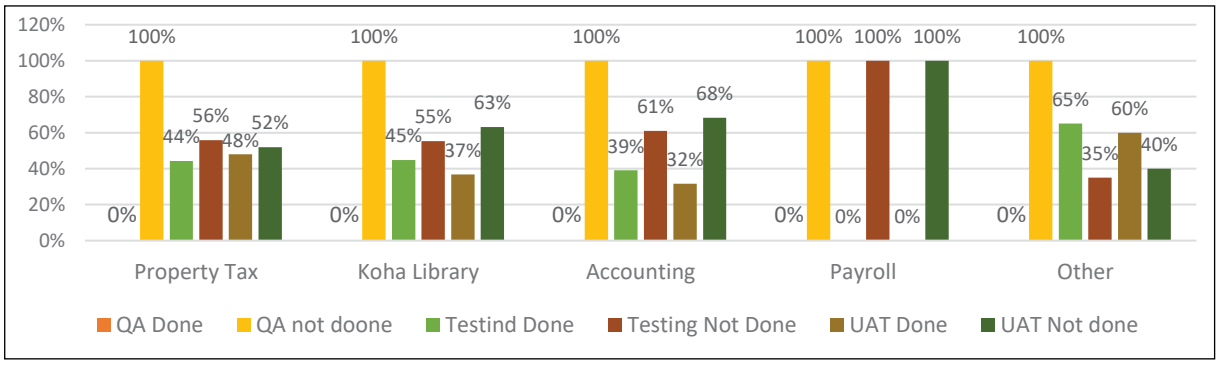


Figure 4.6-5 : Status of Quality Assurance, Testing and UAT in the Software Development Approach

4.6.4 Overall satisfaction and user-friendliness

In general, user satisfaction is one of the key factors increasing the access and usage of e-Systems. The user satisfaction with the e-System shall be measured based on the perceived value of the system such that not only the functional aspects are covered, but it also depends on various other aspects including design elements, navigation, convenience, accessibility, etc. Figure 6.4-6 shows the comparison of user-friendliness and user satisfaction among different e-Systems. The score was based on a 1-10 Likert scale which is categorized into 4 categories, namely, Poor, Fair, Good, and Excellent (0 to 2.5 - Poor, 2.6 to 5 - Fair, 5.1 to 7.5 - Good, 7.6 to 10 - Excellent). As per the average scores, almost all available e-Systems fall into the "Good" category as per respondents' ratings. However, the employees of LAs who are the respondents to these questions do not possess a good knowledge of all the aspects of e-Systems since they have been exposed only to the e-Systems they are currently using. Therefore, they are not familiar with the concepts of user satisfaction and user-friendliness. Also, note that the satisfaction levels and friendliness vary based on the perception of the user and the knowledge and clear understanding of the e-System. There are challenges in measuring the outcome of the survey, but on an aggregate level, the findings reflect the limited acceptance of the e-Systems.

Therefore, the outcome of the survey is not prudent to be used as the only yardstick for measuring the success of the e-Systems.

In contrast, Figure: 6.4-3 shows that the Koha Library Information Management e-System has earned the highest levels of user satisfaction and user-friendliness followed by the Payroll e-System. It is also clear that e-Systems such as MIS, inventory, and store management has earned the lowest score for user satisfaction and user-friendliness. However, in general, all the e-Systems have a score in a close range not exceeding the level of the "Good" category for satisfaction and friendliness. This reveals that current e-Systems require further improvements to enhance user satisfaction and user-friendliness.

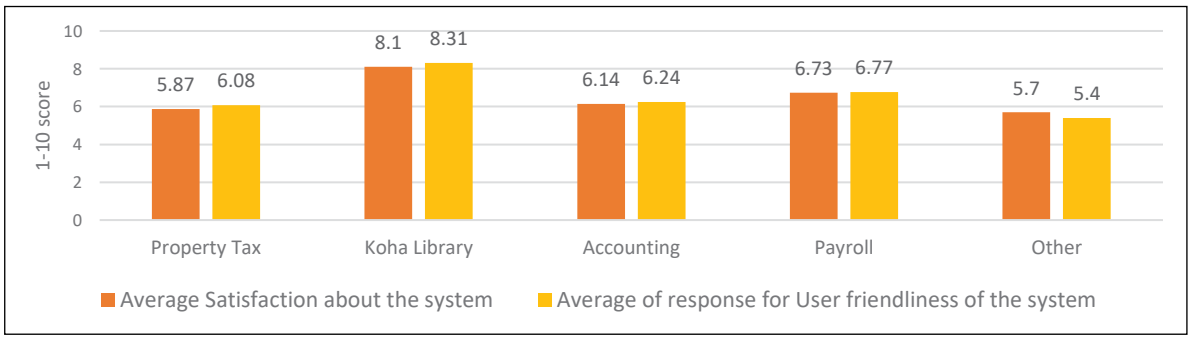


Figure 4.6-6 : Average user scores for user friendliness and user satisfaction in the 1 to 10 Scale

4.6.5 Availability of language provision in the application

The e-Systems are mostly functional in a context where the institution has a multicultural, multi-ethnic workforce that needs a certain level of accessibility support in terms of language provision to clearly understand the system functionality and workflow to effectively manage the system. The availability of link language in the system is also mandatory to ensure the e-System will be accessible by all levels of users with knowledge of the link language.

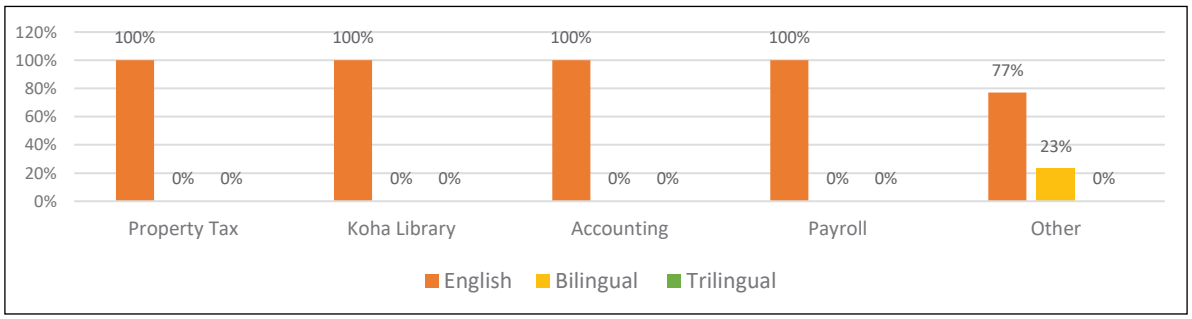


Figure 4.6-7 : Percentages of e-Systems offering multi-language facilities

The language provision in all e-Systems is similar except in the case of a few e-Systems falling into the "other" category. As per Figure: 4.6-7, interfaces of e-Systems and data entry of Property Tax, Koha, Accounting, and Payroll are in the English language. The outputs of the systems such as acknowledgments, slips, reports, letters, and other notices are also in the English language which may not be acceptable to the public. There are few bilingual e-Systems in the "other" category which account for about 23% of the e-Systems available within the category.

Some of the websites are available in trilingual and bilingual arrangements. As per the web systems development standards and the e-Government Policy, the trilingual provision for a web portal is a mandatory requirement.

Considering the above situation, a conclusion can be made that the e-Systems need further improvements for servicing the local people in their languages.

4.6.6 Availability of accessibility options for persons with special needs

The e-Systems must have facilities to ensure inclusive access for persons with special needs and plan to incorporate technologies that enable accessibility mechanisms. The inclusive nature of the system will promote mainstreaming the accessibility of services with equal rights. The accessibility of services to a person with special needs was mandated in the physical environment of LAs, similarly, this has to be adapted in e-Systems as well. So assistive technologies need to be incorporated into the e-Systems to ensure inclusive access.

Figure 4.6-8 clearly shows that the e-Systems in LAs are not compliant with incorporating accessibility features for persons with special needs.

Figure 4.6-8 : Accessibility options for persons with special needs

Necessary policy level intervention needs to be taken to ensure the inclusiveness of the e-Systems and steps need to be taken to incorporate assistive technologies into the existing e-Systems and the same to be mandated for the future e-Systems.

4.6.7 Availability of work-from-home option

The current Covid-19 pandemic has changed the normal way of life in every routine. There is no exception for the Local Government Authorities, where the mode of day-to-day management functions and service delivery happens through face-to-face communication and contact. To handle unforeseen circumstances such as the Covid pandemic, LAs should have alternative mechanisms to sustain their routine operations. The incorporation of ICT-based solutions is one of the alternatives to cope with the disruption in service delivery. As per Figure 4.6-9, the current e-Systems have very limited provisions for working from home. Most of the current e-Systems do not use web application architecture and therefore, these stand-alone, and client-server systems cannot cater to work from home requirements. Even though Koha is a web application architecture-based software, it is currently not used as an application hosted on the internet that would enable it to be used from outside the office premises. Presently, Koha e-System is used as a stand-alone system by hosting it on desktop computers which are very similar to the client-server systems.

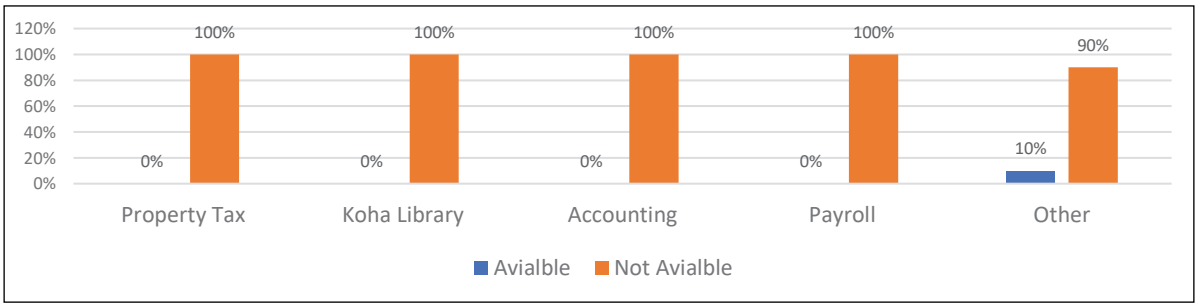


Figure 4.6-9 : Availability of Work from Home Facility

The above Figure: 4.6-9 shows the status of the availability of work-from-home options for staff and no e-System caters to the current requirements. Therefore, it is necessary to upgrade the e-Systems as well as the hardware infrastructure to cater to the current requirements, particularly as it is the best time to move into cloud-based application hosting.

4.6.8 Training for employees in using e-Systems, manual availability, and status of user roles

The efficiency of the e-Systems mainly depends on the system users that operate the system with maximum understanding and knowledge of the modus operandi of the e-System. The hands-on training of e-Systems to the user is a mandatory requirement and a recurring task to ensure the system user is completely aware of the working modality of the system. The new employees of the institutions are to be trained extensively in all aspects of an e-System to make them ready. The existing users need to be refreshed and updated at certain intervals to keep them updated on the changes introduced to the e-System. It is also necessary to update the employees who are currently using these systems on the technological changes happening in the ICT industry sector for them to withstand in the sector as knowledgeable workers.

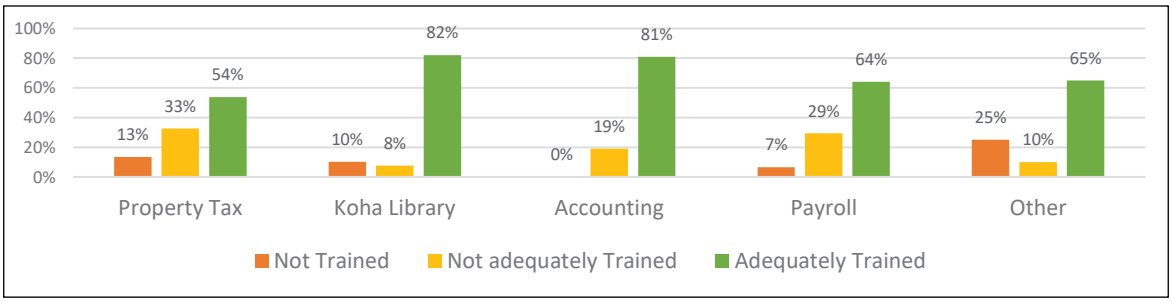


Figure 4.6-10 : Status of Training of Employees to use the e-Systems

As per the above Figure 4.6-10, training has been reported at an adequate level for ensuring hands-on experience for the users. It was revealed that user training has been adequately given for e-Systems such as Koha, Accounting systems, and Payroll. However, user training related to Property Tax systems and e-Systems categorized under "Other" shows inadequacy.

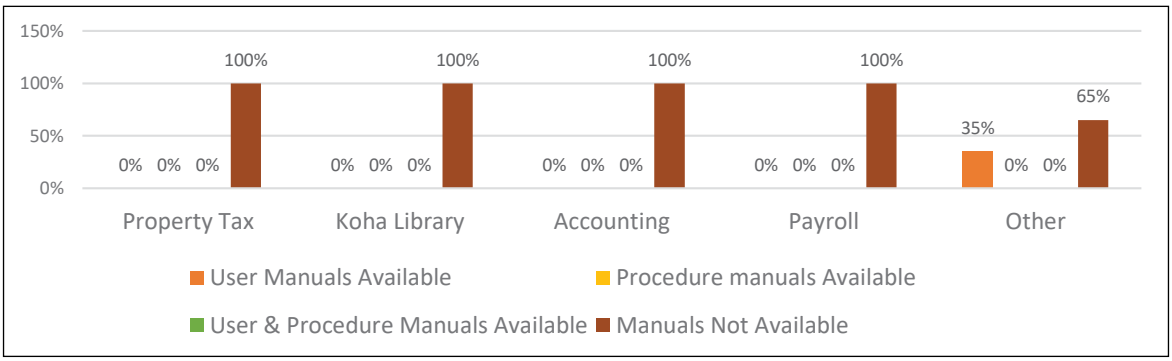


Figure 4.6-11 : Status of Availability of user manuals and procedure manuals

The user manuals and procedure manuals are important to guide the users and the system administrators in using e-Systems. As a usual practice, system developers prepare these manuals as per the system design and make them available to the clients. The user manuals guide the users to operate the system on a step-by-step approach and procedure manuals help the system administrators to maintain the system and clear minor bugs and issues. Figure 4.6-11 presents the status of the availability of user manuals and procedure manuals. Accordingly, none of the e-Systems other than a few categorized under the "other" category has paid attention to the preparation of user manuals and distribution of them among the users. It appears that none of the developers have done procedure manuals for their e-Systems.

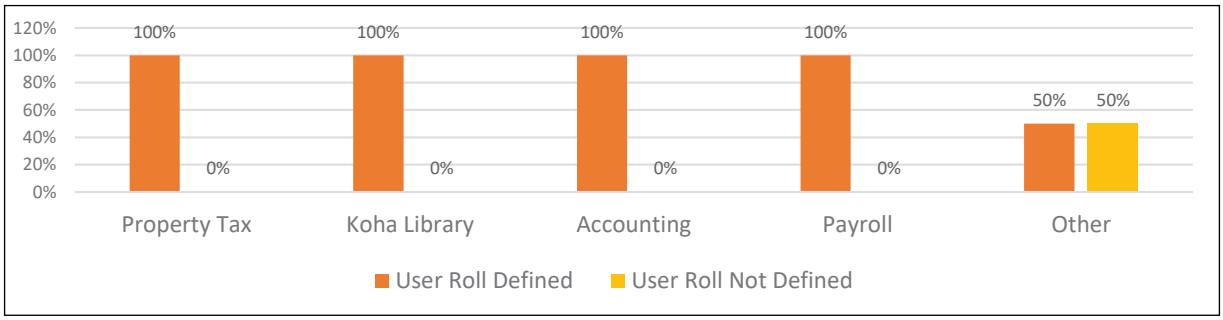


Figure 4.6-12 : Status of clear identification of the User Rolls and privileges

With reference to Figure 4.6-12, user role definition has been fully incorporated in almost all e-Systems other than e-Systems that comes under the "other" category. In the "other" category only 50% of e-Systems have defined the user roles and the rest of the e-Systems appear to have a flat user hierarchy without any role-based access. In this case, the user role defining may have been avoided as some of the systems such as MIS are only for information collection and dissemination. However, defined user roles and privileges are an important tool for the management and security of the systems. Any advanced e-System must employ these tools for the enhancement of system management and system security.

4.6.9 Coverage of e-Systems

The coverage of e-Systems is also a key factor in the successful implementation. The fully covered e-Systems will have end-to-end functionality that completely replaces the manual workflow and operations. This will also move the institutions towards a paperless office environment and to the status of a digitally compliant institution. Full coverage will also enable the users to perform their tasks effectively and hence increase productivity. Partially covered systems will include digital components of core functionality concerning manual operations. This will take a longer time to process since manual tasks are to be performed in the end-to-end workflow. - Undertaking a proper system study ensures the coverage of all of the essential functionalities to

be incorporated in the e-Systems. Figure 4.6-13 presents the status of coverage of functionalities of respective e-Systems as per the respondent's view.

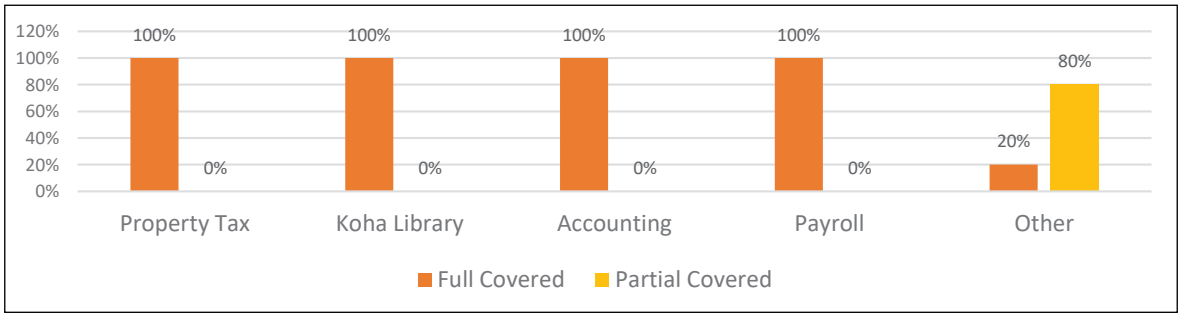


Figure 4.6-13 : Coverage of the Functionality by the e-Systems (whether Manual Work is Required)

Accordingly, all key e-Systems facilitate the functionalities of respective work processes without manual work. However, this does not mean that the e-Systems are automatically appending the necessary data from other systems for their operations. Regarding the e-Systems in the "other" category, 80% of the systems do not handle an end-to-end process. Also, it was clear that despite the respondent's view, even the key e-Systems do not cover all aspects related to the respective processes. The property tax collection process could be taken as an example. Most of the property tax e-System had been developed in a way that automatically adds the warrant cost to every transaction at the end of every quarter. This is contrary to the actual workflow which accrues the warrant cost after the legal notification of the warrant is issued by the Commissioner / Secretary of MCs, UCs, and PSs under the due process. Therefore, the workflow defined in the property tax e-System needs to be updated to ensure it adheres to the relevant operational procedures and legally abides by the norms.

However, end-to-end coverage of functionality is necessary in the implementation of a proper e-System, and it enhances the efficiency and effectiveness of the system by minimizing manual work.

4.6.10 Application Architecture and Client- side Access Type

The client-side access provision is also a key aspect to consider in the deployment modality of e-Systems. The systems which are based on standalone systems and client-server systems are mainly based on terminal client interfaces. The terminal client is a piece of software exclusively developed for client-side access to the e-System and there are certain limitations in interoperability. This is because of the freedom of customization for the vendor to build it in their style with limited open standards. Meanwhile, most of the enterprise-based software application development has been moved to web application architecture which provides more freedom to interoperate with other systems. It is worth noting that web-based systems employ open standards that make the application more reliable and provide a wider scope for expandability. Similarly, web standards provide many open-source platforms to build on and deploy applications that will have considerable savings against the proprietary platforms. Furthermore, there is a recent trend in introducing mobile applications to provide client access to e-Systems and this has the maximum potential for system users to access system functionality on the go. Figure 4.6.14 presents the current status of client interface provisions of the e-Systems available in the LA system.

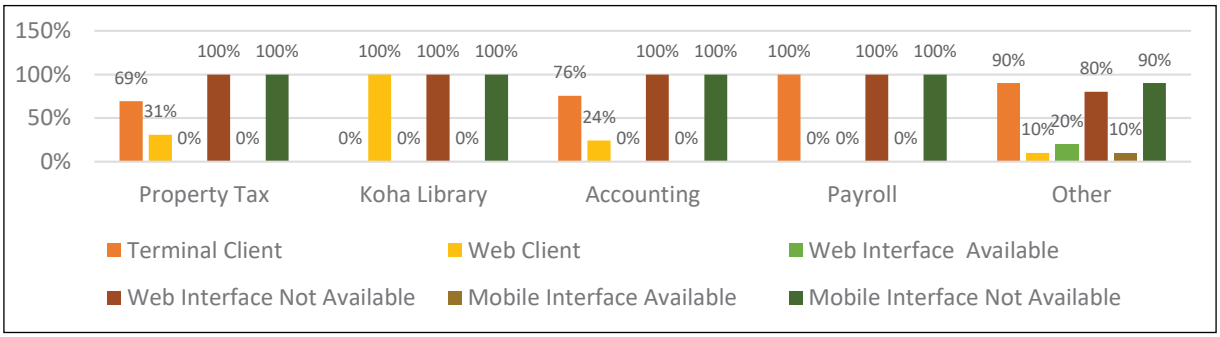


Figure 4.6-14 : Status of client access provisions

In the above Figure 4.6-14 it is evident that e-Systems in all LAs employ a considerable number of terminal client-based access provisions. The Koha library information application system is the only application that has been reported to provide full web-based access provisions. However, as per the current usage of LAs, Koha is accessed via a web client with limited features regardless of the available options. Other than Koha, there are a considerable number of applications in the "other" category, that provides web-based access facilities. Among them are software applications that have been connected to mobile applications such as the Garbage Vehicle Tracking System of Kaduwela MC. Predominantly, property tax and accounting applications have been built based on client-server architecture. However, among several commercial variants of these applications, there are e-Systems built based on the web-based architecture such as CAT2020 and e-Net. It is also evident that many of the commercial software developers have upgraded their products to web-based architecture. However, the majority of the LAs were not able to migrate into the upgraded e-Systems due to the higher cost involved with the migration process. It was = also learned that irrespective of having web-client access, none of these LAs have a real web interface for these applications as they are not hosted for internet-based access. Among the above five applications, Payroll e-System is a 100% standalone client server application, mostly used on a desktop computer.

4.6.11 Licensing model of e-Systems and the Intellectual Property Rights of the Systems

The licensing model of an e-System is a key aspect in deciding the ability of the system to have a long-term operational arrangement including future updates to the e-System. There are clear concerns to bear the recurring financial cost to license the e-Systems from time to time and it was revealed that the contractual relationship of LAs with the system development companies is not strong enough to protect the rights of the LAs.

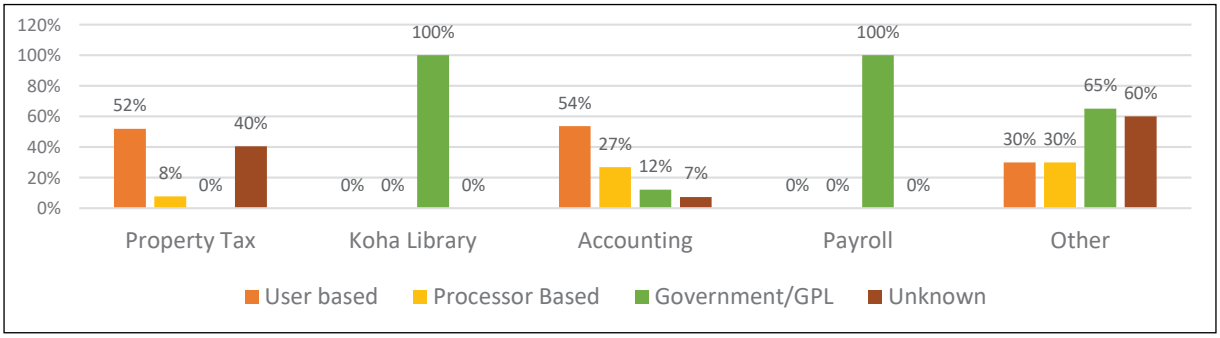


Figure 4.6-15 : Software licensing model

The above Figure 4.6-15 clearly shows that across all e-Systems, the licensing model is not common. Note that GPL referred in Figure 4.6-15 is General Public Licenses. Systems developed by central government agencies

such as CIGAS and Payroll have exclusive rights rendered to the government users and LAs to use them without any user limitations or additional cost. Any updates to the current software application could also be obtained on the same basis. Koha is an open-source application, the vendor customization is limited to every major release, and it is updated without any further licensing constraints. Other than Koha and systems provided by the government, all the other customized applications are running on a user-based or processor-based license as per the licensing agreement proposed by the vendors. There is also an issue where LAs focus less on the implications of licensing and partnering with a vendor to develop customized e-Systems on an ad hoc basis that results in vendor lock-in. Hence, the vendor holds complete control and authority over the e-System and the LAs solely rely on the vendor to provide support in every aspect of the system.

From the above Figure: 4.6.15, it is proven that some of the LAs do not know the modality of licensing the e-Systems. This is a clear indication of the prevailing need to improve the understanding of LAs on the licensing options for e-Systems.

The next concept along with software licensing is the right of intellectual property (IPR). If LAs have the IPR and the source codes for the software application systems, those systems are not bound to a single vendor. As per the requirement, the software could be changed, modified, altered, and upgraded to the version by themselves or with any other software developer. However, usually, software developers keep IPR with them and source codes are not released to the client. The process of developing software for LAs is a joint effort. While the staff of LAs is providing their classic knowledge of processes and their flow for system development, software developers convert them into computer codes. Therefore, both parties should at least have shared IPR for such systems. Figure 4.6-16 depicts the status of the IPR related to e-Systems that are being used at LAs.

Accordingly, it is obvious that LAs hardly have an IPR of an e-System. The private vendors have locked in on the system as well as the data generated by the systems.

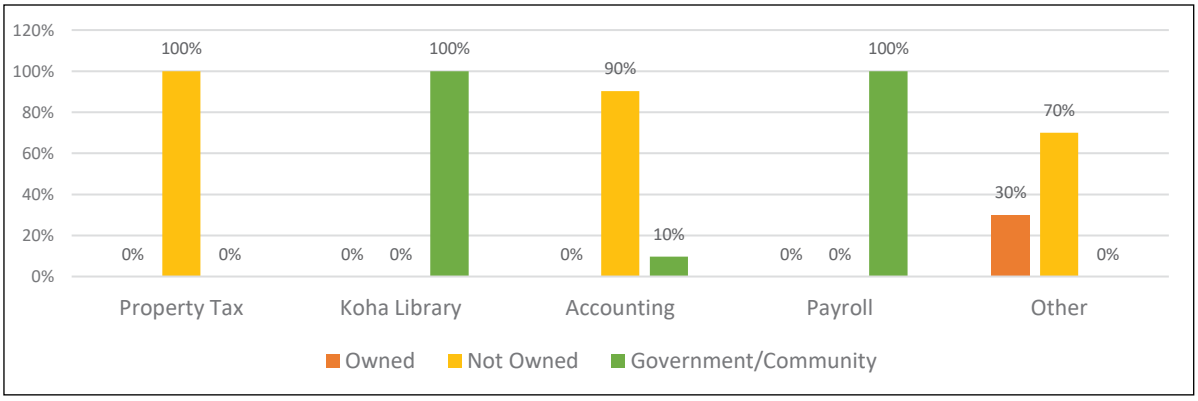


Figure 4.6-16 : The Intellectual Property Rights of the systems

4.6.12 Type of hosting provision

The e-System hosting provision includes servers, server racks, firewalls, necessary network infrastructure, and suitable building space with proper air conditioning for setting up the necessary environment for hosting. The hosting provision shall be in the form of either a standalone desktop computer or in the form of a physical data center based on-premises or in a Cloud-based server. In the case of client-server model applications, they are usually hosted on-premises. Most of the client-server software applications are hosted on standalone desktop computers. However, hosting of the software applications and databases on a standalone desktop computer accumulates a high risk as there could be hardware failures at any given time. When standalone computers are used for hosting purposes, access is limited to a single user in most cases. Therefore, the hosting provision shall provide a central point of control for the e-System to accommodate administrative sophistication and to enhance system robustness and security provisions.

As per the information gathered, the e-Systems in LAs were hosted as predominantly cloud-based systems across all MC, UC and PS and with a limited number of responses to standalone and on-premises facilities for hosting the e-Systems. Similarly, it is clear from the below Figure: 4.6-17 that cloud systems are common in most of the LAs since this is the preferred mode of hosting by the third-party vendors.

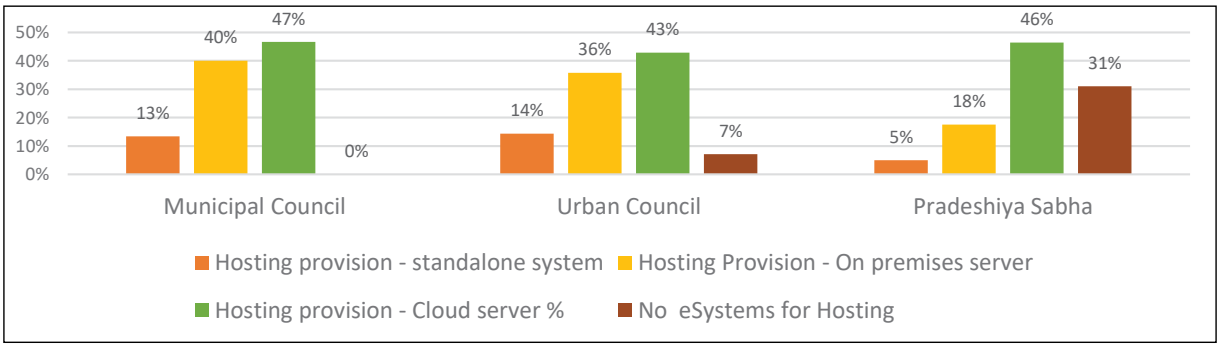


Figure 4.6-17 : Hosting provisions of the e-Systems

It is also important to note that cloud usage is mostly for web hosting and none of the work applications related to day-to-day work have been hosted in a cloud other than the garbage vehicle tracking system of Kaduwela MC. Moreover, it was revealed that application hosting, database hosting and user management take place in the same server in a majority of LAs. This reveals that the systems in LAs are vulnerable. It is also noted most of the LAs do not have a proper and standard server room for stationing the servers.

4.6.13 System performance

The e-System performance is measured using indicators such as uptime or availability, response times, reliability, interoperability, integration, etc. Under the study, endeavors have been made to identify and measure the performance in e-Systems available at LAs by using indicators and criteria which are generally accepted in the ICT industry[21]. In Figure 4.6.18 below, the availability of e-Systems has been presented as per the information reported by LAs based on the full uptime and uptime based on the operational hours of the institution. As per the accepted norms of the industry, availability of the e-Systems should be over and above 99%. However, the outcome of the analysis of survey data revealed that e-System availability is not satisfactory as per the industry-accepted performance terms. When considering the network and other hardware facilities available as well as the locations of LAs Figures seem to be encouraging. It is also important to note that, the availability of e-Systems is dependent on aspects such as error-free software, reliable hardware, and connectivity.

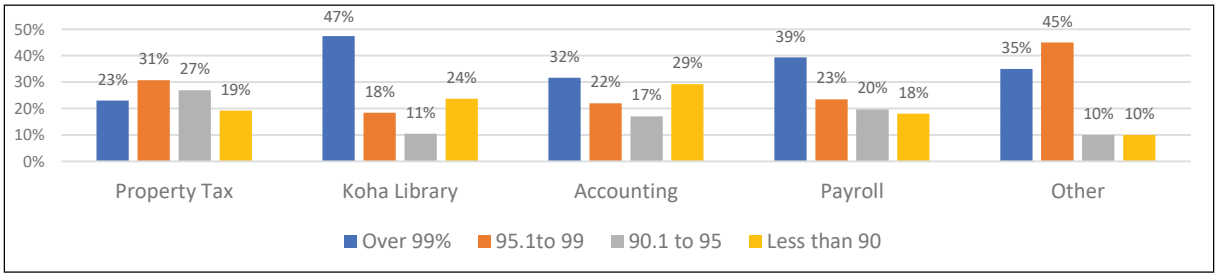


Figure 4.6-18: e-Systems Availability

[21] Software Quality Metrics - Engineering Metrics in Minutes, https://www.google.com/search?q=software+application+performance+indicators&sxsrf=AOaemvJBGF9rJeKnNuPiGqob-FJ0FCaB0uA%3A1637206803536&ei=E8uVYdqMIM6w9QPUo5SIBQ&ved=0ahUKEwia4srP_qD0AhVOWH0KHdQRBVEQ4dUD-CA4&uact=5&oq=software+application+performance+indicators&gs_lcp=Cgdnd3Mtd2I6EAM6BwgjELADECc6BwgAEEcQsAM6Bg-gAEAcQHjoICAAQCBAHEB46BggAEAgQHkoECEEYAFD-BliPH2D8NmgBcAJ4AIABlgGIAZoKkgEDNC44mAEAoAEByAE

In Figure 4.6-19, the availability of systems was analyzed according to the type of LA, and it was found that the over 99% availability of e-Systems has been shown a similar level of performance (between 33 to 37%) across MCs, UCs and PSs. Note that the availability is mostly considered during the working hours of the LAs, since most of the system functionalities are utilized only during office hours. Because none of the LAs provide their key services online currently on 24/7 basis availability.

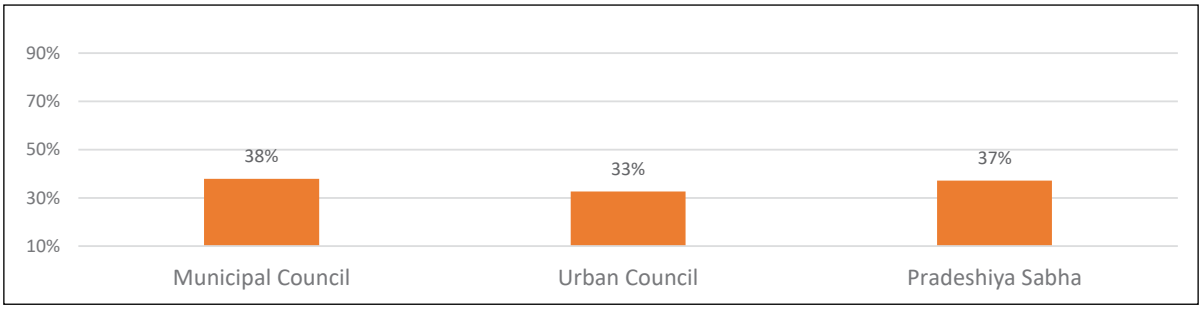


Figure 4.6-19: Over 99% of e-Systems Availability According to the Type of local authorities

Performance could also be measured in terms of the number of transactions and the efficiency achieved in digitizing the manual workflow. The time taken to complete a task may take days or weeks due to the delays in the logistics and approvals in the workflow. Through digital form of documentation, the logistical delays could be eliminated, and the document could be shared with multiple staff members in minutes or seconds. Figure: 4.6-20 presents the average time statistics related to manual operations versus computerized operations.

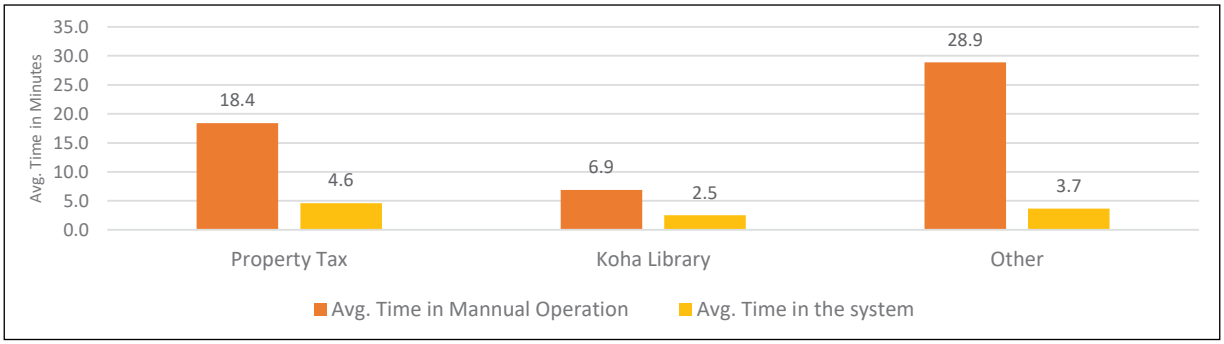


Figure 4.6-20: Average transaction time for selected services

In simple operations such as paying property tax, finding registers, issuing receipts, data entry and report generation of inventory, stores management systems, etc. e-Systems reduces the time taken by 65% to 75%. The e-Systems can provide centralized access to the above functions thereby saving a considerable amount of time and providing hassle-free access to the services. Furthermore, complex operations such as the preparation of employee salaries which take about three working days depending on the number of employees could be completed in less than 10 minutes if the attendance management system and payroll run together. It is similar to the preparation of accounts. It was observed that e-Systems save more than 5 to 7 working days for an employee for the preparation of monthly accounts and bank reconciliation statements.

The above Figure 4.6-20 clearly shows the effectiveness of working with e-Systems in terms of time saved against the manual operation of tasks.

4.6.14 Integrated and Connected e-Systems

The interconnection and interoperability among e-Systems are mandatory requirements to avoid the duplication of data collection and entry which causes a great deal of inconvenience to the public and the LA staff. The study concluded it is uncommon that the e-Systems which serve different functions of the LA is developed and maintained by a single entity. Hence, integration of the e-Systems developed by various public, private, and individual entities is a challenging task. Also, LA e-Systems are expected to communicate with the other e-Systems in the provincial and central government institutions. The interoperable systems could easily get connected with such other e-Systems through web services irrespective of the technology used for the development of such e-Systems. Otherwise, there should be a middleware layer that would be capable of translating instructions and database structures from one system to another which is a very complex and time-consuming operation. Figure 4.6.21 represents the status of interoperability across e-Systems by including necessary provisions.

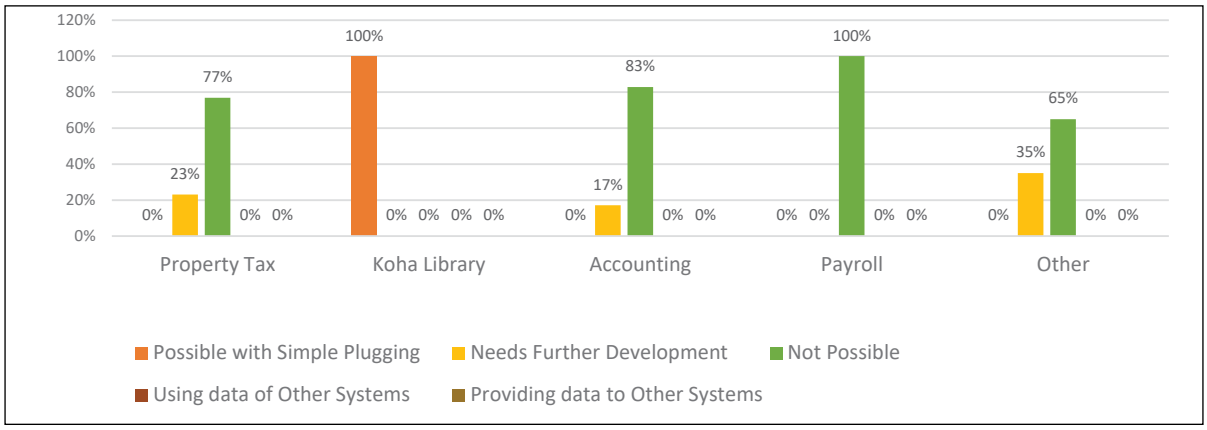


Figure 4.6-21 : Ability to Interoperate with other Systems

The Koha is the only e-System currently being used that is interoperable with other systems with simple plugging if the system is hosted with web access. There are very few systems in the categories of property tax and accounting which could be upgraded to interoperable status with further necessary development. However, the majority of e-Systems currently being used such as payroll, property tax, and accounting applications cannot be directly and simply converted to interoperable status as e-Systems can have different software architecture. This makes modifications to e-Systems a complicated task.

Moreover, none of the current e-System is interoperable with other available ~~other~~ e-Systems in the same local authority or with the e-Systems of other provincial and central government institutions. In short, the e-Systems are not interconnected and are not meant to provide integrated services across vertical and horizontal layers of the workflow. This has created information islands within the institutions with limited data sharing provisions. Furthermore, most of the current e-Systems are hosted locally within the LA premises such that access is limited to the users of the LA. Therefore, inter-institutional interoperability is not possible currently, without introducing major changes to the physical infrastructure setup.

4.6.15 Availability of resources to manage the e-Systems

Routine maintenance of the e-Systems needs to be managed on a timely basis to provide bug fixes, update patches, upgrades and troubleshooting issues. Figure: 4.6-22 presents the status of resource availability in LAs for bug fixing and system maintenance. As per the survey data, it has been revealed that the majority of LAs do not have any resources for system bug fixing and maintenance. It is important to note that none of the LAs have deployed in-house staff for bug fixing and system maintenance of key e-Systems.

These e-Systems have been developed either in-house, by the central government or by a private sector developer. There are different models for bug fixing and maintenance of e-Systems that are currently being used. The bug fixing and maintenance of e-Systems developed by the central government agencies are done by those agencies. There are many instances where the e-Systems are developed by an external agency and hosted at LAs. It is important to note that in most cases the software development agency provides support for software troubleshooting including bug fixing and for routine operational maintenance. This could be provided by the software development agency in the form of a warranty and maintenance agreement. These developers use software such as "Team View" for directly accessing the client servers for bug fixing and maintenance. As a result, the overall system control lies on both parties which may lead to administrative overhead and pose security and privacy concerns.

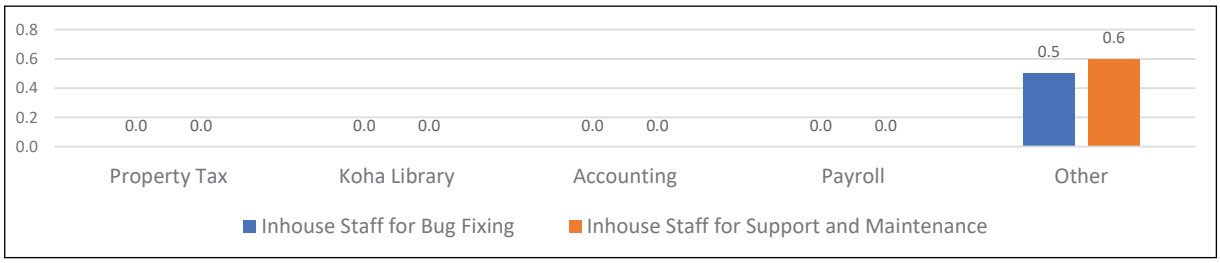


Figure 4.6-22 :Status of resource availability in local authorities for bug fixing and system maintenance

It was also learned that there are considerable delays correcting errors and bugs of a system when dealing with the vendors remotely as internal resources are not available for solving it instantly.

It is an accepted norm that the LAs which use critical applications have a service contract with hardware vendors and software application development entities. LAs usual pays the annual subscription fee for the operational software as it is a requirement to obtain support from the respective software vendor. Besides that, in most cases, these entities do not have any other service contract in operation. The information highlighted by Figure 4.6-23 clearly indicates that all LAs are unaware of the importance of a maintenance contract related to the software and hardware of e-Systems.

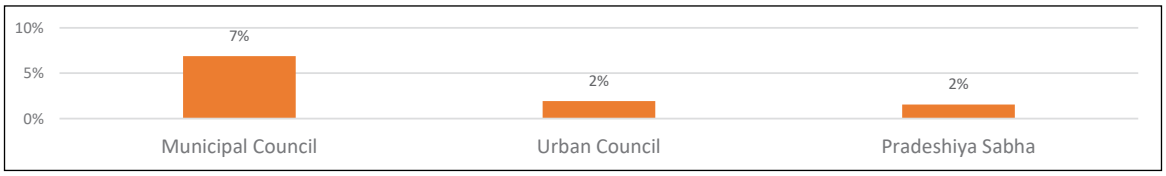


Figure 4.6-23 :Availability of maintenance and services contracts

4.6.16 Status of security of e-Systems

The security provision for e-Systems is a mandatory requirement to avoid critical cyber security threats that arise from various sources. The defense mechanism to stop the threat vectors is mainly concentrated at the Operating System level, application level, and database level. Once these three levels are secured the amount of intrusion or threat activity could be minimized to a considerable level. The systems are primarily vulnerable to aged software code that has not been updated with necessary patches for a long time which paves the way for security vulnerabilities. It is clear from Figure 4.6.24 that the security concerns related to the e-Systems were limited in all LAs.

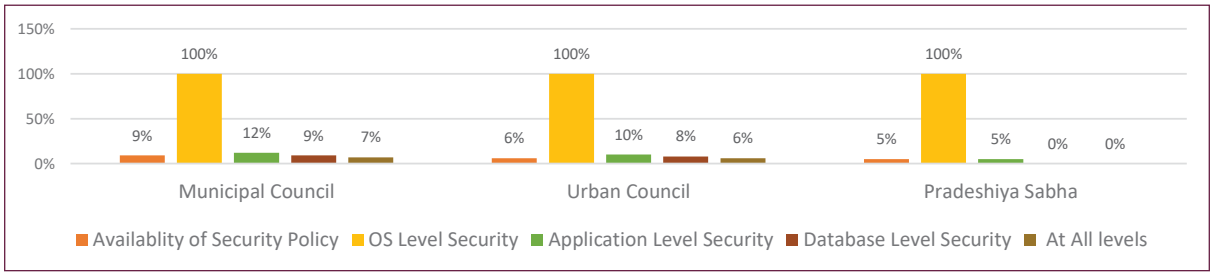


Figure 4.6-24 : Availability of security provision in the e-Systems

The key security measure that has been adopted is password security provided by the Operating System level. This is a freely available feature of any Operating System which could be activated or deactivated by the users. However, the majority of the systems do not have security provisions beyond the Operating System level security. It is also interesting to know that majority of LAs do not have any security policy to be implemented. Accordingly, the efforts undertaken by LAs to ensure the e-Systems are secure and reliable for the client and the employees could be concluded as inadequate.

When considering the availability of e-Systems and software available at the LAs, the app "ManKiwwa" could be counted as a good initiative taken towards connecting the general public with the LAs. Sri Lanka's population of 21.1Mn is served by multiple LAs in Sri Lanka. To have greater quality standards within Authority limits, the Authority should have the ability and awareness to attend and solve public issues as quickly as possible. Many problems occur daily, and the citizens must have the ability to report these issues to the authorities to focus their attention on these issues and to prevent or fix them. "ManKiwwa" is a fully integrated solution that can develop the public experience by enabling ease of reporting on an incident together with the location by a single click on the smartphone of the user. Then the setting is to notify the authorities instantly about the incident not only with a picture but also the location. The app is fully automated, and authorities can handle incidents, utilizing minimal resources round the clock. "ManKiwwa" is developed to bridge the gaps in communication networks. As a result, LAs will receive information on the public issues reported in real-time. So, the authority can assign tasks/ jobs digitally and transfer the information to the respective officers who can solve the problem. Since local authorities are the closest authority to the citizens, this service is introduced in LGs to assist the citizens to connect with them. The authorities get the trigger to manage these reports in a platform regulated in a cloud. Currently, Gampaha MC, Kotte MC, Akkaraipattu MC, Kuliyapitiya UC, Biyagama PS & Attanagalla PS are connected to the platform. (Refer to Annexure 11 for a more comprehensive understanding of the app.)

4.7 Best practices observed in the local authority System

Best practices are generally known as a set of guidelines, ethics, or ideas that represent the most efficient or prudent course of action in each managerial or business situation. Best practices may be established by governing bodies, or they may be internally decreed by an institutional management team by a policy document. The term "Best Practice" in this section is used to identify e-Systems which have been generally accepted as superior to any other alternative creation and produce a high-quality output that is superior to those achieved by other means as it has become a proven product over the years. Best practices are also considered as a key element that facilitates e-Systems to operate sustainably to ensure the system progresses through a maturity model over the years. If such best practices related to local service delivery are available LAs can use them as references for enhancing the efficiency and effectiveness of citizen services.

Adhering to the proven best practices in all stages of the lifecycle of an e-System will provide measurable advantages to new and experienced institutions and will ultimately result in the successful implementation and operation of e-Systems. This section focuses on the identification of best practices based on respondents' score on the dimensions of such best practices and how it relates with the functional efficiency of e-Systems. Accordingly, the best practices identified in LAs were identified and formulated based on three scores.

I. First is the score for the eight dimensions. Based on respondents' ratings gathered from the LAs at the primary data collection.

II. The second is the comparative/relative measure of functional efficiencies, adopted development processes, ideal characteristics of e-Systems and the current state of LAs.

III. Third is the section on self-reporting best practices acquired from the primary data collection tool based on the following dimensions,

   a. Innovative approaches practiced in the e-System.

   b. Sustainability and ability to transform as per the changes in the institutional processes.

   c. Repeatability and less hassle of administrative overheads in replication.

   d. Deemed essential in the context of routine operations of the institution.

   e. Beneficial and have high value in terms of productivity.

   f. Well-defined and re-engineered to align with the manual process and workflow.

   g. Maturity level and the stability of the system to sustain the core functionality.

   h. Value proven and had high value for money and user satisfaction.

The above dimensions are evaluated in a 1- 10 score by the respondents of Local Government Authorities and average scores were used to identify the systems that are performing well, based on the level of acceptance by the e-System operators and the satisfaction of the end users.

The innovative practices that have been adopted for developing and deploying a new e-System or in implementing an existing system were considered under innovativeness. As per the responses in the primary data survey, there are noticeable innovative practices by the LAs that have made a positive impact on service delivery and internal operations. These practices have simplified the workflow in the e-System, as opposed to the manual workflow which had several complex routines. These e-System software applications in the innovative category are either newly invented or are being utilized in new ways. For example, revenue collection of the LA has been automated with a digital system to process the collection of tax, issue digital receipts and to provide precise information to the senior management for monitoring the progress of revenue collection. In addition, a mobile application was developed to enable field level collection of assessment tax and to provide real-time access to the system for processing (Balangoda UC). Furthermore, a loyalty program for the taxpayers has increased customer interest and satisfaction.

Sustainability in the context of the study means that it enables change quickly with a lower likelihood of bugs, a decrease in the total cost of ownership of applications, and increased business agility. The agility of the system was considered to ensure the e-System shall withstand the change management in the manual operating procedures of the Local Government Sector. For instance, the budgeting manual has been updated in recent years with new structural heads in the budget line items. These changes were to be addressed in the financial management system (CIGAS) to quickly enact the new budget heads and to align with the backlog information and to enable the trend analysis of the data in the system. The ability of e-System to transform from a terminal-based standalone system to a centralized web-based system was also considered as an agility factor to move all the core features to a different modality without changing the core functionality.

The repeatability of an e-System is the ability to repeat the software application without the hassle of licensing and other technological impediments. If the LA system realises the value of new e-Systems used in one

entity, there should be means for replicating it without undergoing heavy licensing costs and unfair terms & conditions from the vendor. The e-System development process is collaborative as relevant process owning government entity must expose its own business process to the commercial vendor for software designing and cording. The collaborative effort of both parties will finally become a software application. Therefore, it is desirable to negotiate for shared Intellectual Property Rights (IPR) with software developers when such a project is outsourced. If the government entity also has the IPR of the software application, it could be repeated in other government entities without any hassle of licensing.

"Deemed essential" means that the software application is vital for the business operations of LAs. There is no alternative or not many alternatives are available for processing relevant work without the software application.

"The beneficial" means that e-Systems have many benefits to the institutions for the operation of respective business processes and to increase its productivity considerably. It is also beneficial to stakeholders including the citizens as the customers.

"Well defined and re-engineered e-Systems" mean that a series of actions or steps are taken to achieve a particular result. The processes of the manual system should be captured end to end. If this is off-the-shelf software it should be re-engineered to suit to the current business processes. The e-System blueprint will serve as a key tool in the replication of the system to other LAs. The blueprint shall have documented practices, manuals, training provisions.

"Maturity" means that the software application that has been in use for long enough that most of its initial faults and inherent problems have been removed or reduced by continuous development. There should be stability in the system to sustain the core functionalities.

"Value proven" means whether the software application is adding measurable value for customer satisfaction.

The above eight dimensions were evaluated in the 1 to 10 score by the respondents. The definitions of the above eight dimensions were clarified to the respondents with the questionnaire. However, most of the respondents were unable to quantitatively express an exact score for dimensions, particularly as some have been recruited to those LAs during or after the e-Systems implementation.

Table 4.7.1 presents the best practices as per the scores received from the respondents. For the respective e-System used in the multiple LAs, the average score has been taken for each dimension for comparative prioritisation. The "Average Priority" score of 5 (50% of the total) was considered as the cut-off to remark the best practices among the listed e-Systems.

Table 4.7-1 : Best practices as per the ranking of the respondents

Name of the e-Systems	Innovativeness	Sustainability	Repeatable	Deemed Essential	Beneficial	Defined Process	Mature System	Value Proven product	Average Priority
CAT2020	7.86	8.00	8.14	7.43	7.29	6.71	7.00	6.57	7.38
Koha	6.23	6.77	7.00	6.38	6.46	6.46	6.38	6.08	6.47
Property Tax-Tax Man	6	5	6	6	5	5	5	5	5.38
Payroll	4.50	5.00	5.67	5.33	5.06	4.94	4.61	4.67	4.97
Property Tax-e-Net	5	4	5	5	6	5	5	4	4.88
CIGAS	5.33	5.67	5.67	5.00	3.33	4.33	5.00	4.67	4.88

Name of the e-Systems	Innovativeness	Sustainability	Repeatable	Deemed Essential	Beneficial	Defined Process	Mature System	Value Proven product	Average Priority
e-Puraneguma	4.94	4.69	4.88	5.06	4.81	4.19	4.88	4.63	4.76
Property Tax-Tax Finder	5	6	5	4	5	5	3	5	4.75
Property Tax -Nek Far	4.11	3.89	4.11	5.33	5.78	4.67	5.00	4.22	4.64
ET Labs Software (Finger- Print Detecting System)	4	4	5	4	5	4	5	6	4.63
Property Tax-e-GATE	4	3	3	5	6	5	5	4	4.38

According to the respondent's scores only CAT 2020, Koha and Tax Man Property Tax systems have scored more than 5. CAT 2020 is being implemented in several LAs in the NW province. It covers 28 functionalities of a LA and functions as a suit of application with a single authentication interface. However, none of the LAs using CAT 2020 have not implemented the fully pledged system with all the functionalities available in the suite.

The CAT 2020 system has been developed by a government entity and therefore, there is independence to replicate and incorporate changes without a hefty cost.

The Koha is an open sources library information management system which is being implemented in several LAs. However, there are a few different versions customised by different vendors. None of these versions facilitate for full functionalities available in the open- source application such as online information sharing.

The Tax-Man property tax system is implemented only in the Balanagoda UC and in average it has scored more than 5. However, the software has been developed in-house and the respondent is from the same institution. It is suitable to conduct a detailed system audit on the Balangoda UC e-Systems to understand its suability for replication.

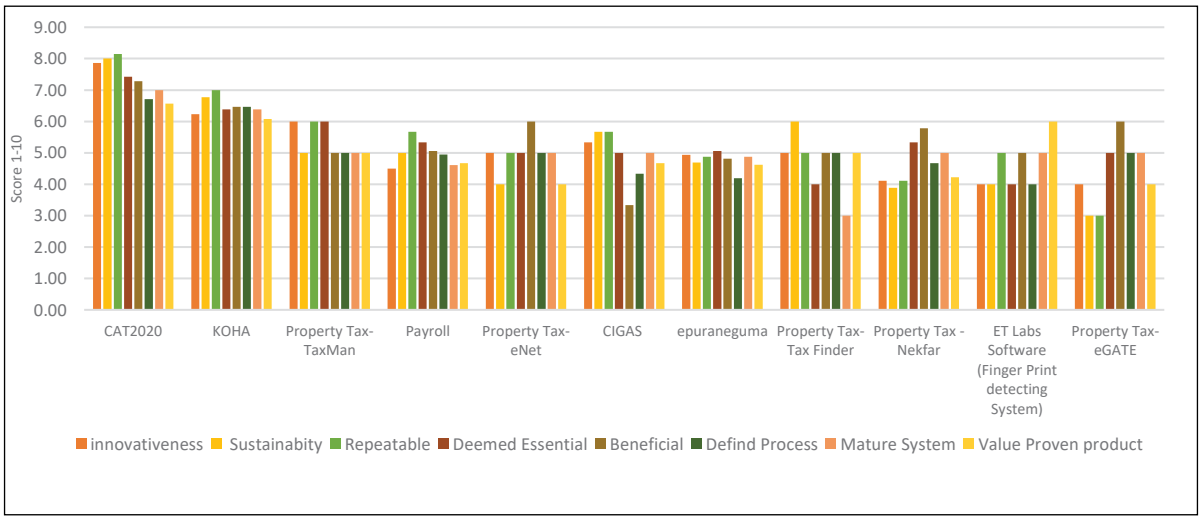


Figure 4.7-1 : The Best Practices as per the average score for each dimension

Other than the above three e-Systems others have scored less than 5. e-NET, e-Puranaguma, Tax Finder, Nek-Far and e-GATE are a few honorable mentions. These e-Systems are being used as a client server system or a web client system. However, some of the developers claim that they have full control over the web applications. The main reason for low scoring is the vendor lock-in contracts which involve high-cost for any small change and for upgrading new versions. It was noted that end to end system requirements have not been covered as

no proper system study was done. There is no software IPR ownership to LAs and therefore, these cannot be freely replicated.

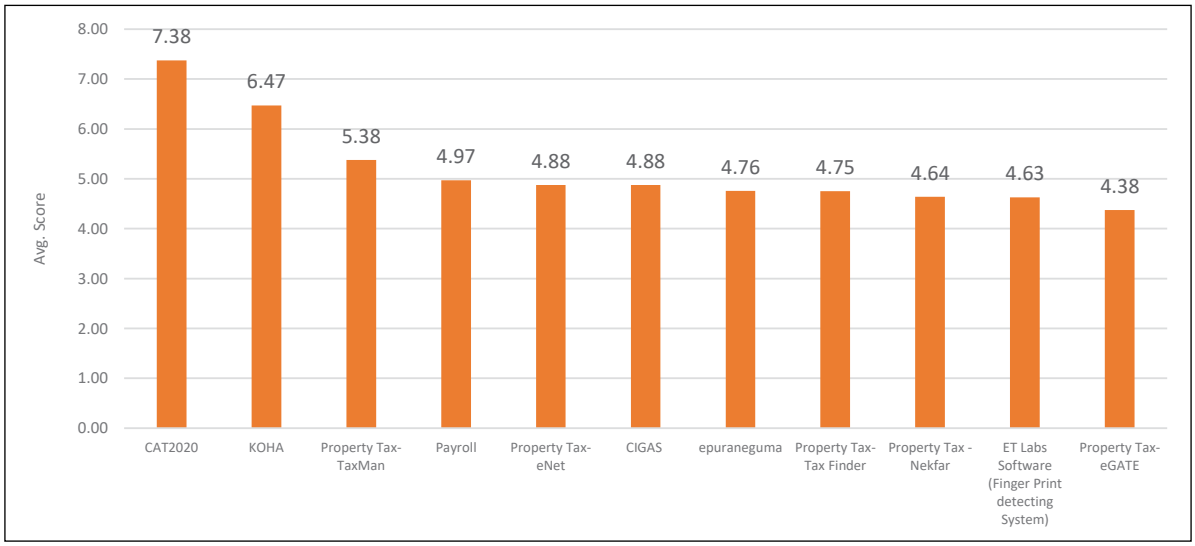


Figure 4.7-2 : The best practices as per overall average scores

CIGAS and Payroll software are developed by the Ministry of Finance. Although CIGAS has a version for LAs, it is a government accounting system that is not very popular among LAs. The payroll is used by most of the LAs for-salary preparation. However, it is a standalone and siloed system. The fingerprint capturing system by ET labs is just for making the employees' attendance and it is not incorporated into any HRM system though it has earned a remarkable score from the respondents. Hence, this concludes the content related to the first criteria.

As explained above, the best practices are also measured on the second criterion based on the functional efficiencies, adopted development processes, ideal characteristics of e-Systems and the current state of the LAs. According to the analysis submitted in previous sections, particularly, in section 4.6 none of these e-Systems could be categorized as best practices as per the second criteria of the evaluation. Among those e-Systems, Koha, an open-source software requires proper customization to use it full features. The CAT 2020 software is an agile development however, it appears that the full steps in the software development life cycle has not been followed in the development process. Therefore, it is recommended to do a system audit on functionalities, security aspects as well as the capability of providing support services if this system is to be replicated among LAs outside of the NC province.

In terms of the second criterion, no other e-System currently used in LAs could be considered as a best practice. Most of the e-Systems are private sector developments without proper system study, BPR, quality assurance and testing. There are issues relating to not capturing the processes end to end and several securities loopholes and omissions to name a few. LAs should consider adopting measures to conduct thorough and comprehensive system audits and to draft and negotiate conditions of contracts to be in their favour.

The main concern in the LG sector is to identify the priority areas and the priority projects to invest. The e-Systems should provide visible benefits to the stakeholders i.e., the immediate gains and long-term achievements. The benefits of an e-System will be more precise if a system requirement was thoroughly studied and incorporated, and the implementation feasibility is measured before launching the initiative. The actual beneficial value of the system shall be perceived once the system completely aligns with the processes reengineered through BPR and as it reduces the complexity in operations. The best practices identified in this section are a viable benchmark and a learning platform for the implementation of comprehensive and interoperable systems.

CHAPTER 5 : CURRENT LEVEL OF ICT USAGE AT PROVINCIAL COUNCILS - SUMMARY OF FINDINGS

5.1 Profile of the Selected Sample for Study

The first level of sub-national governing sphere in the country is the Provincial Council (PC) system which is being operated with a considerable quantum of devolved powers. During the last two decades, the PC system was introduced for all nine provinces in the Sri Lankan polity. These councils are administered by the democratically elected members of each province, organized as a council headed by the Chief Minister and the Board of Ministers appointed from among the Council Members by the Governor. PCs function under the directives of respective Governors.

This study on e-Governance application in sub-national governing entities has been conducted by selecting a sample of eight provincial institutions functioning under the nine PCs. Accordingly, the sample size is 89% of the total population. When selecting the sample, weightage was given to provinces in the UNDP assisted CDLG Project viz. Northern, Eastern, North Central, and Uva. Other five PCs in the study have a significant number of features in terms of digital applications for their G2G and G2C service delivery systems.

Table 5.1-1 : Profile of the selected sample for the study

Provinces	Provincial Department of Revenue	Department of Provincial Motor Traffic	Provincial Department of Local Government	Provincial Department of Lands	Provincial Education Department	Provincial Department Company Registration	Provincial Planning Secretariat	Office of the Deputy Chief Secretary Training and HR	Office of the Deputy Chief Secretary Finance	Total number of samples	Total number of actual completion	% of completion
North Central	Completed	Completed	Completed	Completed	Completed	Not Applicable	Completed	Completed	Completed	8	8	100
Uva	Completed	Completed	Completed	Completed	Completed	Not Applicable	Completed	Completed	Completed	8	8	100
Western	Completed	No	Completed	Completed	Completed	Not Applicable	No	No	No	8	4	50
Southern	No	Completed	Completed	Completed	Completed	Not Applicable	Completed	Completed	Completed	8	7	88
Northern	Completed	Completed	Completed	Completed	Completed	Not Applicable	Completed	Completed	Completed	8	8	100
North Western	Completed	Completed	Completed	Completed	Completed	Not Applicable	Completed	Completed	Completed	8	8	100
Sabaragamuwa	Completed	Completed	Completed	Completed	No	Not Applicable	Completed	Completed	Completed	8	7	88
Eastern	No	No	Completed	No	No	Not Applicable	Completed	Completed	Completed	8	4	50
Central	Completed	Completed	No	Completed	No	Not Applicable	Completed	Completed	Completed	8	6	75

With reference to Table 5.1-1 above, out of the eight departments in North-Central, Uva and Northern provinces (which are within the CDLG project) have recorded 100% availability of e-Governance applications. However, EP which is a CDLG project area has shown 50% of applicability as data from Revenue, Motor traffic, Lands and the Education departments have not been received due to non-accessibility to those entities because of the pandemic situation. It doesn't conclude that EP does not have e-Systems for the above departments as Revenue, Motor traffic, Land as well as Education authorities universally use Government (ICTA) introduced e-service packages. Hence, it could be assumed that almost all CDLG areas have a high applicability of e-services in comparison to other provinces in the island.

The Provincial Department of Companies Registration was considered because it is one of the popular service delivery units of the Western province. Nevertheless, during the survey, it was found that Department of Companies Registration functions in a limited number of provinces and those departments could not be reached due to the current pandemic situation of the country at the time of the survey. Therefore, in Table 5.1.1 it is indicated as 'not applicable' for all provinces. Furthermore, in the above Table against Western, Eastern,

North-Western, and Southern provinces under certain departments it is indicated as 'NO'. This does not imply that such departments do not exist nor that they do not have e-applications at all. It denotes that during the survey, details of services provided by those departments could not be considered due to inaccessibility.

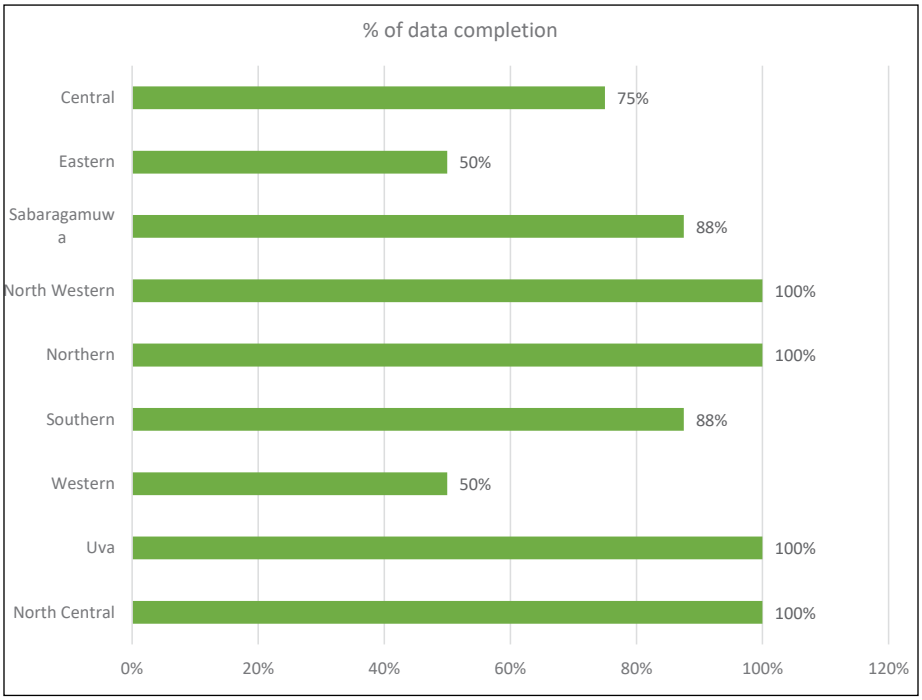


Figure 5.1-1 : Profile of the selected sample for study

According to Figure 5.1-1 above, out of the five PCs which are outside of the CDLG project the North Western province leads with 100% of applicability of e-Governance applications covering all eight departments. Both Southern and Sabaragamuwa provinces were able to reach 88% applicability, the Central & Western Provinces were able to acquire 75% and 50% respectively. As stated above, the reason for these remarkably lower record values are due to non-availability of data due to the pandemic situation in the country.

However, in terms of Table 5.1.1 indicates that out of e-Governance applications available in eight provincial departmental units, five provide G2G services while G2C & G2B are available only in two out of the eight (Department of Revenue and the Department of Lands) and G2C services are offered in only one entity which is the Department of Motor Traffic.

5.1.1 Distribution of sample by working language in PCs.

The working language sample of the survey has covered all nine provinces, and it has significant features to be emphasized. Out of the total population of nine provinces, five provinces (55.5% of the sample) have recorded 100% usage of Sinhala as their working language. The other remarkable characteristic is that all these five provinces are located in the southern part and between the middle and top parts of the island. On the contrary, a similar reflection has been indicated by the Northern Province recording 100% of Tamil language usage.

Table 5.1-2 : Sample by Language of work.

Language							
Province	**Sinhala**	**Sinhala %**	**Tamil**	**Tamil %**	**Bilingual**	**Bilingual %**	**Total**
Eastern	0	0%	2	50%	2	50%	4
North Central	8	100%	0	0%	0	0%	8
Uva	8	100%	0	0%	0	0%	8
Northern	0	0%	8	100%	0	0%	8
Western	3	75%	0	0%	1	25%	4
North Western	8	100%	0	0%	0	0%	8
Central	2	33%	0	0%	4	67%	6
Southern	7	100%	0	0%	0	0%	7
Sabaragamuwa	7	100%	0	0%	0	0%	7
Total	**43**	**72%**	**10**	**17%**	**7**	**12%**	**60**

While these extreme situations are shown in the majority of six provinces, Eastern, Western, and Central provinces have indicated a versatile maturity. It could be seen clearly in Figure 5.1.2 below, that the Eastern provincial departmental units maintain 50% of Tamil and 50% of Bilingual usage. Similarly, in the Western province it is indicated that 75% of Sinhala and 25% Bilingual usage, while Uva Province has recorded 33% Sinhala and 66% Bilingual usage, with respect to the ethnic distribution in these provinces.

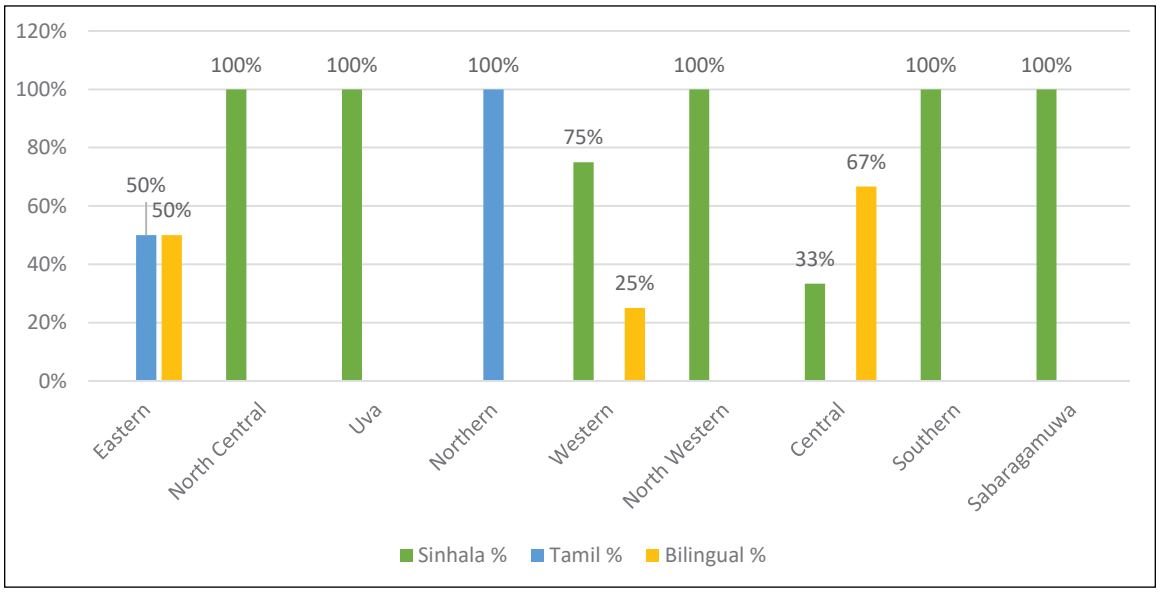


Figure 5.1-2 : Distribution of language of work in PCs.

However, the language usage pattern evident from the survey is not compatible with the Language Policy of the Country since all provincial administrations are mandated to provide services in all three languages. Therefore, in the future trilingual e-applications for provincial and LG level institutions should be introduced streamlining these services.

5.1.2 Sample by Number of Employees

The number of employees in the sample includes sixty (60) departmental units in all nine provinces. In other words, eight Departments from every province has considered in order to ascertain the number of employees therein under four clusters viz. 01 to 50, 51 to 100, 101 to 200, and more than 200.

Table 5.1-3: Distribution of Employees in the Provincial Institutions in PCs.

Province	Mumber of Employees								
	1 to 50	1 to 50	51 to 100	51 to 100	100 to 200	100 to 200	more than 200	more than 200	Total
Eastern	4	100%	0	0%	0	0%	0	0%	4
North Central	4	50%	3	38%	1	13%	0	0%	8
Uva	5	63%	2	25%	1	13%	0	0%	8
Northern	3	38%	3	38%	2	25%	0	0%	8
Western	0	0%	2	50%	0	0%	2	50%	4
North Western	6	75%	0	0%	2	25%	0	0%	8
Central	4	67%	1	17%	1	17%	0	0%	6
Southern	1	14%	4	57%	1	14%	1	14%	7
Sabaragamuwa	5	71%	2	29%	0	0%	0	0%	7
Total	**32**		**17**		**8**		**3**		**60**

As indicated in Table 5.1-3 above in the Eastern province all departmental units taken into the survey, (100% of the sample) are in the 1 to 50 cluster. In the North Central province 50% of units are in the 1 to 50 cluster, 38% of units are in 51 to 100 cluster and 13% of units are in 101 to 200 cluster. Likewise, Uva, Northern, Northwestern, Central and Sabaragamuwa provinces all departmental units have less than 200 employees. Only the Western and Southern provinces have recorded more than 200. The Southern province has indicated that 85% of units are below 200 employees and only one entity has more than 200 employees.

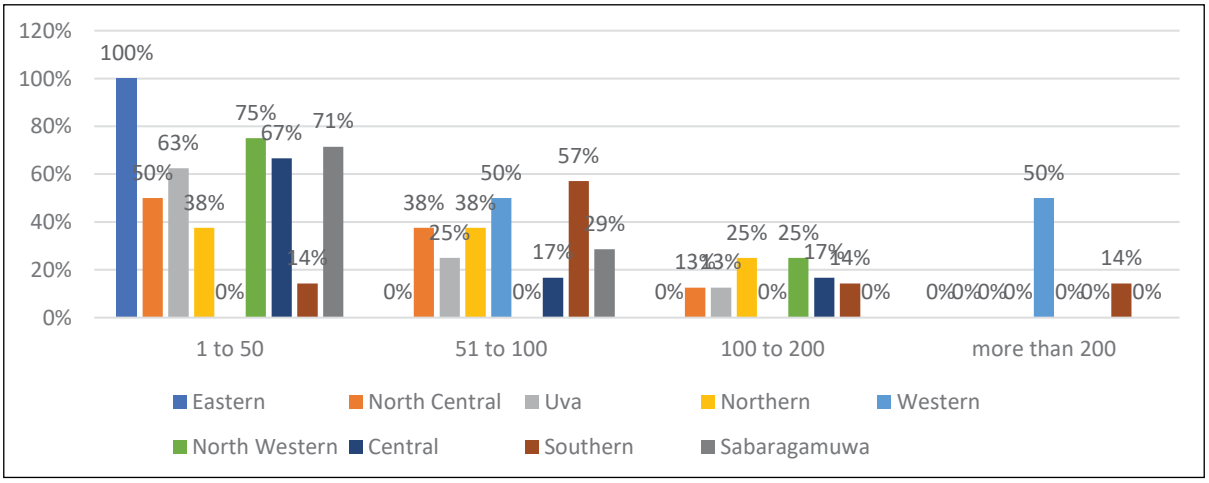


Figure 5.1-3 : Distribution of employees in the provincial institutions – 9 provinces

Figure 5.1-3 clearly shows that in six provinces, more than 50% of their Departmental units are in the region of below 50 employees. In other words, except for the Western Province and the Southern Province all other provincial units predominantly have smaller units with less than 100 employees. Other five Provinces; North Central, Uva, Northern, Northwestern, and Central have less than 25% of units with 100 to 200 employees.

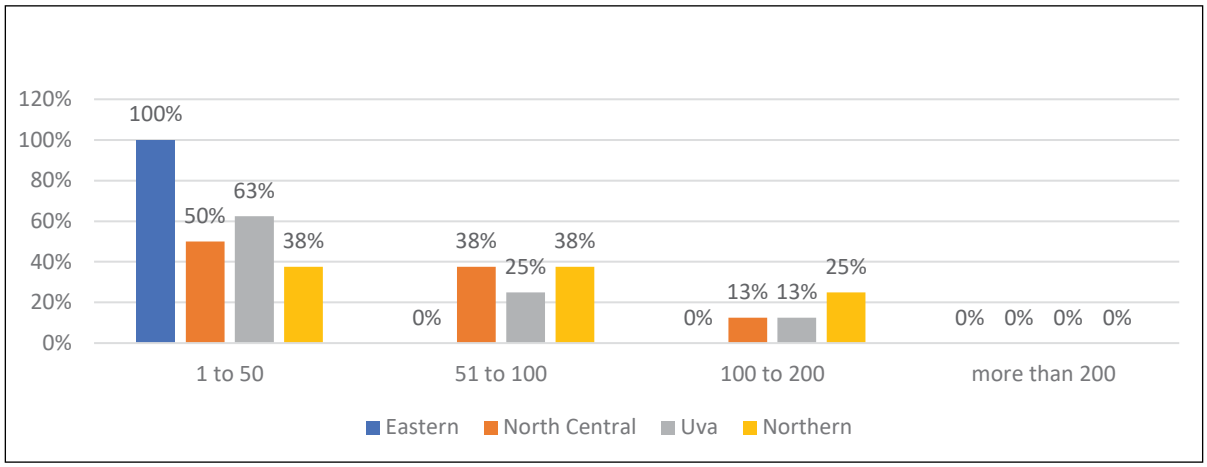


Figure 5.1-4 : Distribution of employees in the provincial institutions – CDLG provinces

In scrutiny of Figure 5.1-3 above, there are a couple of significant features typical to CDLG provinces related to staff allocation. All four provinces have recorded 100% coverage of the survey. The Eastern province departmental units have indicated units with less than 50 employees in total. The Northern, Northcentral, and Uva, Provinces have maintained approximately the same number of employees in their departmental units under the 2nd and 3rd clusters. Finally, none of the CDLG provincial departmental units have indicated a staff cluster of more than 200 according to the study.

5.2 ICT hardware, connectivity, and other infrastructure availability.

Implementation of any e-System would mainly depend on the availability of necessary hardware and software infrastructure, networking connectivity, and professional manpower. Therefore, under the survey, the information on available and useable ICT hardware infrastructure and networking facilities, including information on connectivity within provincial councils were separately collected and analyzed and it has been presented in this section of the report.

ICT hardware and infrastructure availability would pave the way for fast-tracked replication of currently available e-Systems and implementation of any new e-System. Furthermore, PCs that already have the infrastructure would eventually have the capacity to manage them as well. PCs that have the hardware infrastructure are the most suitable immediate candidate for the introduction of any new e-System. Nevertheless, it is also important to understand the situation of PCs that do not have the hardware infrastructure to understand the prevailing issues and to plan a proper strategy for the implementation of e-Systems at different levels of Departments.

Whenever applications are used for services provided to the citizen, networked hardware infrastructure is essential for supporting a multiuser environment to cater to each service point of the workflow such as initial data entry, approval, payments, issues of outcome etc. Also in such a work environment, availability of common databases for the chain of workflow is imperative. Therefore, in-house hardware infrastructure should be capable enough to cater to multiuser environments as well as large volumes of data reliably, unless otherwise an outside data center or cloud storage is not used as data and application storages. The server hardware and operating system of such hardware have been designed to cater to the requirement of large volumes of data storage and software applications in a highly reliable and robust manner for hosting the applications and to facilitate the concurrent multiuser environment. Therefore, it is vital to examine the server hardware availability and usage in this study for exploring the readiness of PCs for adopting e-Systems. Table 5.2-1 provides information about the current availability of server hardware in PCs.

Table 5.2-1 : Availability of server hardware

Province	Total Number of Institutions surveyed	Number of Servers							Number of institutions having servers	Average age of Server Computers (Years)
		1 Server		2 Servers		3 Servers or more		Total (having Servers)		
		1 Server	1 Server	2 Servers	2 Servers	3 Servers or more	3 Servers or more	Number of servers		
Eastern	4	3	75%	1	25%	0	0%	4	75%	5.7
North Central	8	0	0%	0	0%	0	0%	0	0%	0.0
Uva	8	2	25%	0	0%	0	0%	2	25%	1.0
Northern	8	3	38%	0	0%	0	0%	3	38%	5.3
Western	4	1	25%	0	0%	0	0%	1	25%	2.0
Northwestern	8	2	25%	0	0%	0	0%	2	25%	2.5
Central	6	4	67%	1	17%	0	0%	5	67%	4.3
Southern	7	1	14%	0	0%	0	0%	1	14%	4.0
Sabaragamuwa	7	0	0%	0	0%	0	0%	0	0%	0.0
Total	**60**	**16**		**2**		**0**		**18**		

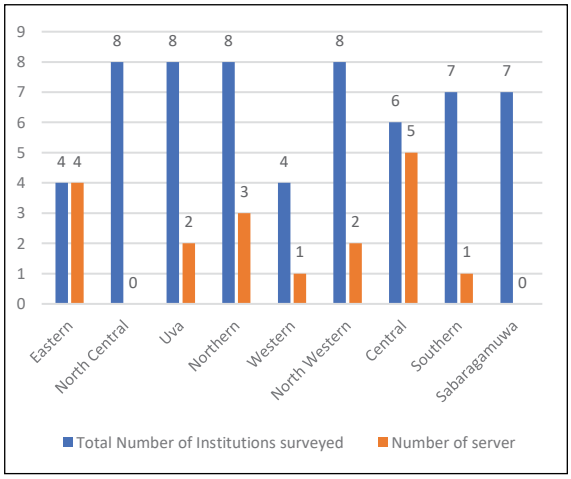


Figure 5.2-1 : Server infrastructure availability by institutions

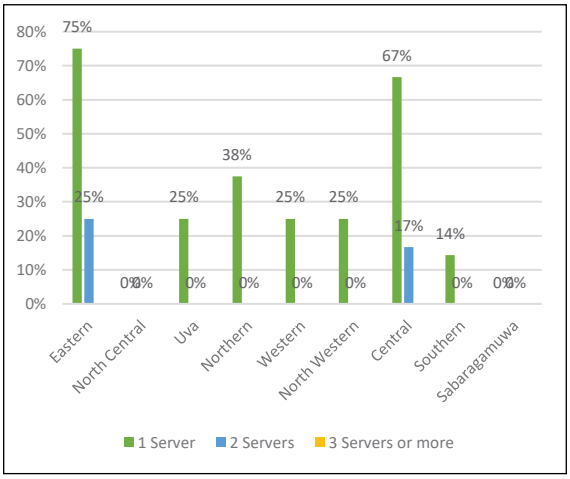


Figure 5.2-2 : Physical server infrastructure availability

Out of sixty institutions of PCs, Eastern province (75%) & Central province (67%) have invested comparatively more on the servers while other PCs have shown little interest. Northern Central & Sabaragamuwa provinces shows 0%. This reveals the low readiness of the PCs for implementation of e-Systems at their entities as an on-premises solution.

The data also show that out of the PCs which have servers, the majority have only one server. Accordingly, out of sixty PC institutions, only sixteen (27%) have one server, only two institutions (3%) have two servers. This data reveals that most of the PCs are hosting their software applications and data in one server. The same server is used for user management and security purposes too. Furthermore, it shows that there is no onsite live backup facility or disaster recovery facilities.

The important finding of this information is that currently available e-Systems are hosted in a very primitive hardware architecture setup. Furthermore, PCs do not have clear segregation of user management, application, database, and backup servers due to a lack of server availability. Hence, all the software products run on the

same server. In general, it is very much important to segregate each server type as a separate physical node to implement better performance. Maintaining a single server for multiple purposes will only reduce the cost of procurement but would not in any way assist to overcome business continuity in the event of a possible technical failure such as hardware failure, virus attack, etc. Therefore, the conclusion is current e-Systems are used in a high-risk environment and therefore it is mandatory for PCs to maintain manual information in parallel to the e-Systems.

Also, another vital fact is that these servers are near to being obsolete as per the average age calculation. Usually, the maximum lifetime of a server is around 6 to 8 years. The study reveals that the average age of a server in the PC system is 3.5 years. Even though the Eastern province has more server availability, the average age spans more than 5 years indicating little interest for a server upgrade. This is also a reason for the high risk imposed on currently available e-Systems in the PCs.

Furthermore, the lack of server availability has created PCs to maintain their data and other valuable information in standalone desktops. The only backup they usually have is just a backup drive. Further, any hardware failure will create operational issues due to a lack of redundancy and may cause possible loss of data.

Under the survey, it was also explored whether cloud services or separate disaster recovery services are being used as primary storage or to complement the available server hardware infrastructure. Table 5.2-2 presents data related to using cloud datacenters and disaster recovery facilities outside of the institution as the primary storage or the complimentary facility.

The data reveals that PCs show less interest using cloud for e-System applications and hosting of data generated and handled through these applications. Overall, only 12% of PCs are using the cloud environment whereas Southern, Western and North Western shows more interest. Eastern, North Central, Uva and Sabaragamuwa PCs do not have single cloud storage.

Since most of the e-Systems which are currently being used are client-server applications there is no technical requirement to host it in a cloud. Also from their perspective, it is an additional financial burden to PCs (cloud rent and cost of connectivity). It was also recorded that in most cases, cloud usage is mainly for web hosting. However, very few PCs use clouds for hosting their web-based applications such as Complain Management System.

Table 5.2-2 : Usage of clouds and disasters recovery availability

Province	Total number of institutions surveyed	Cloud usage			
		Usage		Disaster recovery availability	
		Cloud usage	cloud usage	Disaster recovery availability	Disaster recovery availability
Eastern	4	0	0%	0	0%
North Central	8	0	0%	0	0%
Uva	8	0	0%	0	0%
Northern	8	1	13%	1	13%
Western	4	1	25%	1	25%
North- Western	8	2	25%	2	25%
Central	6	1	17%	1	17%
Southern	7	2	29%	2	29%
Sabaragamuwa	7	0	0%	0	0%
Total	**60**	**7**		**7**	

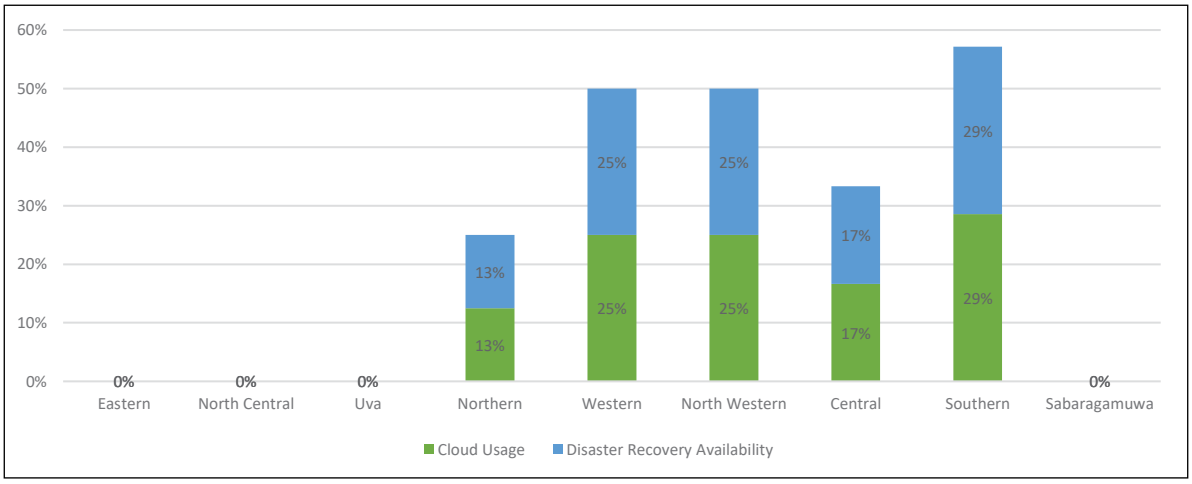


Figure 5.2-3 :Cloud facility usage and availability of disaster recovery

Out of the total number of PCs in the sample, only 12% have recorded that they use some kind of disaster recovery mechanism if the live system becomes defunct. Lack of Disaster Recovery infrastructure implies possible operational downtime (increased risk on business continuity) and loss of data/information in case of a disaster. This situation shows that current hardware infrastructure arrangements in the PCs are neither supporting reliable and continuous services delivery, nor are favorable for new system implementation.

It is also observed that PCs are not obtaining the benefits of the current trend on cost-effective SaaS instead of on-premises solutions which creates additional overheads to maintain and upgrade.

In the context of software development and implementation, various software applications have been developed using different software stacks. When a software application system is to be deployed in a particular institution or cloud, if the same stack of software such as Operating Systems, databases, and web development tools are available, the software could be deployed without any major revisions. Therefore, it is useful to understand currently available Server Operating Systems and other software stacks for the hassle-free deployment of new software applications or replication of currently available software applications in the PC system. Table 5.2-3 presents the status of server OS in the PCs that were under study.

Table 5.2-3 : Type of OS platforms used in server computers

Type of platform	Servers by OS		Cloud utilization by OS	
	Number of servers	Servers by OS	Number	Cloud utilization by OS
Windows Servers	13	72%	2	29%
Linux	2	11%	5	71%
Unix	0	0%	0	0%
IBM	0	0%	0	0%
Others	0	0%	0	0%
Total	**15**		**7**	

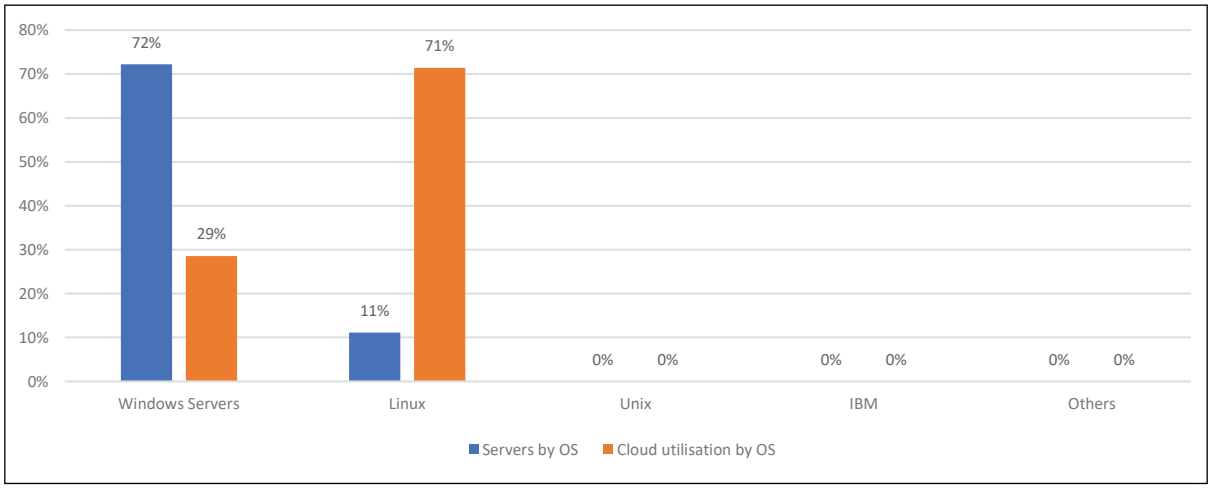


Figure 5.2-4 : Servers and cloud facility utilization by Operating System

According to the survey data, more than 72% of servers in PCs use Microsoft Windows Operating System which is a proprietary and user-based license model. Only 11% use open platform OS such as Linux. The use of proprietary-based Operating systems will add more overhead expense to PCs when it comes to upgrading their Servers to the latest versions. Furthermore, the PCs will have to purchase proprietary databases and other supplementary applications incurring an excessive cost. In addition, annual licensing and maintenance costs will also be very expensive compared to their income. Therefore, for PCs, it would be worthwhile to move into open-source stack whenever possible in their future activities. However, when using cloud storage servers, the majority of such instances (71%) are on Linux-based OS which shows the trend on moving to open source-based server instances.

Availability of warranty and maintenance agreements for server hardware ensures the robust operation of server hardware infrastructure ensuring reliability for hosting the software application and databases for providing services to the citizen. Table 5.2.4 presents the information on the current availability of warranty and/or maintenance agreement services provided.

Table 5.2-4 : Status of maintenance of servers

Status	Number of Servers	
	Number of Servers	Percentage of servers covered under warranty
Warranty/MA are available	6	35 %
No warranty or maintenance agreement	5	30%
Not aware	6	35%

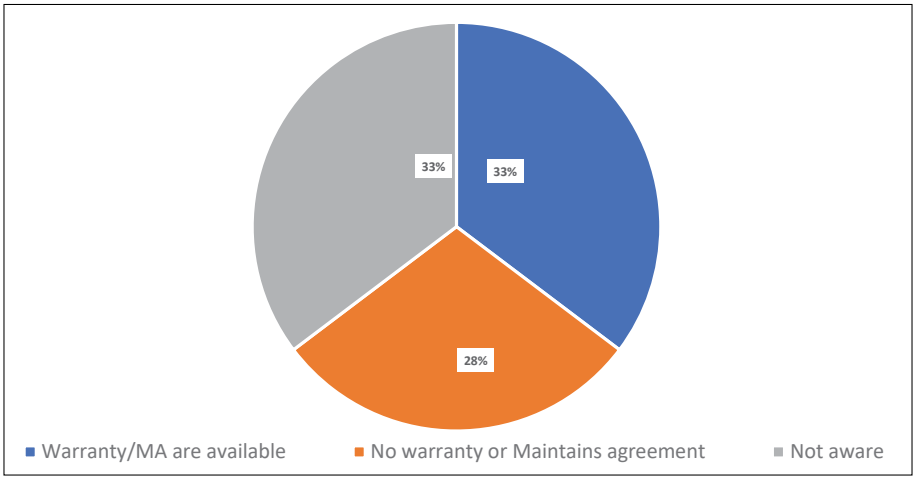


Figure 5.2-5 : Status of warranty and maintenance

It was noted that nearly 30% of PCs do not have any warranty/maintenance agreement. On the other hand, 35% of PCs do not have any idea about warranty/maintenance agreements. Only 35% of PCs have a warranty for their servers.

As a standard, there is a 3-year warranty applicable for a server from the date of purchase. This warranty is usually applicable for high-cost parts such as processors, Memory, Hard Disk, etc. If PC officers are not keen on an applicable warranty, suppliers will reduce the warranty duration at the time of procurement. Further, if PCs are unable to maintain the warranty logs, it will create possible overheads when servers malfunction. On the other hand, if officers try to repair a server that is already under the warranty period, the respective supplier will not accept any warranty claims. Hence it is vital to have a sound knowledge of warranty conditions, and maximum usage of granted warranty by maintaining proper logs and educating officers who oversee the servers.

To explore the possibility of introducing new software applications and/or replication of existing applications without adding new hardware or with minimum addition of new hardware, understanding of current availability of storage capacity and use of the available capacity of server hardware is vital. Table 5.2-5 presents information on the current usage of the storage capacity of server hardware.

Table 5.2-5 : Server capacities used

Server storage capacity	Number of Servers	Percentage
< 1TB	1	6%
2 To 5 TB	8	44%
5 to 10 TB	2	11%
More than 10 TB	0	0%

Accordingly, the notable information here is that majority of servers (44 %) have a storage capacity of more than 2 TB and less than 5 TB. 11% servers have more than 5TB capacity. When considering storage capacities of modern servers, this equipment seems to belong to the category of high-end servers. In this situation, these servers could be recommended for hosting applications and data as hardware storage is adequate to cater to growing data stocks. However, there are only ten such servers in the entire PC system on which the survey was conducted.

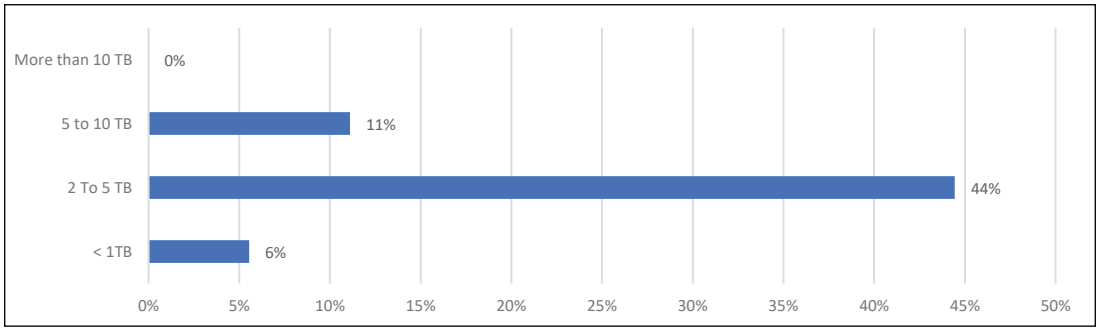


Figure 5.2-6 : Availability of storage capacity in servers

In the journey of digitalization, it is vital to examine the availability of computer networks, and internet connectivity as almost all new e-Systems are designed for a multi-user environment with the capacity for online services. Table 5.2-6 records the current availability of network infrastructure and internet connectivity.

Table 5.2-6 : Status of networking and internet connectivity

Connectivity type	Number of available institutions	Average connectivity speed	Average number of offices using	Security/ firewall available % (out of total)	Average data quota per month (GB)	Satisfaction about connectivity 0 (very bad) - 10 (very good)
LAN – Wired	33	100	32.5	8	NA	6.5
LAN – Wireless	19	16	39	5	NA	6.9
WAN	37	68.97	42.8	5	260.7	7.8
VPN	5	2.8	20.6	2	60	5.4
Any other connections	4	28	20.8	0	38.3	7.3

Out of total PCs, 53% record that Local Area Network (LAN) is currently available in their office premises and more than 47% have remote connectivity. This implies the existing connectivity infrastructure will create difficulties when connecting to services of PCs that are available online, causing possible opportunity loss and low service level efficiency. On the other hand, it will be impossible to expand the operations to implement online and mobile-enabled services such as finance, projects, etc. maintained by the respective PCs. Furthermore, LAN setup will not assist in Work from Home arrangements. If PCs host online and mobile government services to citizens, it is necessary to have strong connectivity of a VPN nature.

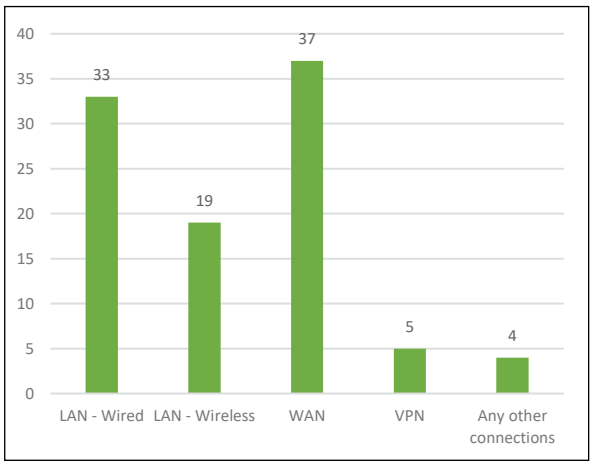


Figure 5.2-7 : Number of institutions with network connectivity

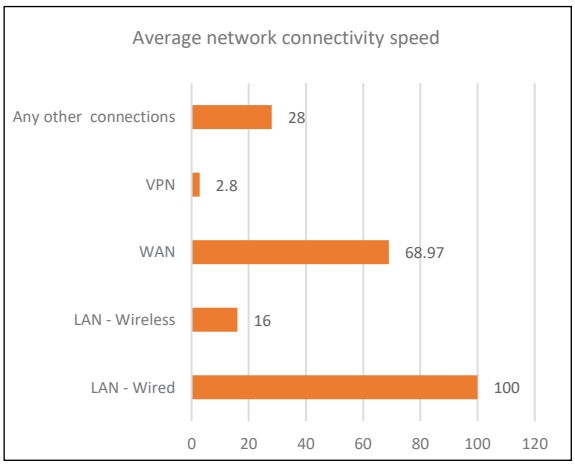


Figure 5.2-8 : Average Internet Connectivity Speed MBPS

Availability of client hardware, such as desktops and laptops is mandatory for the implementation of the e-Systems at PCs. Table 5.2.7 presents the data related to the availability of client hardware, the status of the connection to the network, and the average age of client hardware.

Table 5.2-7 : Availability of client hardware

Type of Hardware (Laptop / Desktop)	Operating System	Number of units	Number of units %	Number Networked	Number Networked %	Number of Units under Warranty / MA	Number of Units under Warranty %
Laptop	Windows	667	24%	236	9%	137	5%
	Linux/Ubuntu	5	0.2%	4	0.1%	0	0%
	MAC OS	0	0%	0	0%	0	0%
	Other	0	0%	0	0%	0	0%
Desktop	Windows	2066	75%	1272	46%	206	7%
	Linux/Ubuntu	5	0.2%	0	0%	5	0.2%
	MAC OS	6	0.2%	6	0.2%	6	0.2%
	Other	0	0%	0	0%	0	0%
Total		**2749**		**1518**		**354**	

Almost all laptops and desktops use only Windows OS. Only 24% units are laptops and majority use desktops. Nearly 50% of client computers are connected with the network. Only 5% of laptops and 7% desktops are under warranty.

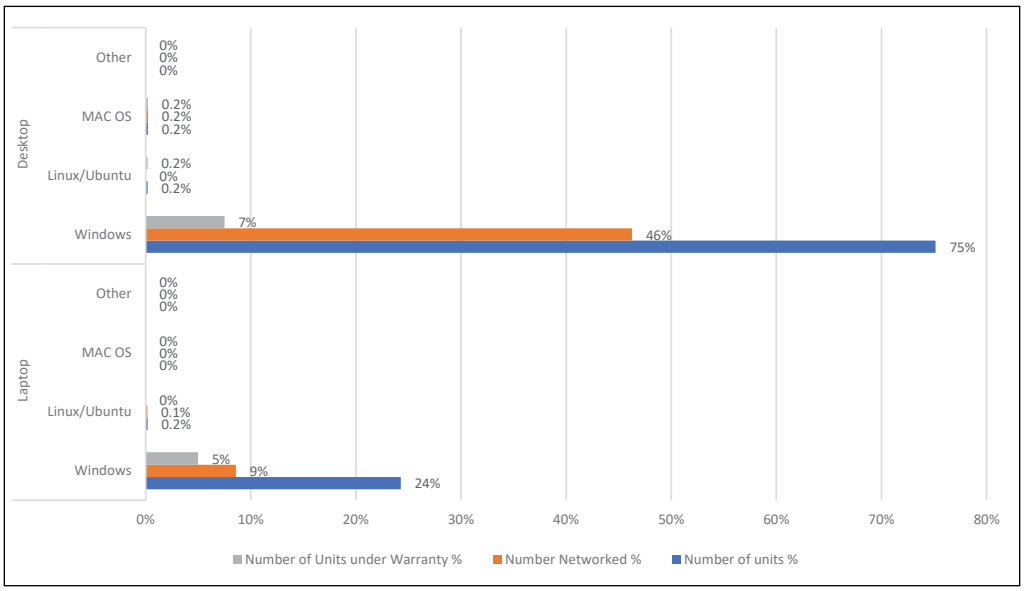


Figure 5.2-9 : Number of Client Computers by Operating System

Using proprietary software for OS will incur expenses in licensing especially when upgrading to latest OS platforms and for OS licenses. Hence an alternative look at open OS will be a good alternative to reduce the cost of IT infrastructure. The availability of Laptops is in a minimal level (24%) which will result in difficulties in enabling mobile services or Work from Home operations.

When considering the average number of client hardware for a single institution, it has been reported that 11 Laptops and 34 desktops are available on average. Accordingly, there is the possibility of introducing new e-Systems without much trouble for client hardware. Consequently, there is a necessity for upgrading client hardware in the long run.

Availability of office software and productivity software is another variable to investigate as the use of these for official work defines the ability and the familiarity of using computers by the workforce. Furthermore, office software and productivity software play a complementary role in the implementation of e-Systems. Table 5.2.8 shows the status of use of office software and productivity software in the PCs.

Table 5.2-8 : Use of Office software and productivity software

Productivity software	Proprietary		Open source		Total	Number of officers using		Purpose of use
	No	% Out of total	No	% Out of total	Total	No	% out of total staff	
Word processing	1205	44%	0	0%	1205	2526	67%	Office Administration and Documentation
Spread sheet	1189	43%	0	0%	1189	100	3%	Office Administration and Finance related work
Presentation	650	24%	0	0%	650	1412	37%	Office Administration and Meetings & Trainings
Desktop publishing	133	5%	0	0%	133	308	8%	Office Administration and Documentation
Database	362	13%	0	0%	362	609	16%	Data management
AutoCAD/ Drafting	25	1%	0	0%	25	46	1%	Planning related work
Email software	617	22%	353	13%	970	1086	29%	Office Administration and Communication
Video Conferencing software	118	4%	50	2%	168	565	15%	Office Administration and Meetings & Trainings
Other	5	0.2%	0	0%	5	29	1%	Planning and other

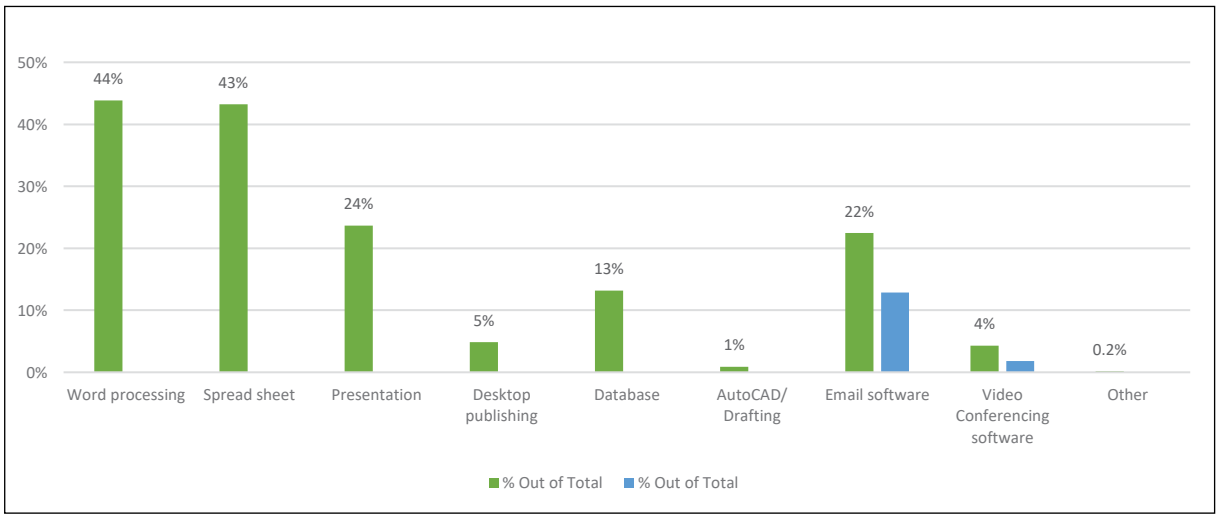


Figure 5.2-10 : Distribution of proprietary software packages vs open-source packages

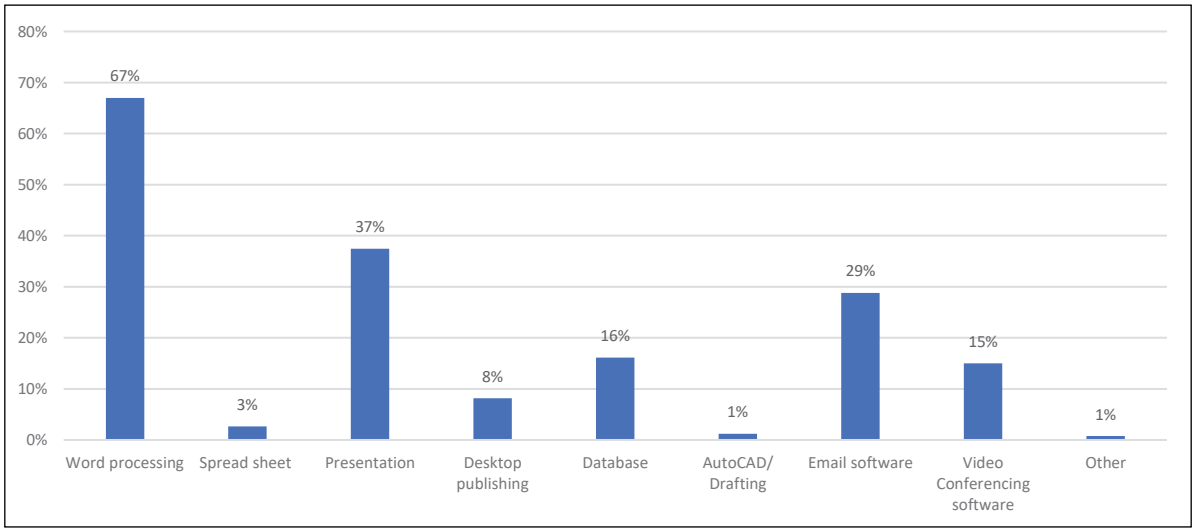


Figure 5.2-11 : Usage of productivity packages by the officers

The present software usage of each PC is more focused on proprietary-based packages. The majority of software packages used are word processing, spreadsheet and presentation software. This gives a positive sign for implementing e-Systems as PCs are into using software packages.

Table 5.2-9 illustrates the existing usage of e-Systems and availability of cloud usage for such e-Systems for readiness of cloud usage for e-Systems.

Table 5.2-9 Use of Office software productivity software

Application	Number of rented servers		Period of current contract (Months)
	Number of servers	Percentage	
CIGAS	1	14%	5
CAT2020	1	14%	5
EMIS	1	14%	4
DSIS	1	14%	9

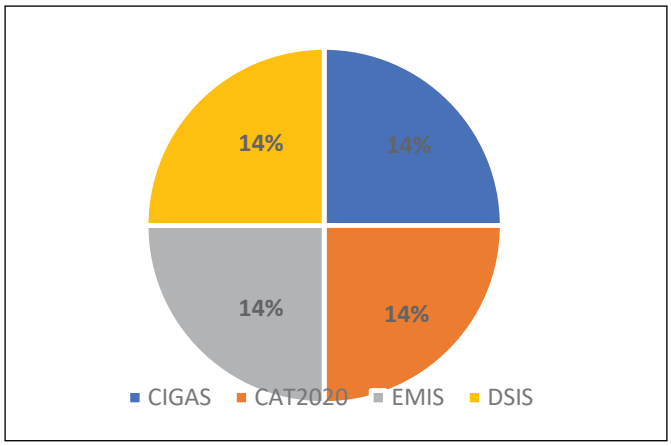


Figure 5.2-12 : Distribution of hosted applications in the cloud service

Accordingly, usage of e-Systems in the cloud is at a critical level with implementation at 14% and this implies the majority of present e-Systems are hosted as on-premises solutions.

5.3 ICT professional and HR Availability

Implementation of any e-System would be further dependent on the availability of required professional staff. Any e-System project will finally be run and managed by these professionals and lack of knowledge and capability will negatively impact successful implementation. Therefore, under the survey, the information on available human resources and their qualifications were separately collected. The result of the analysis is presented in this section of the report.

Table 5.3-1 : ICT professional human resources availability in PCs

Designation	Institutions with these professionals	Gender		Contractual arrangement	
		Male	Female	In house	Outsourced
System Analysts	6	17	4	21	0
Programmers/ Software Engineers	4	7	3	10	0
Database managers	2	5	2	5	2
Data entry officers	11	33	23	56	0
Network managers	2	3	0	3	0
ICT Technical Officers	14	25	8	30	3
Any other related	7	10	7	17	0

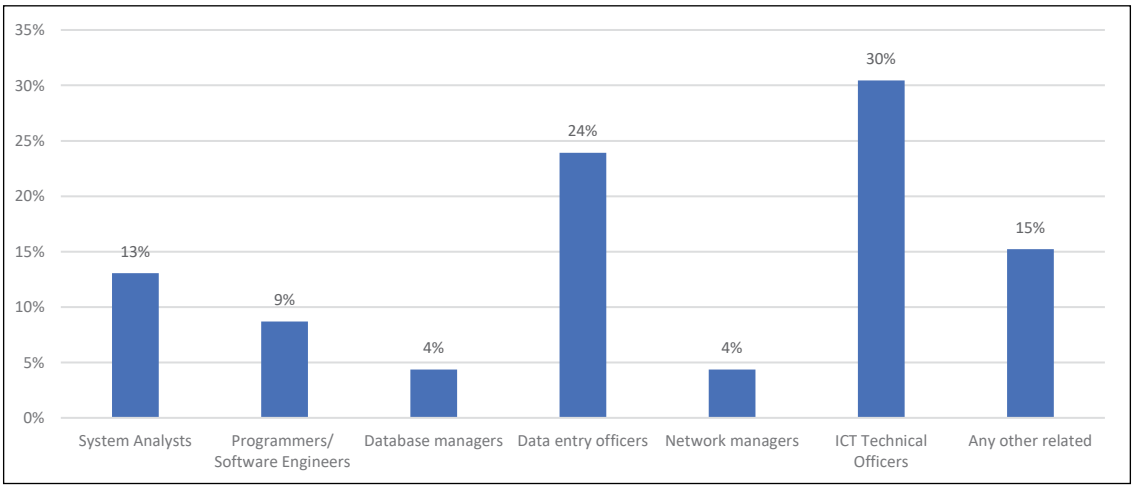


Figure 5.3-1 : Human resource availability in PCs (ICT Professionals)

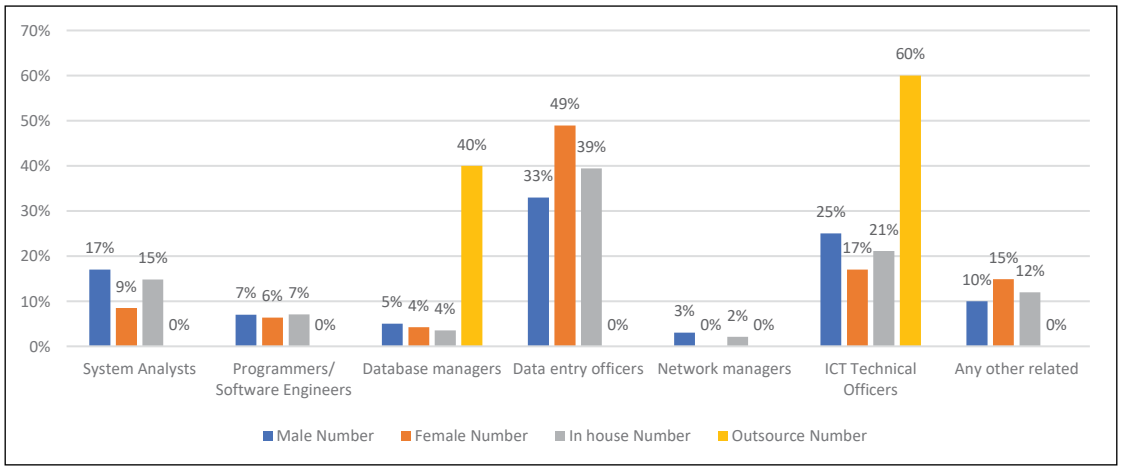


Figure 5.3-2 :Demography of ICT professionals present in the provincial institution

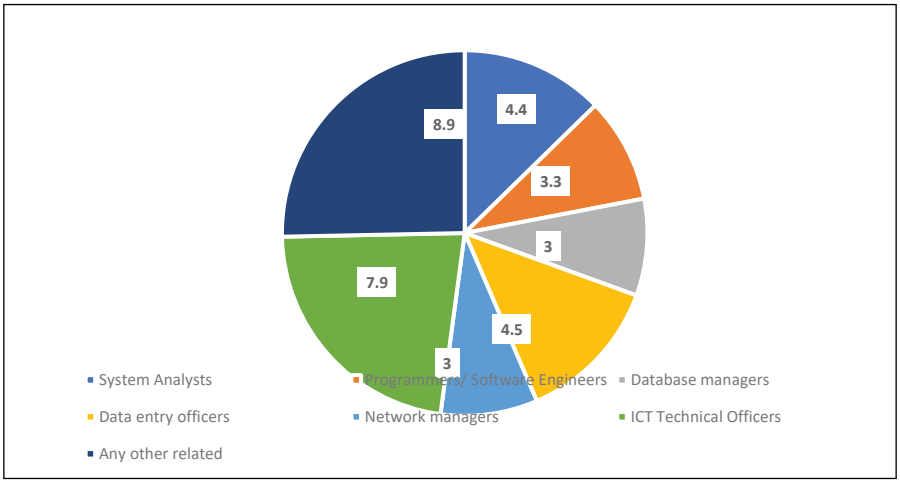


Figure 5.3-3 :Average number of years of experience

The majority of the ICT professionals/skilled staff are mainly occupied for data entry and technical infrastructure maintenance. The professional ICT staff employed is at a critical level considering the survey findings. The majority of female staff are occupied in the data entry works. Few PCs have outsourced services for professional services, but it is not at a satisfactory level in contrast (Only for database consultancy).

Since PCs' primary focus is to provide public services as per their core mandate and maintaining professional skilled ICT staff in-house will not be a cost-effective approach. Hence, the current staff cadre is justifiable. PCs should look for outsourcing professional services based on their requirements. In addition, PCs can plan on getting consultancy services so that their internal staff will be able to provide services with the guidance of industry experts.

5.4 e-Systems availability and usage in the institutions functioning under Provincial Councils

Analyzing and compiling the status of e-Systems usage in the institutions functioning under the PCs was an equally important objective of the study. To fulfill this objective, analysis was carried out to find out the availability of e-Systems for handling the services and the real usage of these e-Systems for performing the services. Similar to the analysis conducted concerning the LAs by considering the nature of the services and its consumers, two main categories of services namely, the Government to Citizen services (G2C) and Government to Business (G2B) services as one category, and Government to Government services (G2G) services as the second category were established for the analysis.

The G2C services and G2B services are the most appreciated as it enhances convenience to them in obtaining the services. Table 5.4-1 below explains the current distribution of G2C/G2B services in the eight provincial Institutions which were selected from each province for the sample survey.

Table 5.4-1 : Usage of G2C/G2B e-Systems by the institutions functioning under PCs

Name Of Department /Section of PC	Number of org. in sample	Using G2C/G2B 1 to 3 services		Using G2C/G2B >=4 services		Not using/not available G2C/G2B services	
		Number of org.	% out of sampled category of org.	Number of org.	% out of sampled category of org.	Number of org.	% out of sampled category of org.
Education D.	6	5	83.3%	1	16.7%	0	0.0%
DCS (Finance)	8	1	12.5%	1	12.5%	6	75.0%
Land D.	8	7	87.5%	1	12.5%	0	0.0%
Local Government. D.	8	6	75.0%	1	12.5%	1	12.5%
Motor Traffic D.	7	6	85.7%	1	14.3%	0	0.0%
DCS (Planning)	8	7	87.5%	1	12.5%	0	0.0%
Revenue D.	7	5	71.4%	2	28.6%	0	0.0%
DCS (HR, Training and Development)	8	4	50.0%	0	0.0%	4	50.0%
Total	60	41	68.3%	8	13.3%	11	18.3%

Out of the institutions functioning under PCs, the Department of Land (DL), the Department of Motor Traffic (DMT), Provincial Planning Secretariat (PPS), Departments of Education (DE) and the Department of Revenue (DR) are reported to be institutions using the highest number of e-Systems for providing services. Regarding DL, DMT, PPS, DE and DR, e-System usage is 100%. In other words, these institutions in all the provinces use a minimum one or more e-Systems for citizen services. However, there are differences in the task handled and the systems that are being used in the different provinces rather than using the same e-System. For example, the e-Revenue Licenses System for issuing annual revenue licenses of motor vehicles (eRL) by the Department of Motor Traffic and the e-State Land Information Management System (e-SLIMS) for management of state lands vested by the Department of Lands in all the provinces.

The other three institutions, the Department of Local Government, Deputy Chief Secretary(Finance) and Deputy Chief Secretary(Human resources, Training and Development) handle the same services and functionalities across all provinces but there is no common software application for providing G2C/G2B services across all the institutions. Out of the eight surveyed Departments of LG in the different provinces, 87.5% are offering a minimum of one service belonging to the G2C/G2B category through e-Systems and concerning the section of Deputy Chief secretary (HR, Training and Development) only 50% of out of the surveyed eight sections are using G2G/G2B e-Systems for service delivery. It is important to note that out of the eight sections surveyed, only 25% of Deputy Chief Secretary (Finance) sections of the eight Provincial Councils provide G2C/G2B services using e-Systems.

It is worthwhile to observe that some sections of the PCs such as Finance, HR, Training and Development do not offer direct citizen services and therefore, those institutions do not require e-Systems for G2C and G2B services.

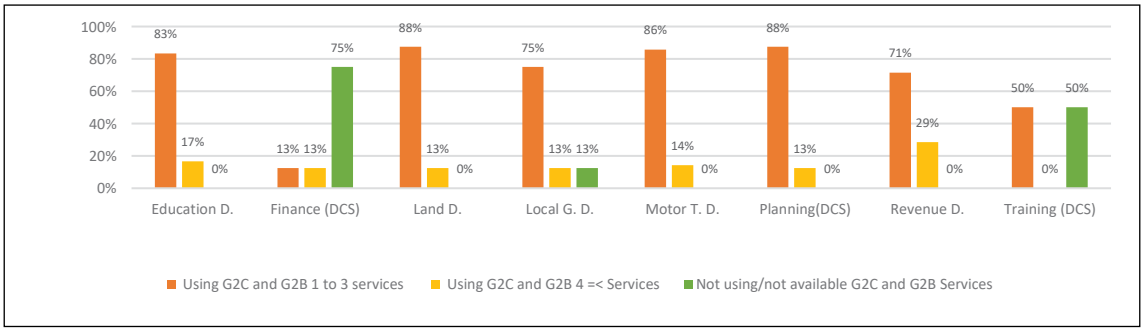


Figure 5.4-1 :Status of G2C/G2B e-Systems usage by the selected Institutions of the Provincial Councils

According to the data, 81.7%% of the provincial level Institutions use e-Systems for providing G2C/G2B services while only 18.3% do not provide any G2C/G2B service. However, the survey revealed that the vast majority of provincial-level institutions use only one to three citizen services, and it is 68.3% out of the total sample and only 13.3% of institutions have four or more than four citizen services. It was also noted that institutions that are not using any e-System are delivering their services through traditional manual systems.

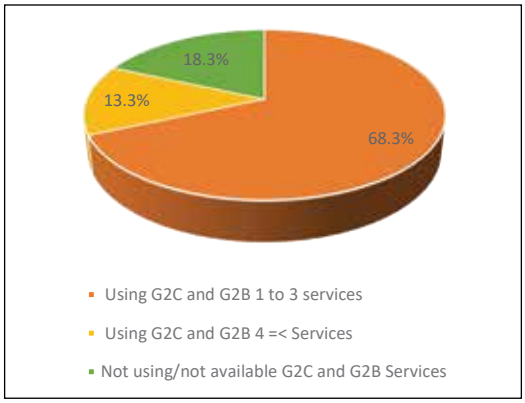


Figure 5.4-2 :Status of total number of G2C/G2B e-Systems usage in by the selected Institutions of the Provincial Councils

In terms of the enhancement of institutional performance and overall governance, the G2G services play a major role at the provincial level as well. The key G2G e-Systems are mainly being used for handling processes related to accounting, finance management, payroll management, inventory controlling, attendance management, fleet management etc.

Table 5.4-2 : Usage of G2G e-Systems in the selected Institutions of the Provincial Councils

Name Of Department / Section of PC	Number of Org. in Sample	Using G2G 1 to 3 services		Using G2G 4 =<Services		Not using/not available G2C/G2B Services	
		Number of Org.	% out of Sampled Category of Org.	Number of Org.	% out of Sampled Category of Org.	Number of Org.	% out of Sampled Category of Org.
Education D.	6	3	50.0%	3	50.0%	0	0.0%
DCS (Finance)	8	4	50.0%	4	50.0%	0	0.0%
Land D.	8	5	62.5%	3	37.5%	0	0.0%
Local Government. D.	8	6	75.0%	2	25.0%	0	0.0%
Motor Traffic D.	7	5	71.4%	2	28.6%	0	0.0%
DCS (Planning)	8	6	75.0%	2	25.0%	0	0.0%
Revenue D.	7	5	71.4%	1	14.3%	1	14.3%
DCS (HR, Training and Development)	8	3	37.5%	5	62.5%	0	0.0%
Total	60	37	61.7%	22	36.7%	1	1.7%

The majority of provincial institutions are using a minimum of one or more G2G systems. The survey shows that in overall, 98.3% of provincial institutions are in this category while only 1.7% are not using any e-Systems for delivering G2G functions. When considering the number of services available in a single entity, overall, 61.7% of the provincial institutions have only one to three G2G Services and 36.7 % have 4 or more 4 services.

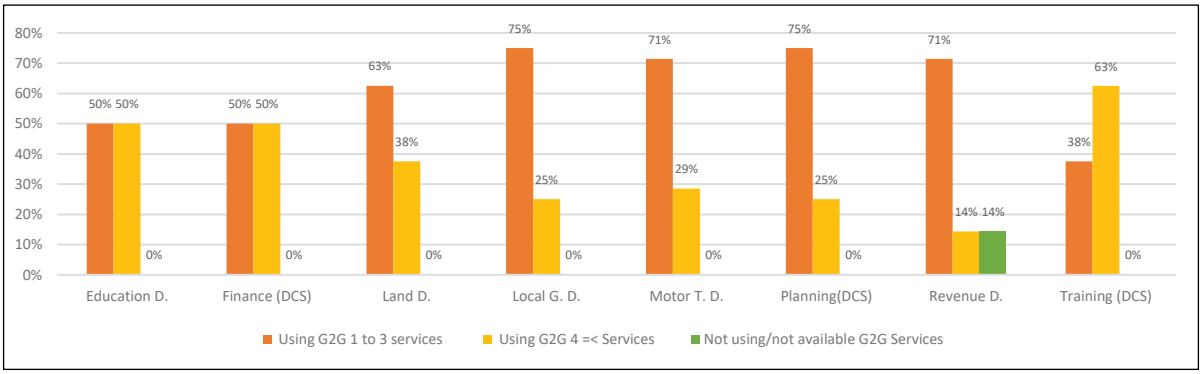


Figure 5.4-3: Status of e-Systems usage by the selected Institutions of the Provincial Councils

The data reveals that almost all provincial institutions are using minimum one e-System for G2G services except in the Departments of Revenue. However, 86% of Departments of Revenue are using minimum one G2G e-System for official work. Table 5.4-2 illustrates the number of G2G e-System availability in different provincial institutions.

In absolute terms, out of the 60 provincial institutions surveyed, except for one institution, all other 59 institutions have one or more than one G2G services offered through e-Systems.

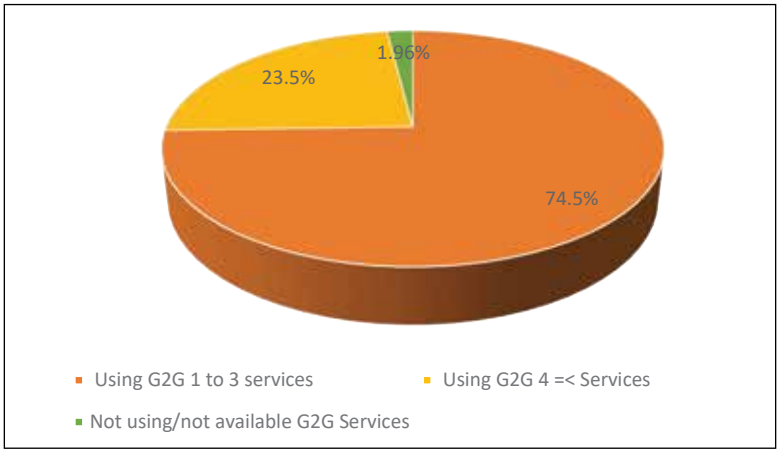


Figure 5.4-4 : Status of total number of G2G e-Systems usage by the selected institutions of the Provincial Councils

It is also important to focus the analysis on the usage of the total number of services available in each category of provincial institutions. It was noted that some of the e-Systems available are not being used although software applications and systems are in place. Table 5.4-3 presents the usage of available e-Services in the eight categories of provincial institutions.

Table 5.4-3 : Availability vs. usage of G2C/G2B and G2G e-Systems in the selected Institutions of the Provincial Councils

Name of Department /Section of PC	Available vs. using G2C & G2B services			Available vs. using G2G services			Total available vs. using		
	Available	Using	% Available Vs using	Available	Using	% Available Vs using	Available	Using	% Available Vs using
Education D.	16	16	100%	34	26	76%	50	42	84%
DCS (Finance)	9	7	78%	30	30	100%	39	37	95%
Land D.	22	20	91%	23	23	100%	45	43	96%
Local Government. D.	12	12	100%	33	30	91%	45	42	93%
Motor Traffic D.	13	13	100%	26	25	96%	39	38	97%
DCS (Planning)	16	16	100%	31	31	100%	47	47	100%
Revenue D.	18	18	100%	22	20	91%	40	38	95%
DCS (HR, Training and Development)	11	7	64%	39	38	97%	50	45	90%
Total	117	109	93%	238	223	94%	355	332	94%

The data reveals that there is no considerable gap of available G2C /G2B and G2G e-Systems and its usage in the provincial institutions. The availability vs. usage of e-Services in provincial institutions are illustrated in Figure 5.4-5.

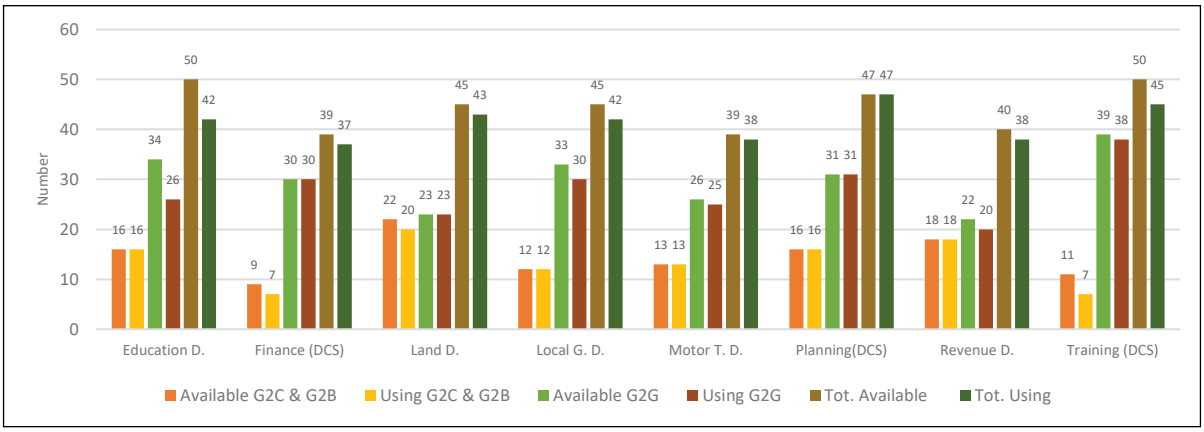


Figure 5.4-5 :Availability vs. usage of G2C/G2B and G2G e-Systems in the selected Institutions of the Provincial Councils

The data is evident that out of available G2C/G2B services 93% are being used and out of available G2G services, 94% are being used. The overall percentage of the available services used is 94%. The optimum usage of available services is displayed by Deputy Chief Secretary (Planning) which is at 100% utilization. The minimum usage of the available services is in the Department of Education, and it is at 84%. In the perspective of all the other six provincial institutions usage of available services are over 90%.

Table 5.4-3 and Figure 5.4-6 quantify the overall usage of available e-Systems. In the provincial institutional setup, unlike the LAs, the majority of available e-Systems are in use for handling services and enhancing institutional performance. This concludes that the provincial setup is already familiar with the usage of e-Systems.

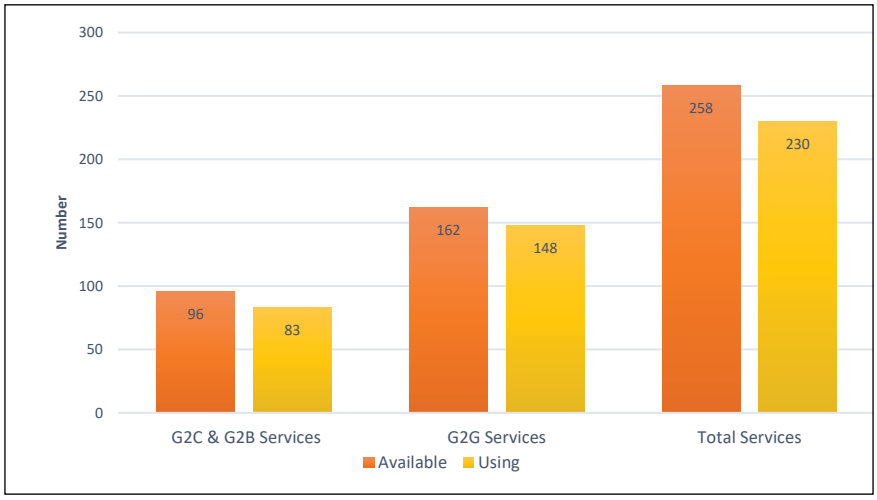


Figure 5.4-6 : Total number of available services vs. using services in the selected institutions of the Provincial Councils

With respect to the usage of available G2C/G2B e-Systems, it has been revealed that overall, 93% of available services are currently being used by the provincial institutions. Only 7% of the available G2C/G2B services are not used due to various issues inherited by those institutions.

It is vital to analyze on average, the number of G2C/G2B services in a single provincial institution to understand the current usage. Table 5-17 presents an average number of G2C/G2B and G2G e-Systems used in the Provincial Institutions.

Table 5.4-4: Average number of G2C/G2B and G2G e-Systems used in the Provincial Institutions

Name Of Department /Section of PC	Average number of G2C/ G2B e-Systems	Average number of G2G e-Systems
Education D.	2.7	4.3
DCS (Finance)	0.9	3.8
Land D.	2.5	2.9
Local Government. D.	1.5	3.8
Motor Traffic D.	1.9	3.6
DCS (Planning)	2.0	3.9
Revenue D.	2.6	2.9
DCS (HR, Training and Development)	0.9	4.8
Average	1.8	3.7

In average, highest number of G2C/G2B services are provided by the Department of Education. Among these services, the most prominent is the website for providing information. The Department of Revenue and the Department of Land have 2.6 and 2.5 n G2C/G2B services in average. The Department of Revenue has web sites for providing information in almost all the provinces. They also use e-Systems for administering the tax systems. The e-State Land Information Management System (eSLIMS), one of the most useful G2C/G2B e-Systems is being implemented in almost all the provinces by the Department of Lands. This has been developed by the Department of Land Commissioner of the Central Government in association with the ICTA through a private developer The software suite uses web-enabled technologies, and it is hosted in the Lanka Government Cloud. It provides a smart workflow for different users working in different capacities from the national level to the subnational level for delivering services related to government land alienation and management processes. However, the eSLIMS has not been vertically and horizontally integrated with any other prevailing e-System such as Citizens Database, Financial Management Systems or with any other system in the national or provincial institutional setup.

The sections of the Deputy Chief Secretary (Planning) in each province use 2.0 e-Systems on average. The usage of e-Systems are mainly to handle activities related to project planning and monitoring.

The Department of Motor Traffic in the eight provinces offer 1.9 G2C/G2B e-Systems on average. Among these services, e-Revenue License (eRL) is the most prominent and the smartest and vertically integrated G2C/G2B e-System prevailing in the entire provincial institutional setup. However, it has not been horizontally integrated with any other e-System in the Department of Motor Traffic. This is also an initiative of the ICTA.

Department of Local Government has 1.5 citizen services in average and however, the prominent service of this institution is the website. Among the provincial institutions, currently, the section of Deputy Chief Secretary (Financial) does not offer considerable number of G2C/G2B services, and it records an average usage of 0.9. When considering all institutions at the provincial level it has an average usage of 1.8 in G2C/G2B e-Systems.

As per the data presented in Table 5-19, there are 238 available G2G services in the eight provincial institutions while 223 services are used (94%). In reference to Table 5.4-4, the average usage of G2G e-Systems are 3.7. Among the institutions using G2G services, the Deputy Chief Secretary (HR, Training and Development) tops the chart with an average usage of 4.8, followed by the Department of Education with an average of 4.3. The e-Systems noted in Table 5.4-4 are traditional software applications predominantly introduced by the Central Government such as Payroll, CIGAS Software (with accounting and inventory control), attendance system, vehicle fleet management system, MIS etc.

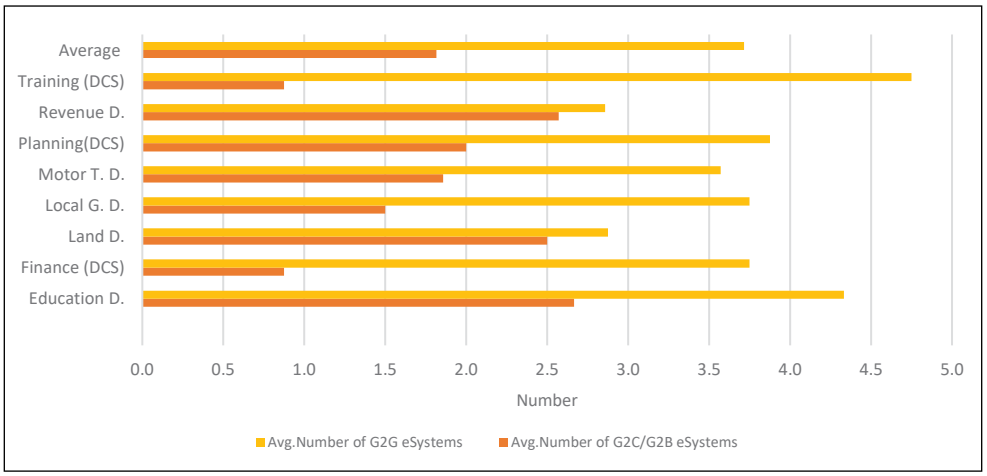


Figure 5.4-7 : Usage of average number of G2C/G2B and G2G e-Systems in one entity.

Table 5.4-5 and 5.4-6 highlight the number of institutions and the total number of services in the provinces of the UNDP project area and the provinces outside the project area respectively. The information was analyzed based on the provinces, to understand the demographic distribution and the e-Systems usage.

Table 5.4-5 : Usage of e-Systems in the provincial institutes in the UNDP Funded CDLG project Area

Type of institutions	Number of institutions in the sample	G2C/G2B e-Systems			G2G e-Systems		
		Number of institutions using services	% of out of sample	Total number of services	Number of institutions using services	% of out of sample	Total number of services
Education D.	3	3	100%	7	3	100%	13
DCS (Finance)	4	0	0%	0	4	100%	9
Land D.	3	3	100%	9	3	100%	7
Local Government. D.	4	4	100%	5	4	100%	15
Motor Traffic D.	3	3	100%	4	3	100%	5
DCS (Planning)	4	4	100%	7	4	100%	12
Revenue D.	3	3	100%	7	2	67%	5
DCS (HR, Training and Development	4	2	50%	3	4	100%	7
Total	28	22	79%	42	27	96%	73

According to Table 5.4-5, out of the institutions surveyed 79% use at least one e-System for providing G2C/G2B services while 96% use at least one e-System for providing G2G services.

Table 5.4-6 : Usage of e-Systems in the provincial institutes outside the UNDP-funded CDLG project area.

Type of institutions	Number of institutions in the sample	G2C/G2B e-Systems			G2G e-Systems		
		Number of institutions with services	% of out of sample	Total Number of services	Number of institutions with services	% of out of sample	Total number of services
Education D.	3	3	100%	9	3	100%	13
DCS (Finance)	4	2	50%	7	4	100%	15
Land D.	5	5	100%	11	5	100%	15
Local Government. D.	4	3	75%	7	4	100%	15
Motor Traffic D.	4	4	100%	9	4	100%	16
DCS (Planning)	4	4	100%	9	4	100%	12
Revenue D.	4	4	100%	11	4	100%	15
DCS (HR, Training and Development	4	2	50%	4	4	100%	22
Total	**32**	**27**	**84%**	**67**	**32**	**100%**	**123**

According to Table 5.4-6, out of the institutions surveyed, 84% of institutions are using at least one e-Systems for providing G2C/G2B services and all the institutions use at least one e-System for providing G2G services. In contrast there are no considerable differences of usage of e-Systems between the provincial institutions in the UNDP-CDLG project area and the institutions outside the project area.

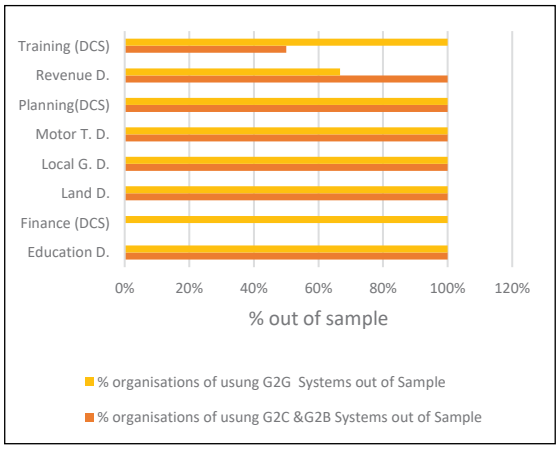


Figure 5.4-8 :Percentage of provincial institutes that are using G2G/G2B and G2G e-Systems for services in UNDP project area

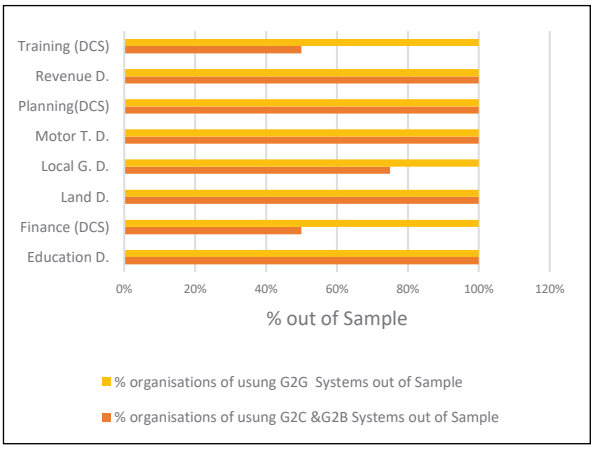


Figure 5.4-9 : Percentage of provincial institutes that are using G2G/G2B and G2G e-Systems in the five provinces outside the UNDP project area.

The number of e-Systems available vs the e-Systems utilized is another important aspect to be looked into. Table 5.4-7 illustrate the information on the availability and usage of G2C/G2B e-Systems. Out of the total number of e-Systems available in the provincial institutions which were surveyed, 38% are websites. The Department of Motor Traffic is providing online revenue licenses (e-Revenue License) through the link provided in the government web portal. The eSLIMS of the Department of Land is also connected to the eSLIMS website. Other than that, there are no prominent e-Services provided through websites by the provincial institutes. Usually, most of the websites provide general information such as the vision, mission, and objectives of institutions, key tasks and progress of accomplishment in tasks, staff information, key officials, and their contact details. However, some of the provincial institutions provide downloadable forms through their websites in addition to the general information that is being provided. The Deputy Chief Secretariat (Planning, HR, Training, and Finance) does not have separate websites as they are in the common web portals of the provincial councils.

There are 35 general services delivery e-Systems that are actively being used, including eRL and eSLIMS which account for 15 e-Systems (8 provincial Departments of Land and 7 provincial Departments of Motor Traffic). Other than these two e-Systems all the other G2C/G2B e-Systems are insignificant to quantify. However, it is important to note that out of all available G2C/G2B e-Systems, more than 90% are being used, except the grievance handling e-System where usage of available systems are at 82%.

Table 5.4-7 : Out of the total number G2C & G2B e-Systems the service availability and usage

Name of the e-Systems	Number of Services Available	% out of Total Number of Available Services	Number of Services Using	% out of Total Number of Using Services	% Available Vs. Using
General Services Delivery	35	30%	32	29%	91%
Regulatory Services Delivery	14	12%	13	12%	93%
Information Dissemination	12	10%	11	10%	92%
Grievance handling	11	9%	9	8%	82%
Website	45	38%	44	40%	98%
Total	**117**	**100%**	**109**	**100%**	**93%**

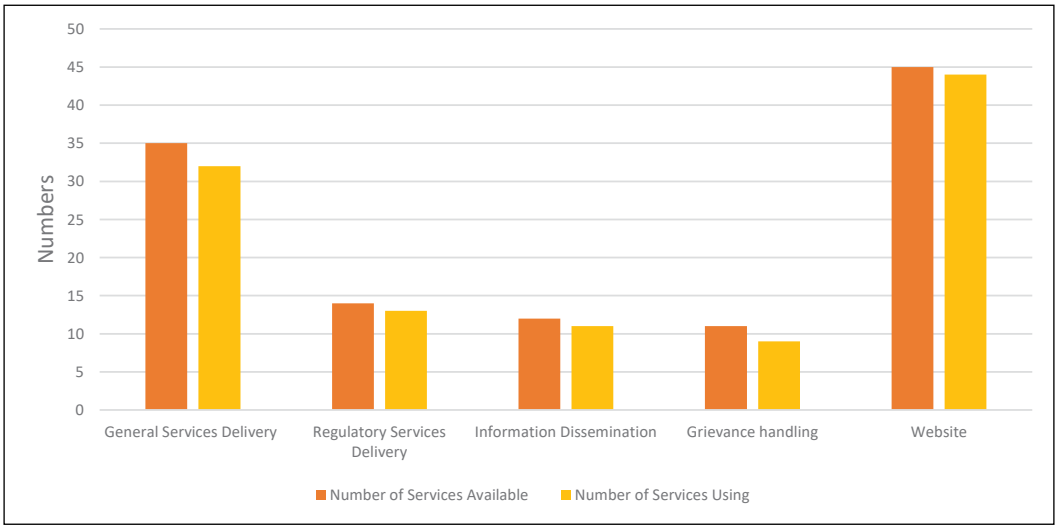


Figure 5.4-10 : Out of the total number of G2C & G2B e-Systems the service availability and usage

There are more e-Systems in the provincial institutions for providing G2G services than the G2C/G2B services. The most prominent G2G e-System is Payroll. Out of the total number of institutions surveyed, 93% are using Payroll for monthly salary preparation. The eight sections of DCS (Planning) and seven sections of DCS (HR, Training and Development) which were in the survey sample are serviced by DCS(Finance) for employee salary preparation through Payroll. Payroll was developed by the Ministry of Finance and has been made available to public institutions without any charge. Currently, this software application is being used in many institutions as a standalone, siloed application in their accounting departments. It should be noted that the Ministry of Finance has taken initiative to develop Payroll to be interoperable with other e-Systems such as Attendance, HR and Finance that are currently being used in government institutions.

Table 5.4-8 : Total G2G e-System availability and usage

Name of the e-System	Number of services available	% out of total number of available services	Number of services used	% out of total number of services used	% available vs. using
Financial Management	36	22%	34	23%	94%
Payroll	43	27%	41	28%	95%
Procurement Management	6	4%	5	3%	83%
Stores Management	6	4%	6	4%	100%
Inventory Control	7	4%	7	5%	100%
HR Management	7	4%	5	3%	71%
Training Management	4	2%	4	3%	100%
Attendance Management	23	14%	21	14%	91%
Vehicle Fleet Management	3	2%	3	2%	100%
Infrastructure Development	6	4%	5	3%	83%
GIS	5	3%	5	3%	100%
Project Management	5	3%	5	3%	100%
Workflow Management	2	1%	2	1%	100%
Que Management	2	1%	1	1%	50%
Mail Management	6	4%	4	3%	67%
Application Tracking	1	1%	1	1%	100%
Total	**162**		**149**		**92%**

The Computerized Integrated Government Accounting System (CIGAS) is the next most common G2G e-System that is being used in provincial institutions. About 34 provincial institutions in the sample are currently using it for financial management activities. Hence, it can be concluded that except for eight sections of DCS (Planning) and seven sections of DCS (HR, Training and Development) in the sample that are serviced by DCS (Finance) for Accounting, all the other provincial institutions are using the CIGAS e-System. Accordingly, as a percentage out of the total number of surveyed institutions 100% of institutions are using this software application. CIGAS is an application suit that comprises with several modules. Those modules are accounting, cash reconciliation, inventory management and stores management. Even though there are multiple modules most of the institutions are only using its accounting module. This software has also been developed by the Ministry of Finance and therefore, public institutions are not charged any fee for software or its updates. The Ministry of Finance, under its Integrated Treasury Management Information System (ITMIS) project, has recently converted the accounting module of this software to a web-based platform. An updated version of the software is being tested in Central Government institutions as a pilot project.

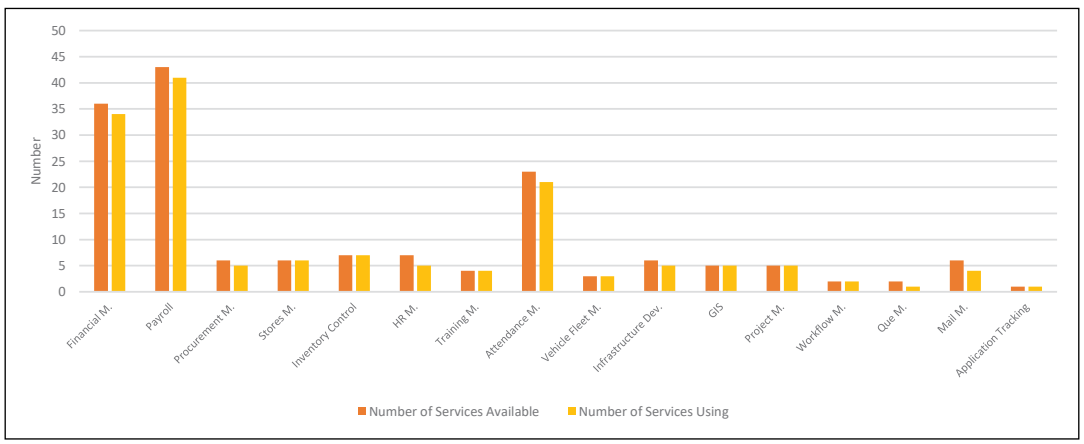


Figure 5.4-11 : Total G2G e-System availability and usage

Other than the CIGAS and Payroll G2G e-Systems, there is no other widely used e-System for G2G services. It is reported that attendance management systems are operational in 23 institutions. This e-System has been built using a very simple software application that provides employees attendance information by capturing the thumbprint or using face recognition technologies. Several commercial software developers are providing different products, and therefore software applications that are being used differ from one institution to another depending on the product they have purchased. Furthermore, it was noted that this is a standalone, siloed application that is not connected to any other e-System.

There are two other important e-Systems in the provincial planning unit of North Central PC. One e-System is used for measuring the progress of development goals. This system is called Decision Support System. This application has been developed by the University of Rajarata. The other e-System is the one that measures the progress of project expenditure in the Planning Secretariate of the North Central PC.

The Department of Education also uses a considerable number of e-Systems for managing the teaching and learning processes. One such application is the Exam evaluation and Result Analyzer developed by a commercial vendor and used in the Department of Education in the North Central Province. There is another e-System in the Department of Education of the Western Province, Decision Support System which is an inhouse development. Furthermore, the Department of Education of the Northern Province uses Education Management Information System (EMIS) as a prominent e-System which is an inhouse development and it offers a mobile application interface as well.

In conclusion, it can be concluded that the provincial institutional setup is currently not using any smart solution that has been vertically and horizontally integrated for providing G2C/G2B, and G2G services.

However, when analyzing current e-Systems and its usage in the provincial level, it is vital to highlight the prevailing gap due to the absence of smart software solutions that are in the fourth level of the Four Stage Model (Refer section 1.3). The study reveals that none of the current e-Systems are fully vertically and horizontally integrated at least within the same institution. Other than the e-Revenue Licenses System, eSLIMS and CIGAS almost all other applications are independent and siloed software applications and the common use of functionalities and exchange of common data among the applications for performing its functionalities are not possible. It should be noted that the e-Revenue Licenses and eSLIMS software applications have not been integrated with the financial management system (CIGAS) or any other relevant application.

However, the e-Revenue License e-System requires vehicle insurance data and emission testing data to verify the validity of the insurance policy and the emission test standards. Hence access to the databases of insurance companies and emission testing companies are mandatory. Furthermore, it was observed that the e-Revenue License system is connected with the payment gateways of the banks to facilitate online payments. The e-Revenue License system has been developed through a proper process laid down in the software development life cycle. It is developed by ICTA and hosted in the government cloud with necessary security and disaster recovery facilities.

The State Land Information and Management System (eSLIMS) is another popular application that is being used currently in the Provincial Land Departments. This application has a web interface for the public to submit their requests and applications well as to track their status. However, this has not been integrated with the other e-Systems. The eSLIMS is currently being used in all provinces. This system has also been developed through the proper process laid down in the software development life cycle.

The CIGAS is the most popular and commonly used G2G e-System for financial management. Other than government accounting services it has facilities for asset management and inventory management. The latest version of CIGAS is a web-based application and it provides facilities to submit the expenditure information directly to General Treasury. However, CIGAS does not provide a direct interface or web services to Payroll. The CIGAS has been revamped and revised to cater to the current requirements of interoperability under the

software development initiative Integrated Treasury Management Information System (ITMIS) by the Ministry of Finance. The software developed under the ITMIS initiative is currently in the pilot phase and will be made mandatory to be used in all government agencies including provincial institutions once it matures as a proven product.

Other than the above three e-Systems, all other e-Systems in the provincial institutions are based on standalone and siloed software applications similar to the LAs. These siloed software applications use their isolated databases to save, retrieve and process the data and information from terminals. Furthermore, the majority of the software applications have been developed based on client-server architecture. Therefore, interoperability cannot be accomplished as in web-based services.

The application and status tracking systems used by some of the provincial institutions have been integrated with the Short Messaging Service (SMS) gateways. With exception to the e-Systems mentioned above most of the other applications have been developed by commercial vendors and there are several in-house developments as well. However, none of them have followed the proper steps of the Software Development Lifecycle. Therefore, these software applications lack interoperability and appropriate security provisions.

The table below tabulates some of the prominent e-Systems used in the provincial setup.

Table 5.4-9 : Prominent e-Systems in the provincial institutions

Name of e-System	Name of developer	Key modules	Architecture	Status of Using
e-Revenue Licenses (eRL)	ICTA/Provincial Dept. of Motor Traffic and Private Developer	Issuance of Annual Revenue License Online and in-house through the system.	Web application Architecture	Using in all 8 Provincial Department of Motor Traffic
eSLIMS (State Land Information Management System)	ICTA/ Dept. of Land and private developer	Land grants, land permits, land releasing for government institutions, long-term leasing letters, yield tax permits, land Kachcheri, Follow-up support for alienated lands.	Web application architecture	Used in all 8 Provincial Departments of Lands
CIGAS	Ministry of Finance	Finance management module, Inventory module, Stores management module (In the process of developing an application with vide scope under Integrated Treasury Management system development)	Client Server (Being converted to the web application architecture)	34 provincial institutions (DCS (Planning) 8 and DCS (HR and T) 8) in the sample are services by DCS(Finance) for accounting
Payroll	Ministry of Finance	Preparation of salaries of employees	Client server, standalone	41 provincial institutions, (DCS (Planning) 8 and DCS (HR and T) 8) in the sample are services by DCS(Finance) for Payroll
Exam evaluation and result analyzer	Developed by private vendor	Exam result, result evaluation & analyzer	Standalone system (web client)	Provincial Education Department Anuradhapura
Decision support and monitoring system	University of Rajarata	Development goal setting and physical progress monitoring system	Web application	Deputy Chief Secretary (Planning), NCP

Name of e-System	Name of developer	Key modules	Architecture	Status of Using
Expenditure monitoring system		Monitoring of annual expenditure of all the departments and institutions of North Central Provincial Council	Web application	Deputy Chief Secretary (Planning), NCP
Revenue Management System	Private developer	Tax and revenue modules	Standalone system (web Client)	Department Revenue (NWP)
Eththa	Ethik	Information gathering, tax calculation	Terminal client	Department Revenue (WP)
Mail merge system	Inhouse development by staff	Data on frequent reception of letters with an ability to merge the letters	Standalone	Department of Local Government (WP)
Decision Support Information System (DSIS)	Inhouse development by staff	Project planning & monitoring, data management	Web client	Department of Education (WP)
iProMIS	Private developer	Project planning, monitoring	Web client	Deputy Chief Secretary (Planning) Northern PC
EMIS	Inhouse development by staff	Exam Management Information System	Web client	Department of Education Northern PC
EMIS (Mobile Application)	Inhouse development by staff	Information Dissemination System	Web client	Department of Education Northern PC
CAIP	Inhouse development by staff	Preparation of consolidated annual development programme, progress monitoring, report generation.	Web client	Deputy Chief Secretary (Planning) EP
HRM	Inhouse development by staff	Managing the cadre, employees personal data	Standalone	Deputy Chief Secretary (HR and T) SP
Expenditure Management system	Inhouse development by staff	Annual expenditure planning and monitoring system	Web client	Deputy Chief Secretary (Planning) SP
HRM	Inhouse development by staff	Managing the cadre, employee's personal data	Standalone-terminal client	Provincial Department of Land, SP
Assets management system	-	Managing assets of an institution, inventory of assets	Web client	Deputy Chief Secretary (Finance) Sub. P
Provincial revenue information system	Inhouse development by staff	Revenue Information Management System	Standalone-client server	Provincial Department of Revenue, Sub.P
MDTU Training Management System	Inhouse development by staff	Training programme planning and training courses management	Standalone-web client	Deputy Chief Secretary (HR and T) Sub.P
Mail Management System	Inhouse development by staff	Data on frequent reception of letters and documents with an ability to merge the letters	Standalone-web client	Provincial Department of Education, SP
Office management system	Inhouse development by staff	Information recoding and report generation	Standalone-client server	Provincial Department of Land, CP

Name of e-System	Name of developer	Key modules	Architecture	Status of Using
Complaint Management System	ITRD (Commercial vendor)	Storing on information on grievances and managing complaint process, tracking the complains. (Grievances related to entire local authority system in the WP)	Web client	Department of Local Government, WP
Inventory	Inhouse development by staff	Inventory Management System	Standalone-terminal client	Department of Provincial Motor Traffic, SP
Attendance management System	Multiple commercial vendors	Recoding the employee attendance.	Client server/ web client	Using In 23 provincial institutions
Cahtbot	Inhouse development by staff	Information dissemination system chatbot provides a question answering system leveraging natural language through chatting system	Web client	Provincial Department of Land
HRM	-	Attendance management and employee information storing	Client server/ terminal client	Provincial Department of Education, SP

In view of the above analysis, it can be concluded that the provincial institutions are in a very primitive stage in adapting connected e-Systems. It is recommended to design and implement an interrelated and interoperable application suit by providing access to different services using common databases where data interoperability is possible and using common application interfaces for enabling access to different modules where applicable.

5.5 System security and Stability in Provincial Councils

5.5.1 Availability of system security provisions across provincial institutions

According to the information received from the respondents of provincial institutions, it seems that e-System security and stability has not been a key concern. Among all the nine provinces, physical arrangements such as server room facilities or separate secured space for servers is only available in three institutions. Out of the total number surveyed 50% of sections of DCS (Planning), 25% of Departments of Lands and 25% of Departments of Local Government have paid attention to providing physical security for their data centers and none of the other institutions have any initiative (Table 5.5-1). Further, some sort of resilient disaster recovery arrangement is available only in two institutions out of eight namely in sections of DCS (Planning) and Departments of Local Government. It was observed that disaster recovery is not attended in all 8 provinces, only in 25% of DCS (Planning) and 25 % of Departments of Local Government have initiatives. Shadowing arrangements i.e., standby/substitute IT-related officials, technicians, operators etc. are available in 25% of sections of DCS (Finance), sections of DCS (Planning) and a few Departments of Local Government. The notable feature is that none of the other six institutions out of the nine provinces do not have alternative staff or shadowing arrangements for substituting in case of any probable human resource issue. This can be highlighted as a serious lacuna in the subject related to provincial level e-Government applications.

Table 5.5-1 : Availability of system security provision across provincial institutions

Name of the department	Percentage of institutions having physical security for data center	Percentage of institutions with a disaster recovery center	Percentage of institutions with alternative connectivity	Percentage of institutions with shadowing arrangement for HR
Section of the Deputy Chief Secretary (Finance)	0%	25%	25%	25%
Section of the Deputy Chief Secretary (Planning)	50%	0%	50%	25%
Section of the Deputy Chief Secretary HR, Training and Development)	0%	0%	0%	0%
Provincial Department of Education	0%	0%	0%	0%
Provincial Department of Land	25%	0%	0%	0%
Provincial Department of Local Government	25%	25%	25%	25%
Provincial Department of Motor Traffic	0%	0%	0%	0%
Provincial Department of Revenue	0%	0%	0%	0%

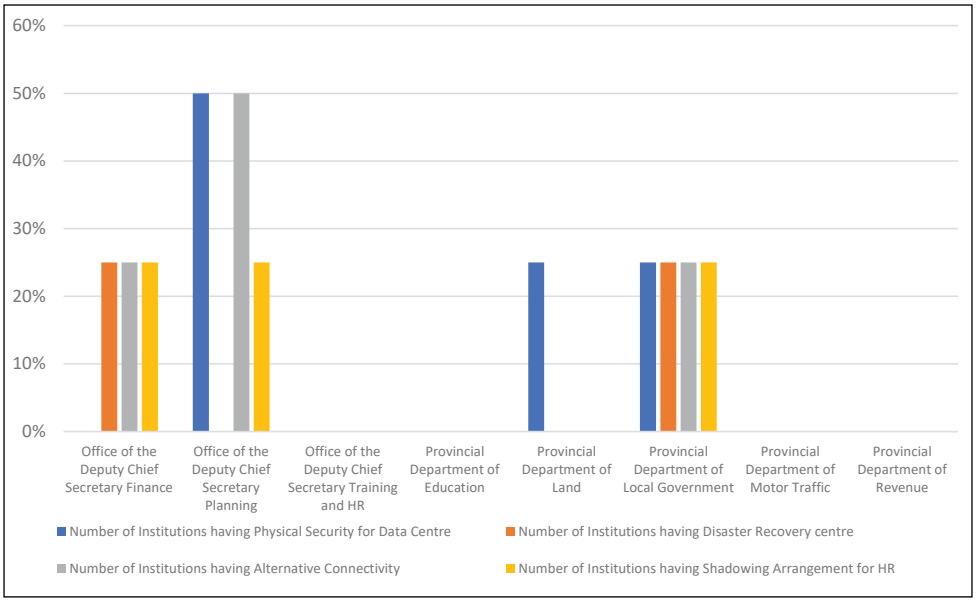


Figure 5.5-1 Availability of system security provision across provincial institutions

5.5.2 Adequacy of security provisions across provincial institutions

Table 5.5-2 depicts that the adequacy of security provisions predominantly in almost all provincial institutions is nil. Only among the Departments of Local Government (25%) has recorded the availability of physical security for data, disaster recovery, alternative connectivity, and shadowing arrangements for HR facilities. In addition to that, 25% of the applications of DCSs (Planning) have disaster recovery facilities. Figure 5.5-1 below indicates this situation very clearly.

Table 5.5-2 : Adequacy of security provision across provincial institutions

Name of the department	Percentage of institutions with physical security for data center	Percentage of Institutions with a disaster recovery center	Percentage of institutions with alternative connectivity	Percentage of institutions with shadowing arrangement for HR
Section of the Deputy Chief Secretary (Finance)	0%	0%	0%	0%
Section of the Deputy Chief Secretary (Planning)	0%	25%	0%	0%
Section of the Deputy Chief Secretary HR, Training and Development)	0%	0%	0%	0%
Provincial Department of Education	0%	0%	0%	0%
Provincial Department of Land	0%	0%	0%	0%
Provincial Department of Local Government	25%	25%	25%	25%
Provincial Department of Motor Traffic	0%	0%	0%	0%
Provincial Department of Revenue	0%	0%	0%	0%

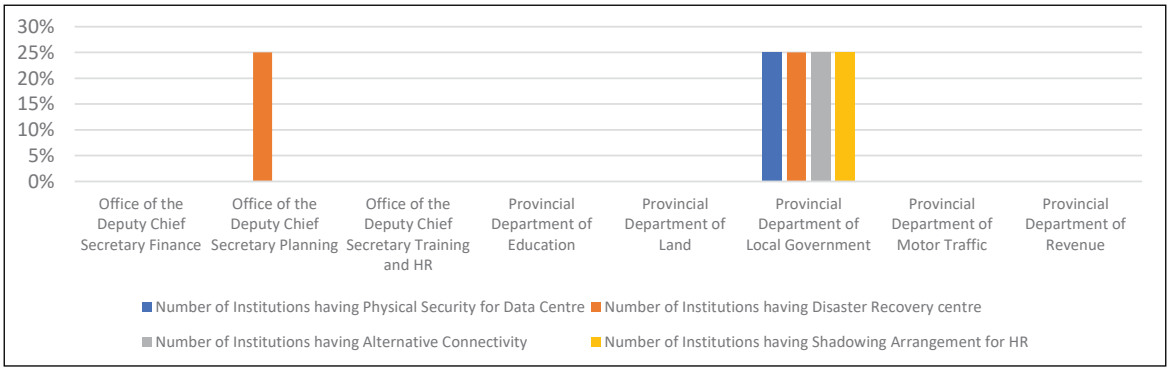


Figure 5.5-2 : Adequacy of security provision across provincial institutions

5.5.3 Adequacy of system security provision to meet the minimum requirement

Table 5.5-3 depicts the adequacy of system security provisions available against the minimum requirement. Accordingly, DCS (Planning), 50% out of nine have indicated that physical security for data, alternative connectivity and shadowing arrangements for HR facilities are in place. The disaster security facility has been accommodated only in 25% of DCS (Planning). Departments of Local Government have indicated that physical security for data, disaster recovery, alternative connectivity, and shadowing arrangement for HR facilities are in place for 25% of provinces. 25% of the applications in DCS (Finance) have indicated that same facilities are provided. Only 25% of Departments of Land have recorded the availability of physical security for data. The most significant feature is that all other provincial institutions lack adequate security provisions even to meet the minimum requirement.

Table 5.5-3 : Adequacy of system security provision across provincial institutions –minimum requirement

Name of the department	Percentage of institutions with physical security for data center	Percentage of institutions with disaster recovery center	Percentage of institutions with alternative connectivity	Percentage of institutions with shadowing arrangement for HR
Section of the Deputy Chief Secretary (Finance)	0%	25%	25%	25%
Section of the Deputy Chief Secretary (Planning)	50%	25%	50%	50%
Section of the Deputy Chief Secretary (HR, Training and Development)	0%	0%	0%	0%
Provincial Department of Education	0%	0%	0%	0%
Provincial Department of Land	25%	0%	0%	0%
Provincial Department of Local Government	25%	25%	25%	25%
Provincial Department of Motor Traffic	0%	0%	0%	0%
Provincial Department of Revenue	0%	0%	0%	0%

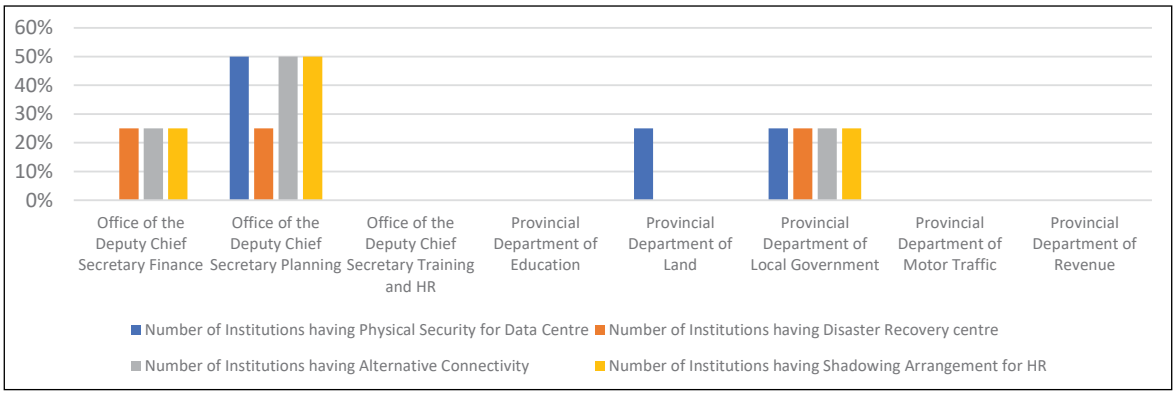


Figure 5.5-3 : Adequacy of system security provision across provincial institutions –minimum requirement

5.5.4 Availability of system backup provisions

Table and Figure 5.5-4 depict that almost all provincial institutions except Departments of Land and Departments of Motor Traffic of all provinces have some sort of satisfactory system for backup provisions. These backup facilities were considered under three categories in this study, namely availability of backup arrangements, backup policies, and delegated personnel responsible for backup operations. Accordingly, only 11% out of nine DCS (Finance) have all the above three components. 28% out of nine DCS (Planning) have backup arrangements and personnel responsible for backup operations while only 17% have backup policies. 17% out of nine DCS (Training and HR) have all the above three components. 6% out of nine Departments of Land have backup arrangements and personnel responsible for backup operations while backup policies are at zero level. 17% out of nine Departments of Local Government have backup arrangements while only 11% have backup policies and personnel responsible for backup operations. 22% out of nine Departments of Revenue have backup arrangements, and only 17% & 11% have personnel responsible for backup operations and backup policies respectively. The notable feature in this regard is that both Departments of Education and Motor Traffic have indicated zero under all above three components. However, this does not deduce that they are not using any system backup provision. The possible reason for having this negative outcome in the survey is due to non-accessibility for data and information for these institutions.

Table 5.5-4 : Availability of system backup provision

Name of the department	Percentage availability of backup arrangements	Percentage availability of backup policies	Percentage availability of delegated personnel responsible for backup operations
Section of the Deputy Chief Secretary (Finance)	11%	11%	11%
Section of the Deputy Chief Secretary (Planning)	28%	17%	28%
Section of the Deputy Chief Secretary HR, Training and Development)	17%	17%	17%
Provincial Department of Education	0%	0%	0%
Provincial Department of Land	6%	0%	6%
Provincial Department of Local Government	17%	11%	11%
Provincial Department of Motor Traffic	0%	0%	0%
Provincial Department of Revenue	22%	11%	17%

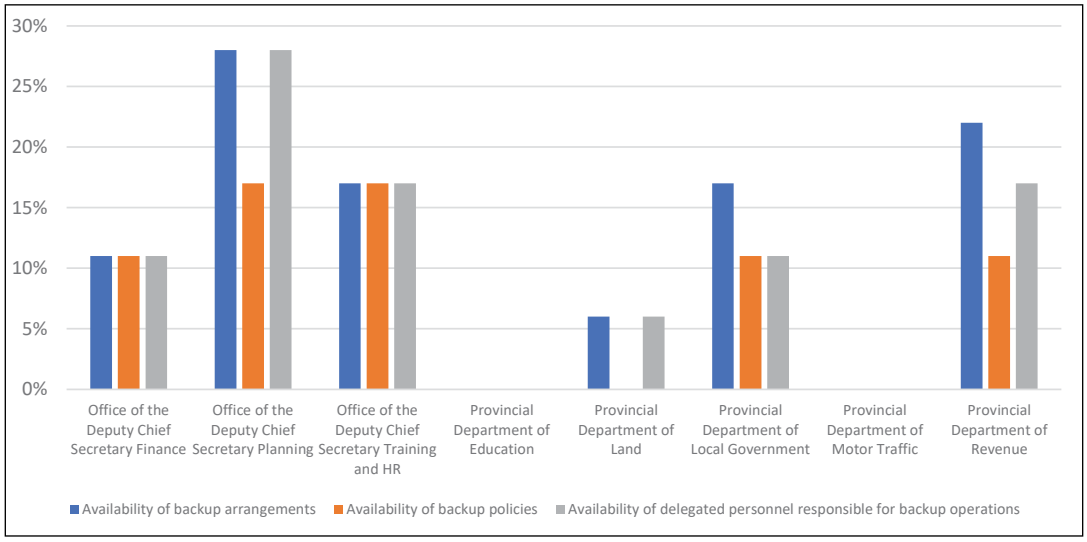


Figure 5.5-4 :Availability of system backup provision

Availability of backup schedule with defined back up frequency

The availability of a backup schedule concerning a defined backup frequency has been considered in the study under four frequency categories. Accordingly, the backup facility provided by all provincial institutions is not in a satisfactory level. It is depicted in Figure 5.5.5 below. The daily data backup takes place only in 6% of DCS (Planning) and Departments of Local Government, and 11% out of nine Departments of Revenue. DCS(Finance), DCS (Training & HR), and Departments of Education, Land, and Motor traffic have no arrangements. Backups on weekly basis take place in 6% of DCSs Finance, DCSs Planning, Departments of Land, Local Government & Revenue and in 11% of DCSs Training & HR, while no arrangements in both Departments of Education & Motor Traffic out of all provinces. Data backup monthly take place on 11% of DCS (Planning), and 6% of DCS (Training & HR) while all other provincial institutions have recoded no arrangements in this regard. Finally, the category of occasional uploading takes place only in 6% out of nine DCS Finance & Planning, Departments of Local Government & Revenue in all provinces while all other provincial institutions have no such arrangement.

Table 5.5-5 : Availability of backup schedule with defined frequencies

Name of the department	Percentages of entities backing up daily	Percentage of entities backing up weekly	Percentage of entities backing up monthly	Percentage of entities backing up occasionally
Section of the Deputy Chief Secretary (Finance)	0%	6%	0%	6%
Section of the Deputy Chief Secretary (Planning)	6%	6%	11%	6%
Section of the Deputy Chief Secretary HR, Training and Development)	0%	11%	6%	0%
Provincial Department of Education	0%	0%	0%	0%
Provincial Department of Land	0%	6%	0%	0%
Provincial Department of Local Government	6%	6%	0%	6%
Provincial Department of Motor Traffic	0%	0%	0%	0%
Provincial Department of Revenue	11%	6%	0%	6%

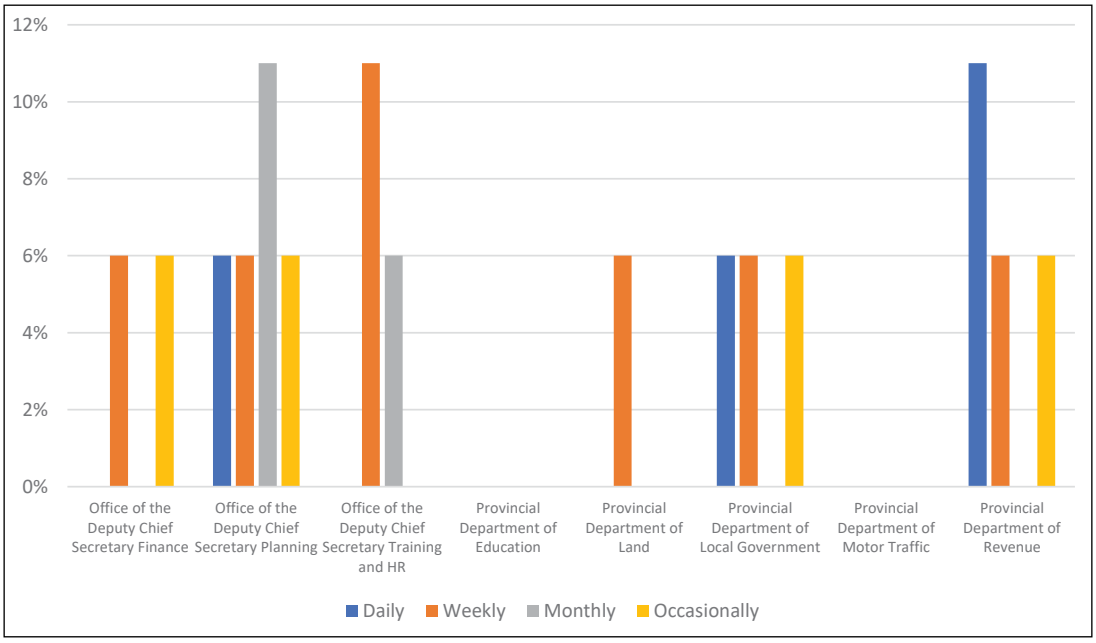
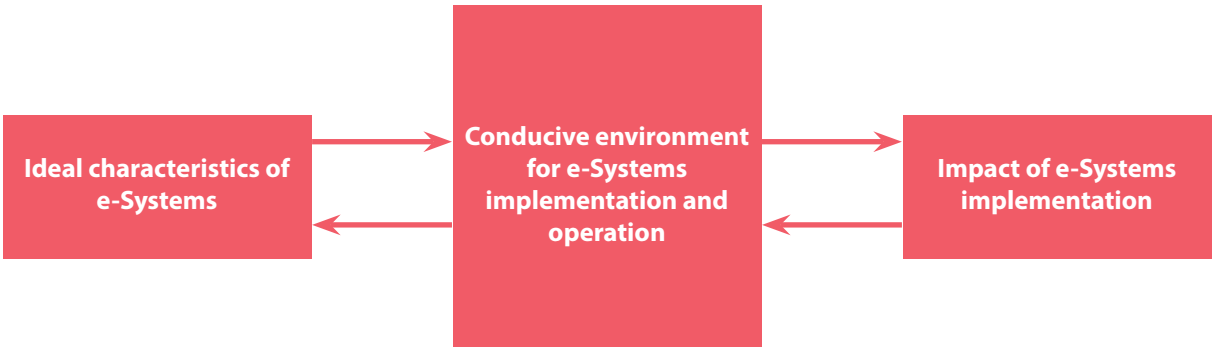


Figure 5.5-5 : Availability of backup schedule with defined backup frequency

5.6 Functional efficiency of e-Systems in provincial institutions

As outlined in the earlier chapter, the functional efficiency of the systems at the provincial institutions was measured based on a proposed framework. The diagram below depicts the conceptual framework with three interrelated dimensions. The conducive environment for the e-System implementation is critical in adapting the ideal e-System and providing a way for measuring the impact in positive terms.



This section, similar to section 4.6 covers the formulation of characteristics of a model for an ideal e-System and also postulates the conducive environment where the e-System shall perform the operational tasks and service delivery in an enhanced way in comparison to the paper-based manual system. The functional efficiency will be derived based on the primary and secondary data collected from nine shortlisted institutions in the nine provinces of Sri Lanka.

Table 5.6-1 : Formulation of Ideal characteristics of the e-Systems to compare against the existing manual systems

Characteristics of e-Systems	Detailed specification on the characteristics
A. User interface, accessibility, and satisfaction	Overall user satisfaction and instilling democratic values in e-Systems.
	Friendly, affordable, efficient interface for service delivery and operations management.
	Participatory and direct communication (e-participation/e-dialogue) enabled in the system to improve engagement.
	Availability of multi-lingual and accessibility provision for persons with disability
	Regular documentation and quality management
B. Mode of service provisioning	Multifaceted service provisioning (information dissemination, service delivery, operational workflow automation, transactional facilities, data repository and processing, communication channels)
	Reduction in transaction time when compared to manual paper-based operations in the institution. Moving forward towards paperless office.
	Level of integration of system components with relevant institutions and stakeholders
	Exercise of professionalism and ethics in the operations
	Extensive monitoring and evaluation mechanism
C. Performance, reliability, and security	Trust level of the e-Systems and the security mechanism incorporated in the system. Security of personal information and informational safety.
	Responsiveness and the transaction time in accessing and completing the tasks in the e-Systems
	Updated credible information and relevant applicable logics

According to the proposed ideal characteristics of the e-Systems there is a greater chance of successful implementation and utilization of the system for routine operations and service delivery depending on the above three dimensions. The current status of the components related to functional efficiencies of the e-Systems have been analyzed in the sub sections below in detail with the relevant data.

5.6.1 User interface, design, accessibility, and satisfaction levels in the e-Systems

The user interaction with the e-Systems must not be complicated and should be very straightforward with only the necessary features to navigate and to use the system. The feedback from the users should be used to

improve the user interface in the interactive development process. In Figure 5.6-1 the demography of computer users against the number of e-System users is presented across the provincial institutions.

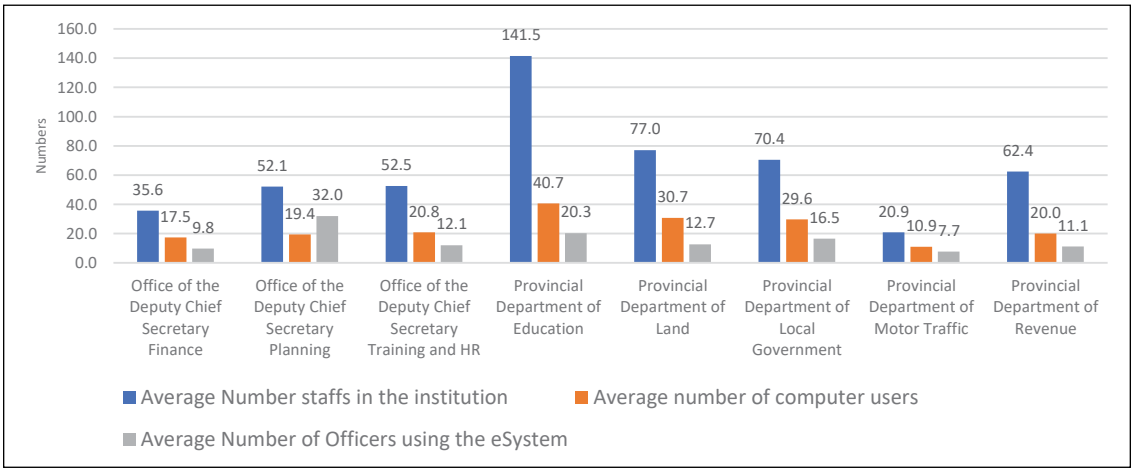


Figure 5.6-1 : Demography of the Computer users and e-Systems Uses in different Institutions

The provincial institutions have a clear footprint on the implementation of e-Systems such that each one of them have a considerable number of computer users and e-Systems in place. In some cases, the e-Systems usage exceeds the number of computer users in-house as the systems are available to access from externally connected sub-offices and are provisioned for remote workers. For example, the e-Systems in the section of DCS (Planning) are used by other institutions for data entry.

The distribution of e-Systems based on the nature of services rendered is presented in Figure 5.6-2 depicting the availability of G2C/G2B and G2G e-Systems in the provincial institutions. This shows the modality of service delivery to the end users. It is worth noting that most of the e-Systems have an interface for providing services. These provincial institutions are meant to have a considerable number of activities for operating internal functions and to have clearly defined linkages with other provincial institutions and central government agencies. The G2G systems include the coverage of back-office operations and the necessary integration with other institutions that require collaboration. As we can see that the provincial Department of Motor Traffic has G2G systems in place and interfaces for citizens to access services from the institution. On the other hand, the Office of the Deputy Chief Secretary (Planning) has full coverage for G2G services since most of the provincial development activities have liaised across other institutions regardless of the interactions with the citizen.

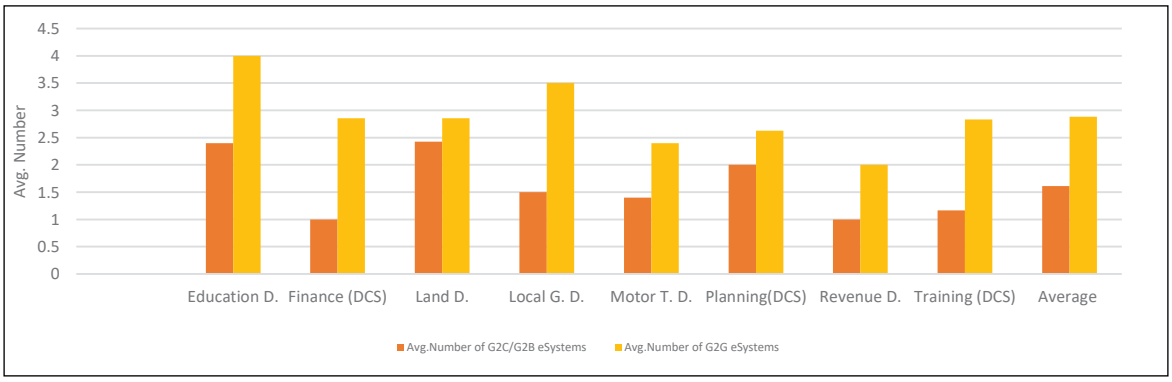


Figure 5.6-2 : Average number of e-Systems in the eight institutions

5.6.2 Satisfaction of the user

User satisfaction is the main purpose of establishing e-Systems. The satisfaction shall be measured based on the perceived value of the system such that not only the functional aspects are covered. It also depends on various things including design elements, navigation, convenience, accessibility and so forth. The user satisfaction will ensure the e-Systems will be fully adapted at all levels and the routine workflow of the institution will be enhanced as a result. Figure 5.6-3 shows the perceived user satisfaction levels based on a user rating of 1-10. The results are satisfactory and there is an indication of certain areas that needs to be addressed. This could be done by conducting detailed exit surveys and user polls on defined features. The e-Systems at provincial Department of Education scores the highest in terms of user satisfaction.

5.6.3 Friendliness of design to the system users

The user friendliness is another key aspect in the measure of satisfaction since friendliness leads to satisfaction. The usability of the system including the earlier discussed factors design, navigation and accessibility were used to decide the friendliness. Friendliness of the system refers to the self-descriptive functional features and the provision of an appealing interface.

The comparison of user friendliness and satisfaction is provided in the Figure 5.6-3 below. It clearly shows that the satisfaction is closely dependent on the friendliness. The e-Systems with higher user friendliness leads to higher user satisfaction and it shall be clearly interpreted from figure below.

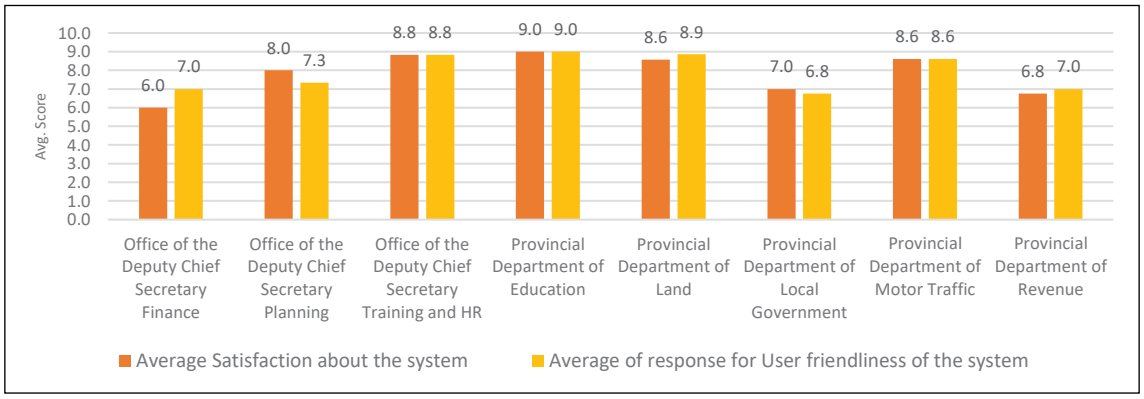


Figure 5.6-3 : MUser Satisfaction and Friendliness of the e-Systems

5.6.4 Availability of language provision in the application

The e-Systems are mostly functional in a context where the institution has a multicultural, multi-ethnic workforce that needs certain level of accessibility support in terms of language provision. This shall be considered a key factor in making the user comfortable in adapting the system on a day-to-day basis. There is also the need for the providing a link language in places where the system will be accessed from various demographic locations and time zones.

From Figure 5.6-4 it is evident that the availability of English language is predominant in all of the institutions since most of the technical terms are easily understandable and the navigation is less challenging as most other devices and software that are predominantly built in English language. In view of web system development standards, the language provision in the e-System will play a major role in the system utilization. The provision of trilingual systems show concerning circumstances.

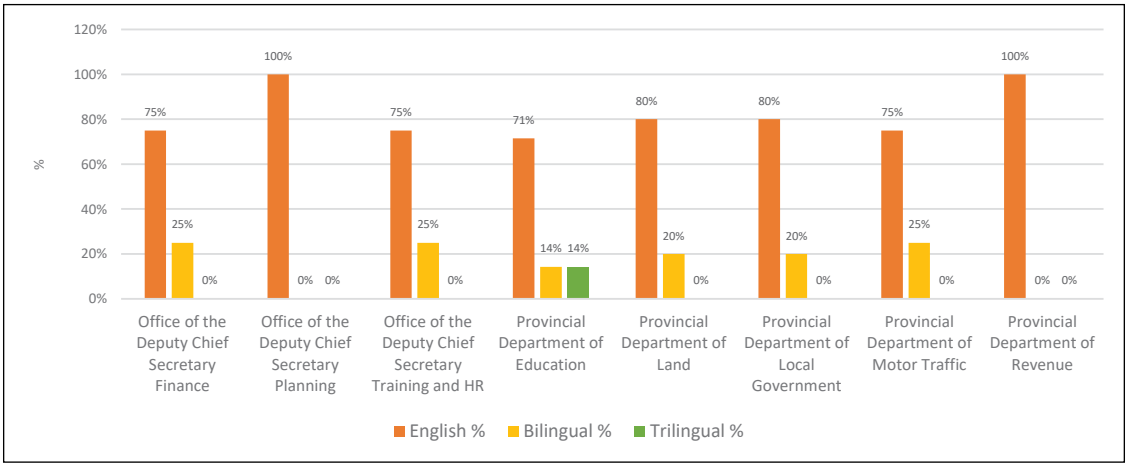


Figure 5.6-4 : Language provisions of the e-Systems

5.6.5 Availability of accessibility options for persons with special needs

The e-Systems must have facilities to ensure inclusive access for individuals with special needs. The inclusive nature of the system will promote mainstreaming the accessibility of services with equal rights. As given in Figure 5.6.4, the sample data revealed that in almost all e-Systems currently being used, there are no provisions for inclusive access to individuals with special needs. There are more improvements to be made at the policy level and at the system level to incorporate accessibility provisions for equitable service delivery.

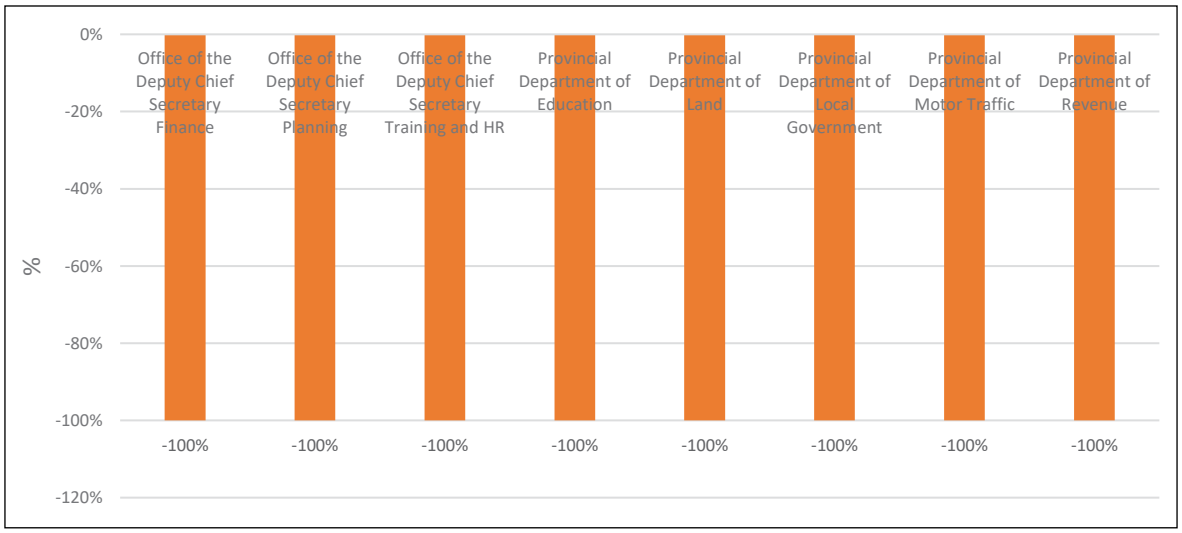


Figure 5.6-5 : Provisions for inclusive access to persons with special needs

5.6.6 Availability of work-from-home option

The current Covid19 pandemic has changed the normal way of life. This is no exception to provincial institutions where the systems and services have to think of alternative mechanisms to improve the operational aspects. The incorporation of ICT is one viable solution to cope with service disruption. Remote access to the e-Systems from outside the institutional premises will facilitate the operations to run during routine working hours without disruption. Figure 5.6.5 provides a glimpse of the institutions that already have provisions to work remotely. The Office of the Deputy Chief Secretary (Planning) has fully compliant systems to provide work-from-home options since they have web-based interfaces for officers to work from sub-offices and field locations.

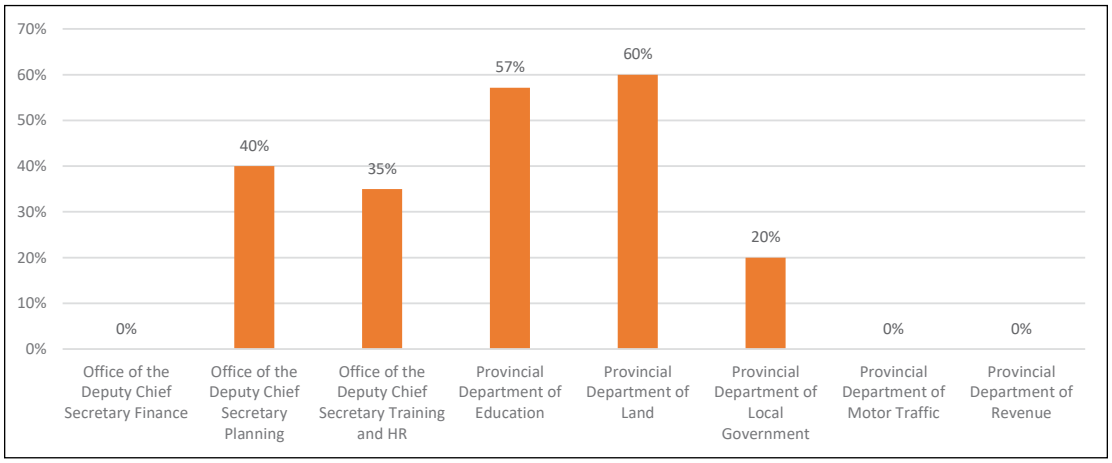


Figure 5.6-6 : Provisions for work from home

The data shows that the provision of work from home is primarily meant for officers in charge of processing operational tasks. As per Figure 5.6-6 there are a considerable number of possibilities to work from remote locations at the provincial institutions.

5.6.7 Training on e-Systems by institutions

The efficiency of the e-System mainly depends on the users that operate the system. The hands-on training of the e-System to the user is a mandatory and recurring task. This will also provide a way for getting feedback and inputs from the new and existing users to improve the system functionality and user interface.

Figure 5.6-7 shows the provision of training for the system users along with the availability of user manuals that supplement and serve as the first point of reference for the system users to confirm the workflow. There is also a key aspect added to it that depicts the availability of user roles defined in the system. The user roles enable the privilege levels to access the system functions, and this will reduce the complexity for the system user to access only the necessary functions regardless of being overwhelmed by options.

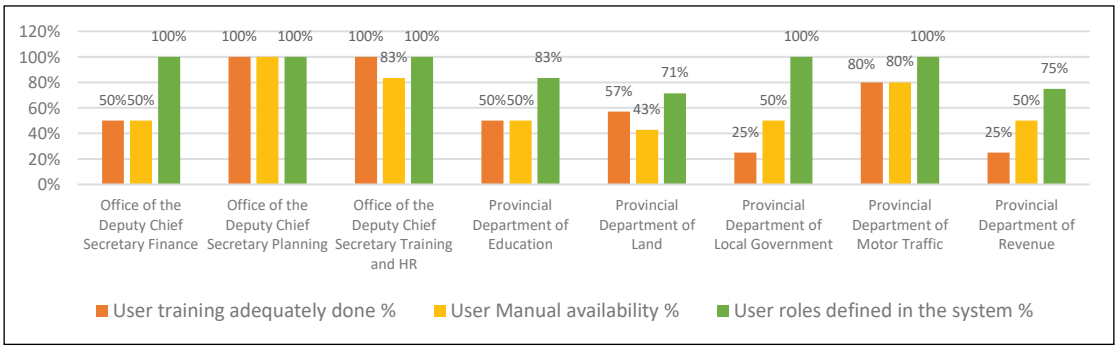


Figure 5.6-7 : Provisions for Training on the e-Systems

It is interesting to note that user satisfaction also correlates with training and knowledge of the e-Systems. Figure 5.6-8 shows the adequacy of training on the e-Systems show that the satisfaction levels are also considerably correlated with training, manual availability, and defined user roles. The key fact is that the knowledge of the system increases the acceptance of its functionalities.

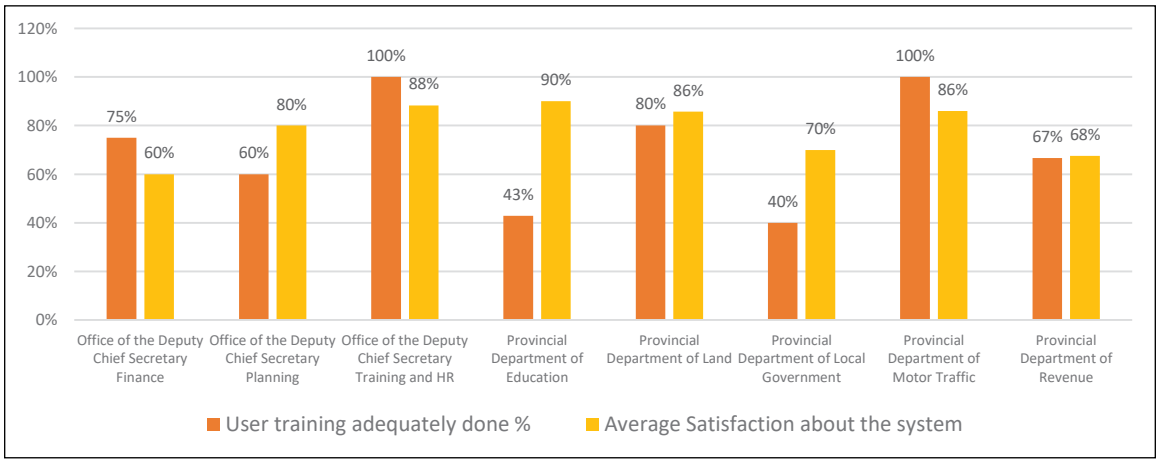


Figure 5.6-8 : User satisfaction in comparison to user training provided

The friendliness of the e-System is also linked to the availability of user manuals and user roles. As per Figure 5.6-8, all of the institutions show user friendliness to be considerably above average and there is a clear indication of higher value for user role definition.

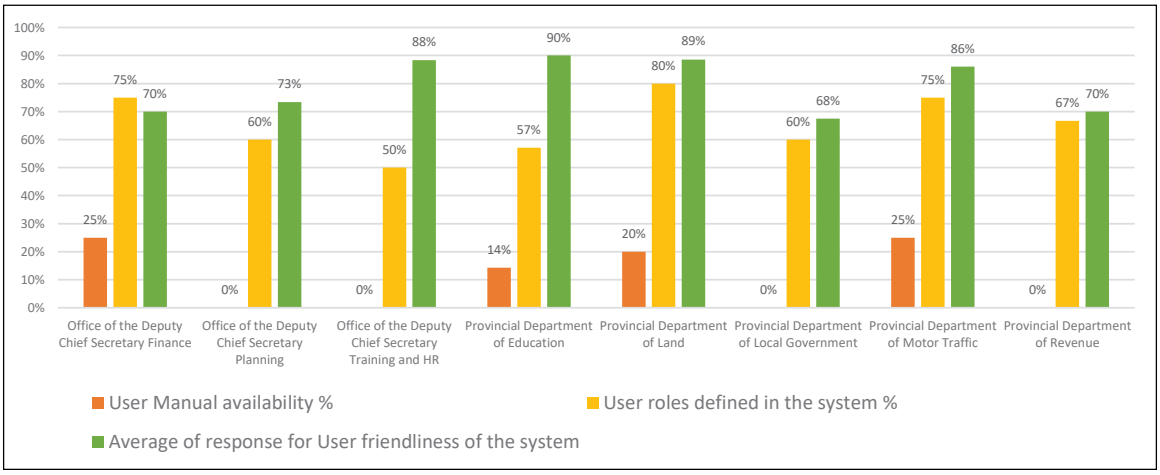


Figure 5.6-9 : System user friendliness in comparison to user manual availability and user role defined

5.6.8 Modality of System Build in the e-Systems

The modality of the system build plays a major role in the stability and reliability. Three key aspects are considered in the planning phase as the foundation for the modality of the system build. The completion of a comprehensive e-System study, a BPR study to identify any necessity to re-engineer e-System components and instances of customization of existing features were the aspects to be considered for ensuring the build modality results in a stable e-System. In Figure 5.6-9 the aspects were highly considered in the Provincial Department of Motor Traffic, Provincial Department of Land and the Office of Deputy Chief Secretary (Training and HR). In contrast, the modalities were considered at a lower level in the Provincial Department of Revenue and the Provincial Department of Local Government.

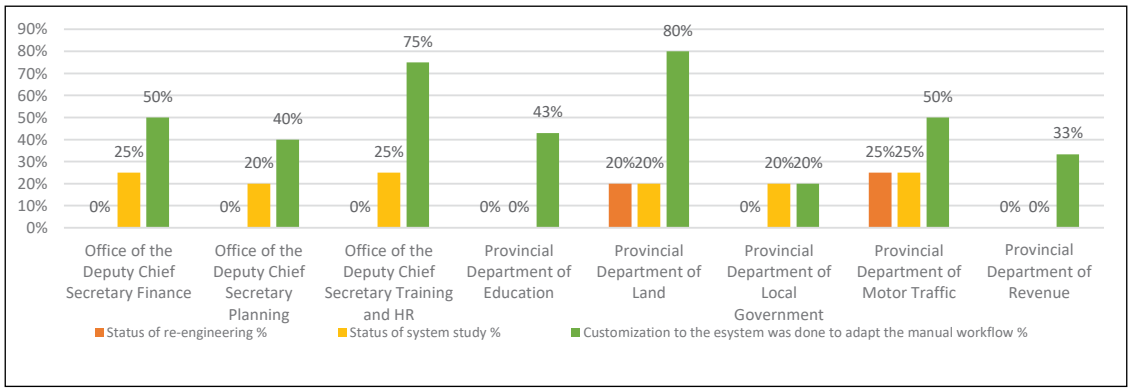


Figure 5.6-10: Status of reengineering (BPR), system study and customization

The system study is key to ensuring the intended manual workflow or for the functional tasks to be translated to digital format and the operations to be worked out as per the logic defined in the manual procedures. In the above Figure 5.6-10 the system study was conducted at the institutions at various levels. Similarly, customization of functions and re-engineering of the systems were also undertaken.

5.6.9 Coverage of e-Systems

The end-to-end coverage of an e-System is also a key factor in successful implementation. The fully covered e-Systems will have end-to-end functionality that completely replaces the manual workflow and operations. This will also move the institutions towards a paperless facility with full digital compliance. The partially covered system will include digital components of core functionality on par with the manual operations. This will result in an increased turnaround time compared to the former.

Figure 5.6-11 depicts the institutions fully covered and there are a considerable number of e-Systems with partial coverage. The Office of the Deputy Chief Secretary (Finance) has an equal number of fully covered and partially covered systems. Similarly, the Office of the Deputy Chief Secretary (Planning) has been incorporated with only partially covered e-Systems. The majority of the e-Systems in all the other departments are partially covered. The coverage is not equally and proportionate as there are different levels of coverage for processes in different e-Systems.

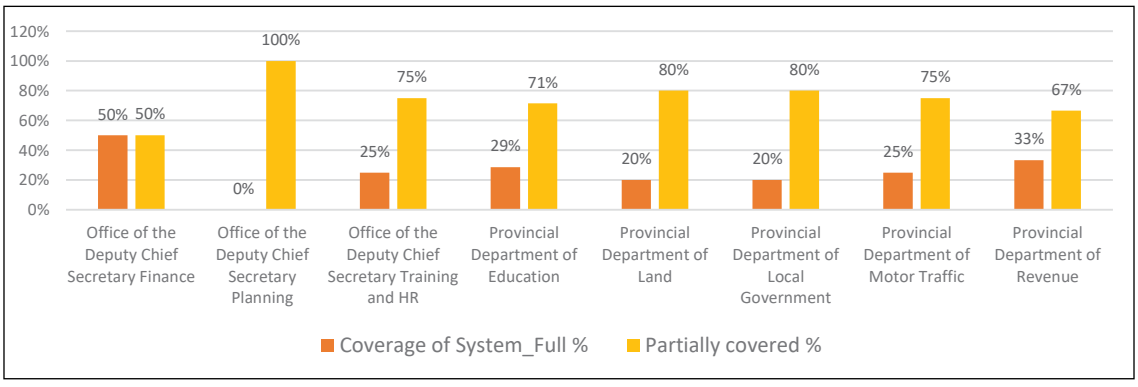


Figure 5.6-11 : Coverage of e-Systems in relation to the operational workflow

5.6.10 Application architecture and client-side access type

The application architecture and the client-side access were major criteria in deciding the reliability of the e-System. The application architecture was the initial decision made by the system development team as

per the requirements of the system study. The application architecture was a high-level topic to explore in the study since the institutional respondents were unaware of such technical jargon related to application architecture. Similarly, the client-side access provision was also a key aspect to consider the deployment modality of the e-System. It will determine the expandability of the system access from institutional premises to remote locations. The client-side access provision mainly has two modes: web access and terminal access. Web access does not need a specially developed client application to access, just a web browser is sufficient. However, for terminal client applications, access irrespective of the e-System is only through a particular front-end client application. These applications are identified as client-server software applications.

Figure 5.6-12 presents the availability of client-side access applications for e-Systems across provincial institutions. The web-based access is predominantly not available in the majority of the e-Systems.

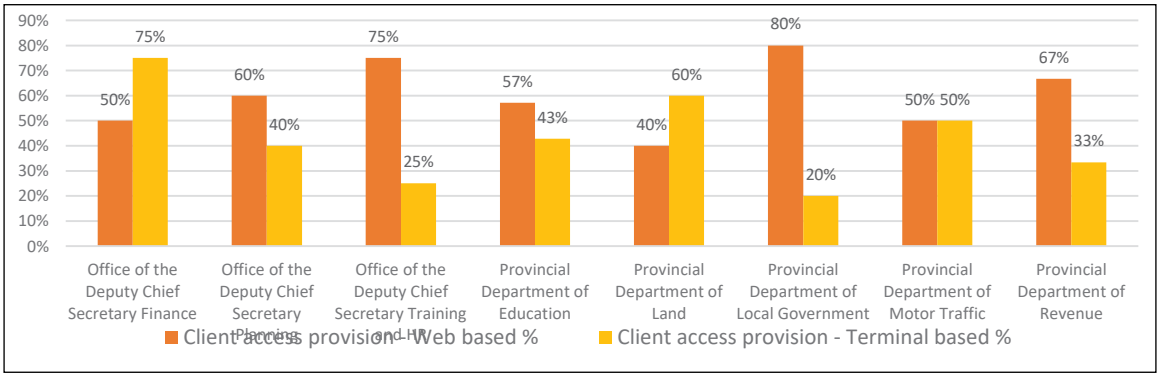


Figure 5.6-12 : Software Architecture

The recent trend in introducing mobile applications to serve client access has maximum potential for the system users to access the system functionality on the go. Figure 5.6-13 shows the availability of mobile applications provisioned in the e-Systems at provincial institutions.

The Provincial Department of Land, Provincial Department of Education, and Office of the Deputy Chief Secretary (Planning, Training and HR) have incorporated mobile applications into their e-Systems.

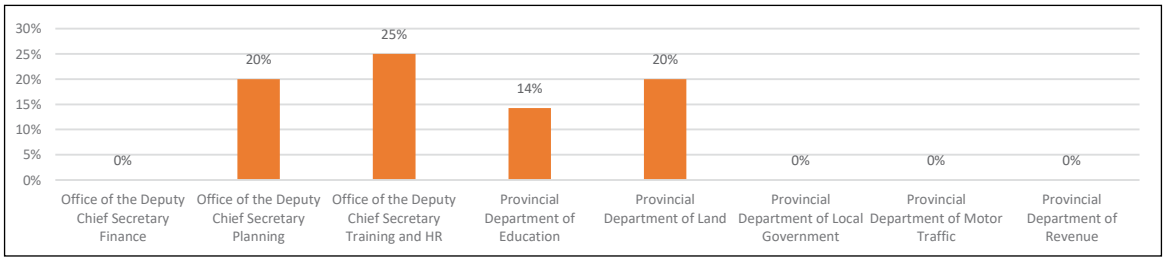


Figure 5.6-13 : Availability of web and mobile application access to the e-Systems

5.6.11 Licensing model of e-Systems

Figures 5.6-14 below show the licensing model of the e-Systems across provincial institutions. In most institutions, the licensing model was unknown to both the user and the management.

Similarly, criteria such as source code availability and IPR also plays a major role in determining the ownership of the e-System and helps to overcome issues arising out of understanding the ownership of the system between the provincial institution and the system development agency. However, the majority of institutions and respondents are not aware of the status of source code availability and IPR ownership.

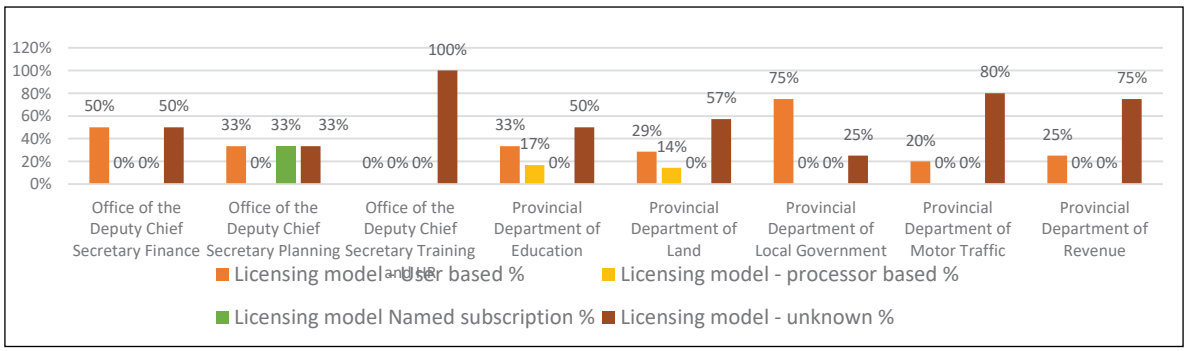


Figure 5.6-14 : Software licensing model

5.6.12 Software development approach and quality standards

Software development approach and quality standards dictate the reliability of the e-System functionality and ensure the system withstands changes in the administrative procedures over time. The quality standards create a solid foundation for the e-Systems to manage the core functionality and also to cater future expansions and changes.

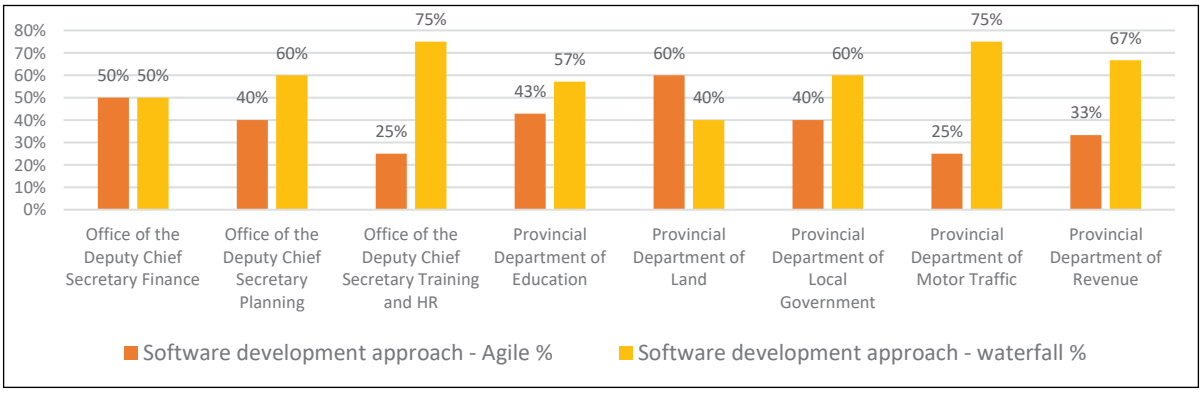


Figure 5.6-15 : Software development approach

In Figure 5.6-15, the software development approach of institutions was identified as predominantly the Waterfall method such that the development occurs in sequence after the complete study of the system components and functionalities. Office of the Deputy Chief Secretary (Finance), Provincial Department of Education, and Provincial Department of Land has reported that the system development lifecycle follows an agile method and the other institutions have responded fairly high on the Waterfall approach.

The quality assurance of the e-Systems in the provincial institutions was represented in Figure 5.6-16. It is evident that quality standards have been strictly adhered to and the system quality assurance, user acceptance testing, and software testing were done with the right measures in place.

As per the below Figure Graph 5.6-15, in the provincial setup, there is less adoption of processes related to software quality assurance and testing. It was learned that there was no understanding among the provincial officials on the requirement of adopting a software quality assurance process and testing process for software development to ensure the quality and standard of software. Furthermore, the aforementioned institutions either have a lack of knowledge of the quality standards or the software development agency has limitations in terms of capacity.

The concerns over source code ownership and IPR rights were also key factors in determining the ownership and quality standards of the e-Systems. As far as the systems are owned by the provincial institutions, the

systems shall be changed whenever necessary and replicated as per the requirement of the institution without additional costs for licensing.

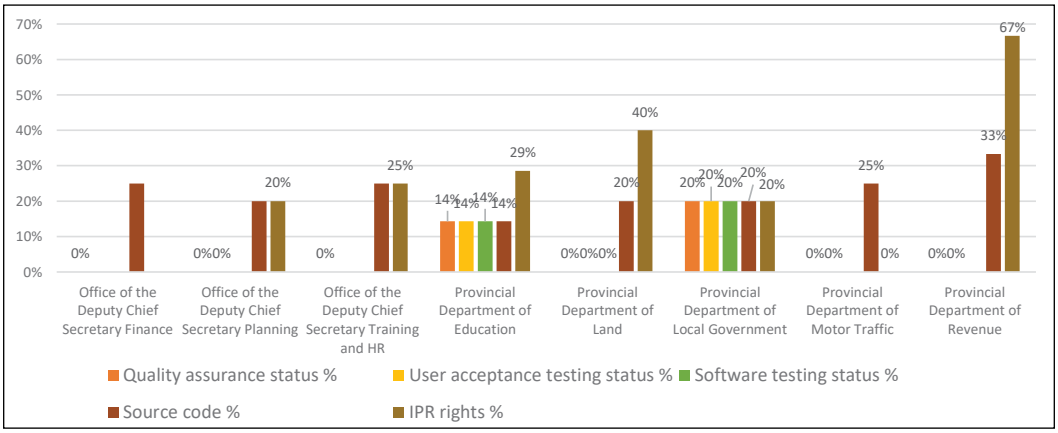


Figure 5.6-16 : Status of Software Quality Assurance, Testing and Ownership of Sauces Code and IPR

5.6.13 Type of hosting provision

The system hosting provision includes the server and necessary network infrastructure environment to set up the e-Systems. The hosting provision shall be on-premises based on a physical data center environment or a cloud-based server environment in the case of a client-server model. Similarly, the hosting provider is not needed for a standalone system that will be deployed on individual client devices. The hosting provision shall provide a central point of control for the e-System to provide administrative sophistication and to enable security provisions.

In Figure 5.6.-17, a limited number of e-Systems are provisioned in cloud-based hosting, however, a considerable number of standalone application hosting is reported. It is interesting to note that the on-premises server provisions are equally used, and the reported standalone systems are to be studied further to get more insights on migrating them to integrated systems with enhanced features.

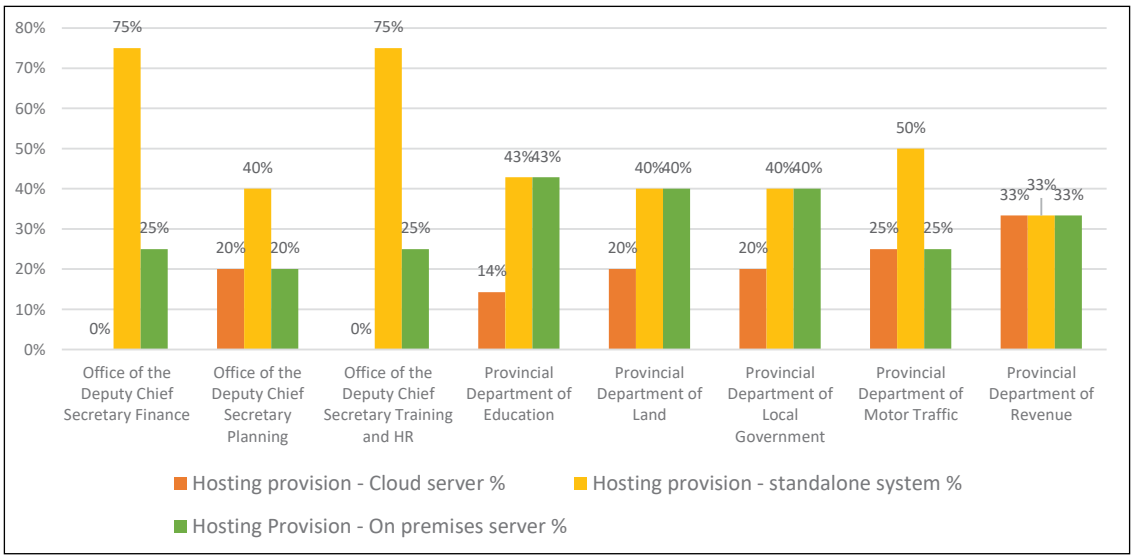


Figure 5.6-17 : Type of hosting provisioned for the e-Systems

Most of the provincial institutions were using centrally developed e-Systems that are provisioned to manage the financial aspects including expenditure management and payroll management. These are common across all institutions and are mandated by central government agencies to ensure that provincial transactions could be centrally processed and monitored.

5.6.14 Performance, reliability, security, and system performance

The system performance is the measure of various aspects of the e-System including uptime or availability, response times, reliability, interoperability, integration, and so forth. The study has focused on identifying some of the criteria with respect to the e-System available at the provincial institution level. Figure 5.6-18 below shows the availability of the e-Systems in terms of the uptime of the system. Almost all institutions have responded that out of the systems that they have, about 50% of the systems' availability of uptime is over 95%. The other 50% of the e-Systems have reported that the uptime of the system is less than normal as the system seems to be available on demand or based on operational hours of the institution.

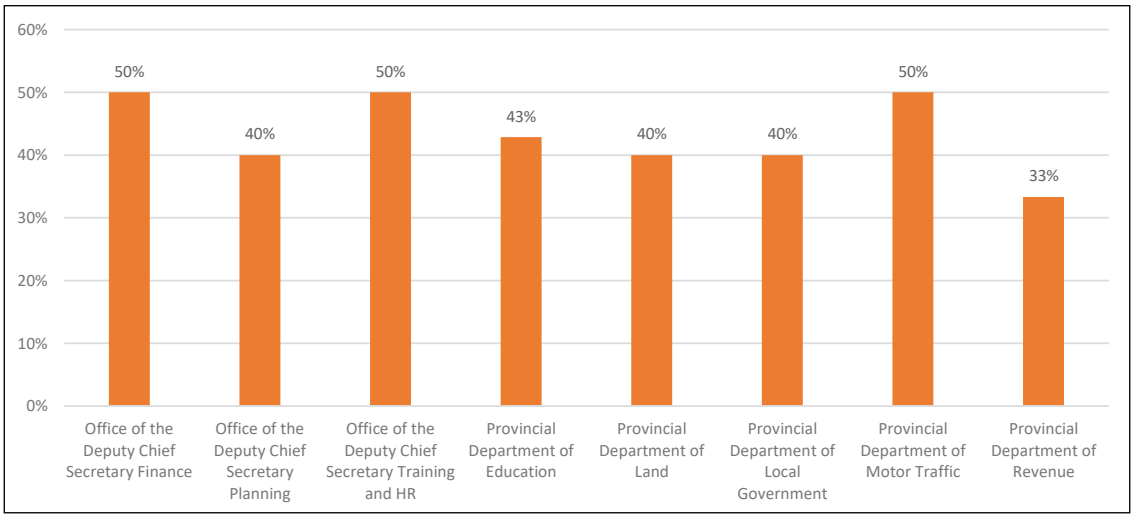


Figure 5.6-18 : Availability of the system - Over 95%

Similarly, in Figure 5.6-19 below, the average time taken to complete an operational task with digital intervention is depicted. As far as manual operations are concerned the time taken for processing is quite unpredictable. This is an absolute reality of manual operations where the delay is inevitable and needs attention.

In Figure 5.6-19, it is evident that the transaction times and processing times are considerably saved. For instance, the Provincial Department of Education has reported that a task takes three days to circulate and process but it is reduced to three minutes. Similarly, the Provincial Department of Motor Traffic also reported that the system has significantly reduced the processing time and improved the transparent operations across other institutions that collaborate and work on common tasks.

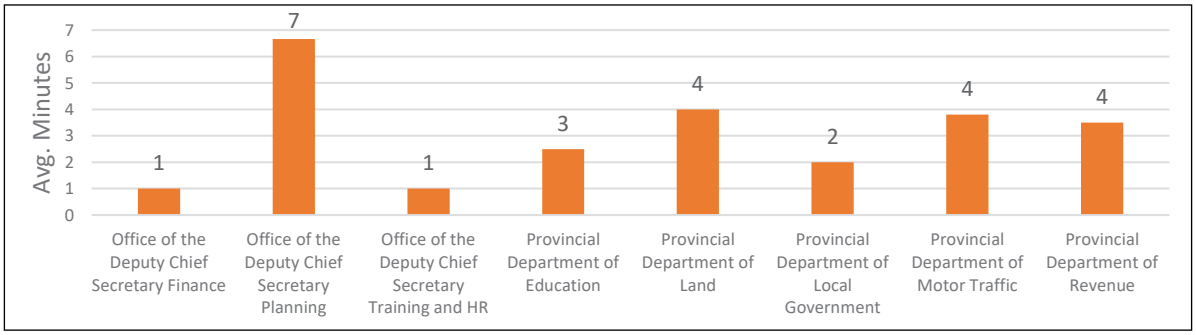


Figure 5.6-19 : Average transaction time of digital system operation in minutes

5.6.15 Integrated/connected systems

The interconnection among e-Systems is a mandatory requirement to avoid the difficulty in processing and mining data from the interweb of systems. The integration of e-Systems is a tricky subject since it is very rare that a sole development agency develops all sorts of e-Systems. However, there are various public, private and individuals involved in the development of various e-Systems. Therefore, it is very challenging to interconnect or integrate e-Systems with different software developers, approaches, different platforms, and various other inconsistencies. The integration depends on the clear knowledge of the institutions concerning the working internal functions of the e-Systems. The integration provides maximum benefits to the institution to have centralized administrative control and it supplements effective decision-making.

From Figure 5.6-20, it is clear that the institutions have wisely chosen e-Systems with the possibility of integration in the future with additional workarounds or plugins. Also, it was noted that most of the institutions are clear on the purpose of integration. There are responses from the Provincial Department of Land and Provincial Department of Motor Traffic that their e-Systems have a certain level of advantages in integration. However, one key fact to note is that some of the systems have already enabled connectivity across institutions during the initial development phase. The Provincial Department of Motor Traffic is a classic example that integrates various institutions to complete the transactions. However, the majority of the e-Systems need considerable improvements for interoperability. The e-Systems based on client-server architecture have to be replaced with the software applications with web application architecture to be interoperable.

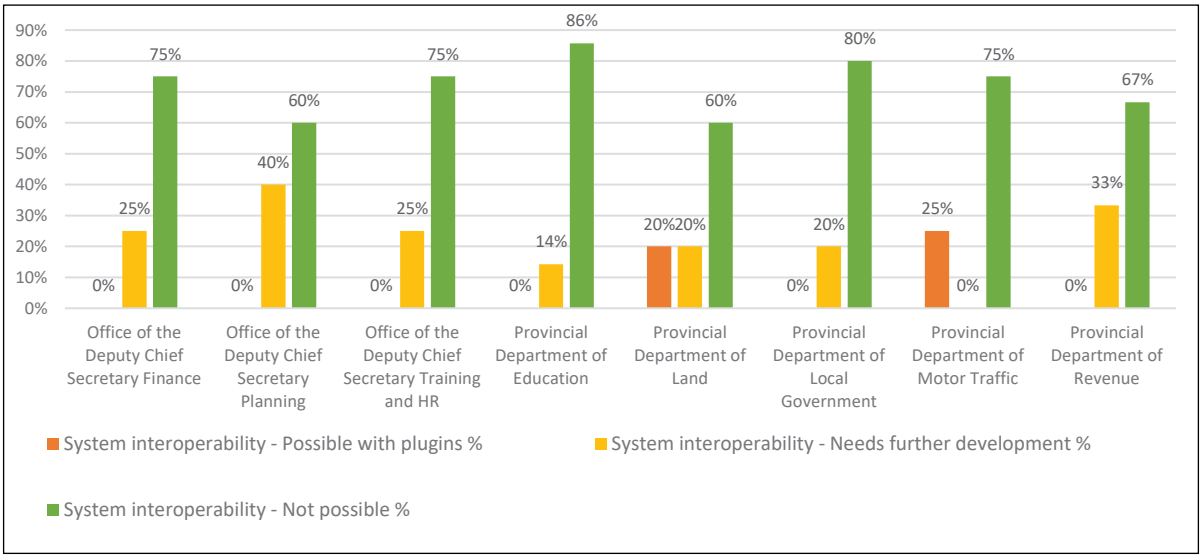


Figure 5.6-20 : Status of interoperability between e-Systems

The integration among e-Systems may happen in both directions and one direction. For instance, the data flow between two e-Systems shall be based on the predefined real-time application program interface layer or any other socket mechanism to export and import the data in either direction in a batch processing mode. So, accessing data from other e-Systems and sharing data with other e-Systems is also studied in the study. Sharing data across other e-Systems in place is commonly not welcome by the system users. Few exceptions are reported in the Provincial Department of Motor Traffic, Provincial Department of Land, and the Office of the Deputy Chief Secretary (Planning) who shares data with other institutions. Other institutions have reported that the interconnectivity is completely null.

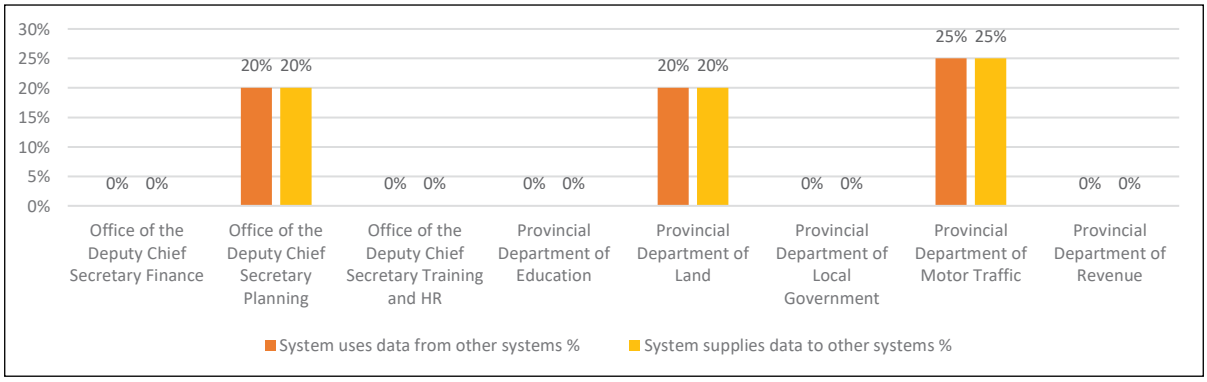


Figure 5.6-21 : Ability to sharing of data with other e-Systems

5.6.16 Availability of resource to manage the system

The e-Systems will be under the ownership of either the provincial institution or the system development agency where the routine maintenance of the system needs to be managed on a timely basis. There are instances where the systems were developed by an external agency and hosted at the provincial institution but maintained by the external agency. So, the level of control over the system is at both parties and the system needs to be administered with relevant expertise. Usually an e-System requires human resources to develop software code, troubleshoot, fix bugs and update necessary patches to the systems. Similarly, an e-System also needs technical support in terms of routine operational maintenance including general system administration, security management, backup management and so forth. So, it is necessary to ensure at least these two roles are available in-house to ensure maximum performance and reliability.

Figure 5.6-22 shows the availability of human resources across the institutions to provide technical support for bug fixing and system maintenance. There is a severe lack of professionals in-house to ensure the system's performance and system functionality without disruption.

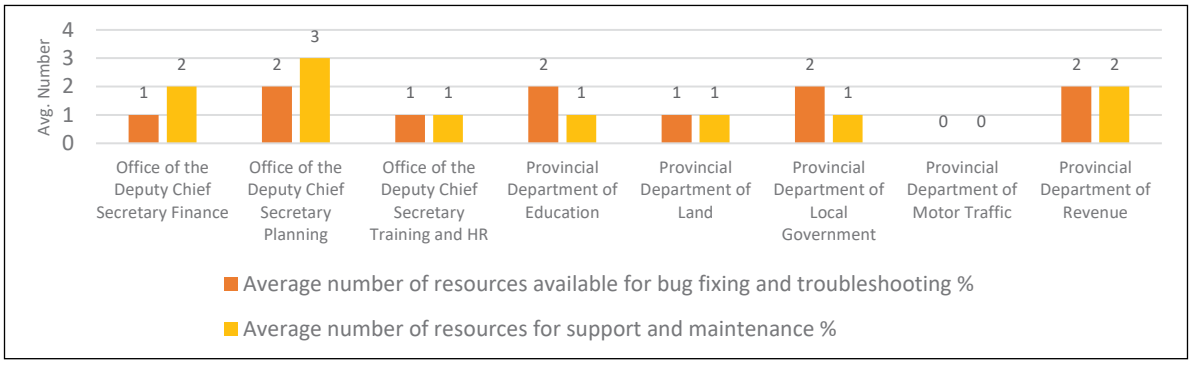


Figure 5.6-22 : Number of resources available to bug fix and manage the e-Systems

In most cases, the software development agency provides support for software-level troubleshooting including bug fixing and other routine operational maintenance. This could be provisioned by the software development agency in the form of a maintenance and service contract. Figure 5.6-23 shows that a considerable number of the e-Systems have opted for service contracts with the software development agency except for the Provincial Department of Motor Traffic and Office of the Deputy Chief Secretary (HR), where the service contracts are supposed to be managed at the provincial level and the central government level.

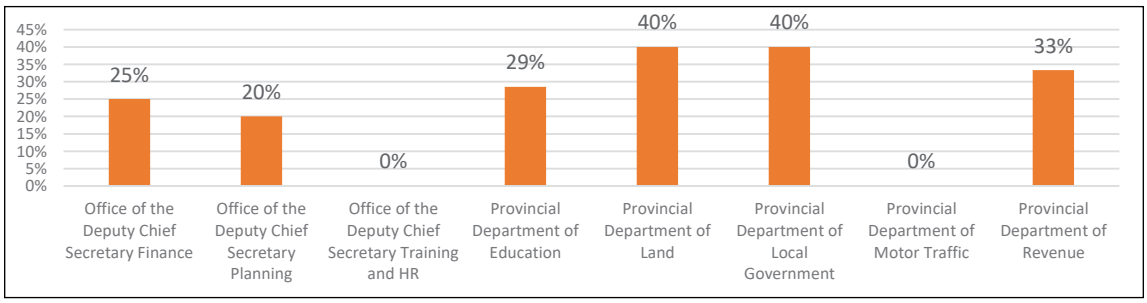


Figure 5.6-23 : Availability of maintenance and service contracts (Percentage out of available systems)

5.6.17 Security status of e-Systems

The security provision for an e-System is a mandatory requirement to avoid critical cyber security threats that arises from various sources. The defense mechanism to stop the threat vectors is mainly concentrated at the operating system level, application level and database level. Once these three levels are secured then the intrusion or threat activity could be minimized to a considerable level. The systems are primarily vulnerable to aged software code that has not been updated with necessary patches or a vulnerability in the operating system or the database. So, the e-Systems should be secured at all possible levels to limit the damage in the event of a compromise.

Figure 5.6-24 below highlights an additional concern to the defined security policy to ensure the right protocols are applied and followed in the e-Systems. Since the software development agency mainly focuses on application security. It is reflected in Figure 5.6-24 that all of the institutions have a decent amount of security provisions at the application level. There are a few that reported database-level security.

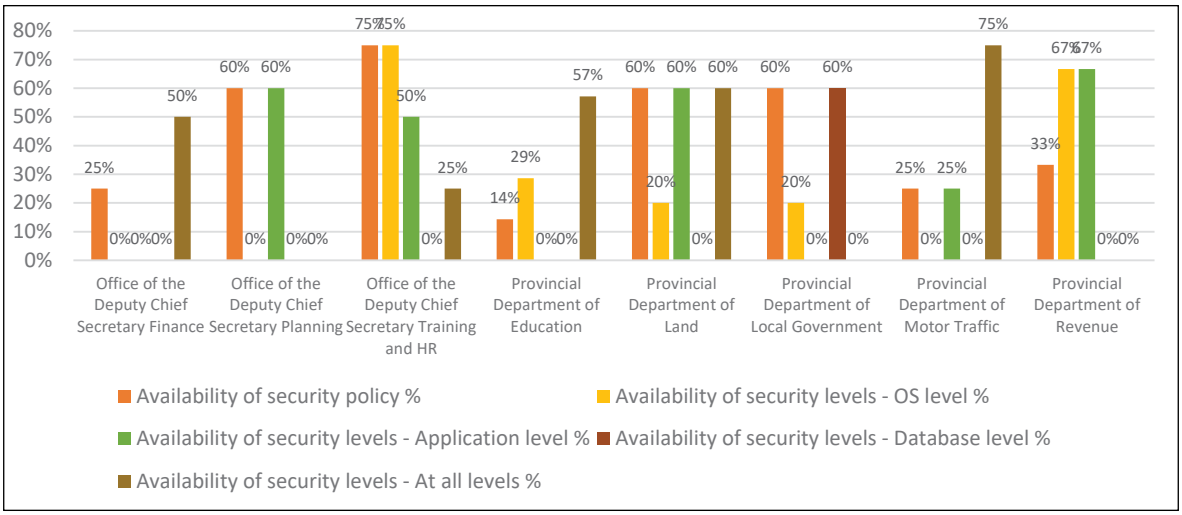


Figure 5.6-24 : Availability of security provision in the e-Systems

5.7 Best Practices Reported from the Provincial Council system.

The term "Best Practice" used in this section is the same as in section 4.7 of chapter 4. The best practices in the provincial institutions are considered the key element to enhancing the productivity of the institution by operating sustainably and ensuring continuous and efficient service delivery.

This section, as per section 4.7, focuses on the identification of best practices based on the respondent's score. Accordingly, the best practices identified in provincial institutions were identified and formulated based on three sources.

i. The first one is the score for eight dimensions, as per respondents' rating in the primary data collection,

ii. The second is the comparative/relative measure of functional efficiencies, software development process and the ideal characteristics of e-Systems as well as the usage in the current state of provincial institution

The primary data collection tool comprises a section on the self-reporting of best practices based on the same eight dimensions explained in the section 4.7 in the chapter 4.

Each of the eight dimensions was evaluated in a 1 to 10 scale. The definition of the above eight dimensions was clarified (as in the section 4.7 of chapter 4) to the respondents in responding to the questionnaire. Even though, the majority of the respondents doubted quantitatively expressing the exact score for dimensions, understanding of the dimensions among the respondents of the provincial institution were comparatively higher than the respondent of LAs. Based on the scores of respondents the analysis was conducted. Table 5.7-1 presents the best practices based on the scores received from the respondents. The average score has been taken for each dimension for comparative prioritization. The average of 5 (50% of total) is considered the cut-off point to be a best practice according to the respondents.

Table 5.7-1 : Best practices as per the ranking of the respondents in provincial institutions.

Name of the application	Innovativeness	Stationarity	Repeatable	Deemed essential	Beneficial	Defend process	Mature system	Value proven product	Average priority
ERL	8.86	8.57	9.14	9.00	8.86	9.14	8.86	8.57	8.88
eSLIMS	9.33	8.67	8.5	8.33	9.33	9.33	8.83	7.5	8.73
Exam evaluation and research analyzer	9	7	10	8	10	9	8	8	8.63
Front Office Management System	8	9	8	9	10	8	9	7	8.50
iProMIS	8	9	10	9	10	6	8	8	8.50
Consolidated Annual Implementation Program	8	9	8.5	8.5	8	7	8	7	8.00
SIGAS	8.83	8.17	9.00	8.71	8.83	7.83	7.96	7.13	8.31
SDG monitoring /Project monitoring	9	8	9	10	8	6	7	6	7.88
Chat Bot	7	8	9	7	6	10	9	6	7.75
Decision Support Information System (DSIS)	8	8	7	9	7	7	7	8	7.63
EMIS Web Base System	6	7	6	8	9	8	8	6	7.63
Project planning and Mentoring software	8	7	9	7	8	8	7	7	7.63
Revenue 2020	8	9	7	9	8	6	7	6	7.50
MIS	8	7	8	6	9	9	7	6	7.50
Training Management System	9	8	6	7	6	9	8	6	7.38
Revenue Management System	6	7	9	7	8	8	6	7	7.25

Name of the application	Innovativeness	Stationarity	Repeatable	Deemed essential	Beneficial	Defend process	Mature system	Value proven product	Average priority
HRM	7	8	8	8	8	6	7	6	7.25
Training Management System	6	8	7	8	9	6	7	6	7.13
Asset management System	7	6	6	8	9	7	8	6	7.13
provincial revenue information system	7	7	6	7	8	7	8	6	7.00
Asset management System & Provincial Treasury Bookkeeping System	7	8	6	9	7	6	8	5	7.00
Ethik	6	7	6	8	6	8	6	8	6.88
Asset Management System	6	8	9	6	7	6	6	6	6.75
HRM	6	7	6	5	9	8	7	6	6.75
Training Management System	8	6	5	6	7	7	7	6	6.50
Graduate Registration System	6	5	7	6	6	7	6	6	6.13

According to the respondents' scores, all 25 e-Systems were identified as best practices as they are above 5. The eRL and eSLIMS are the two systems that obtained the highest scores. These products were developed at the national level under the guidance of the ICTA. The eRL is being implemented in all the provinces with its single functionality of issuing annual revenue licenses for motor vehicles both online and in premises. However, eSLIMS has not been implemented with its full functionalities in all the provinces. It is operating in all the provinces, except the Western province.

Out of the e-Systems developed by the Ministry of Finance, only CIGAS has consistently rates as high performing compared to Payroll.

All the other e-Systems scored as the best practices handle a specific single task belonging to the provincial institutional setup (mostly a G2G services). Although the Department of Revenue works directly with the public, there is no e-System for compiling taxes online. Similarly, the Department of Education has not considered an online school admission application submission and a processing system for such applications.

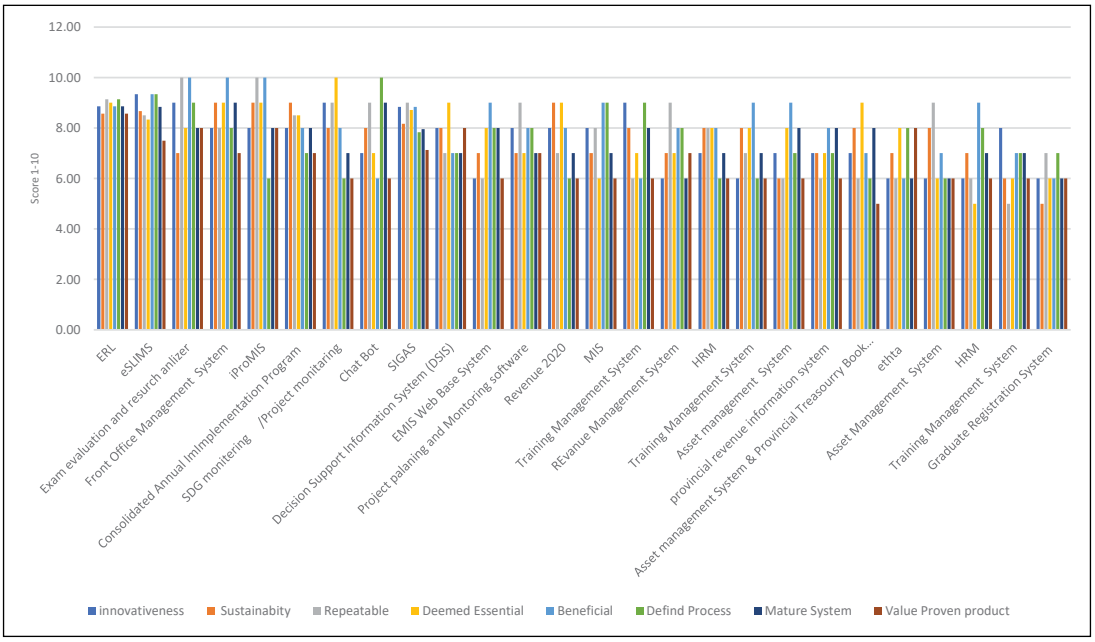


Figure 5.7-1 : The Best Practices as per the average score for Each Dimensions

During the study, it was revealed that some of these eSystems have already been replicated in the other provinces.

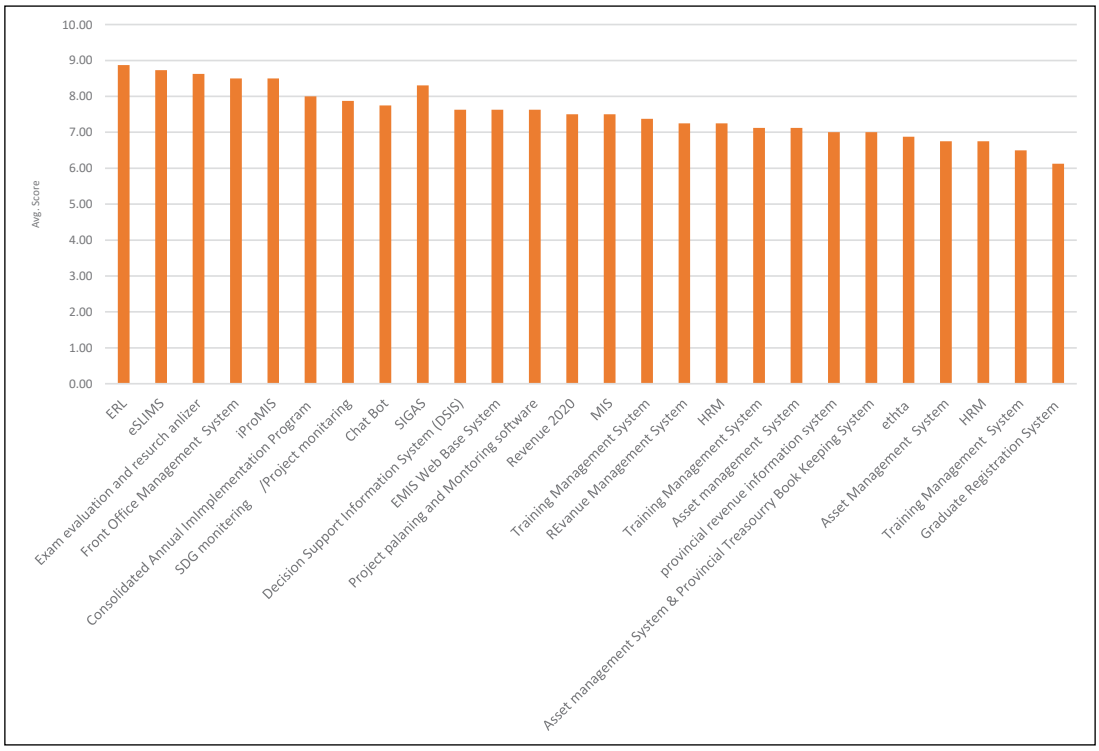


Figure 5.7-2 : The Best Practices as per overall average scores

As explained in section 4.7 of chapter 4, the best practices are also measured on the second criteria explained above. According, to the analysis submitted in the previous sections, other than eRL and eSLIMS, none of the other e-Systems could be categorized as best practices on the second criterion of evaluation. Among those e-Systems, eRL and eSLIMS, being the software developed at the central level by employing a proper process they could be identified as the best practices under the second criteria too. These two e-Systems have been developed through proper steps of the software development life cycle and also has tested for system performance and security requirements. These two systems are properly architecture web-based software application systems with the ability to interoperable through web services. It was also learned that the systems are continually supported by the developers for issue resolution and bug fixing.

The proceeding section will be based on the second criterion mentioned in this section. Most of the developments are inhouse developments and private sector developments which have been completed without proper system study, BPR, software quality assurance and testing. These developments are based on agile methodology. These systems do not require interoperability extensively with other systems. However, in case if these systems are to be replicated, a system audit is recommended to explore the coverage and status of the e-Systems.

At last, the e-Systems should provide visible benefits to the stakeholders. Such benefits may be immediate gains, and long-term achievements. The efficiency and effectiveness of the service delivery could be drastically enhanced by using e-Systems. Therefore, replication of the best practices or producing new e-Systems by benchmarking the best practices would be beneficial to the institutions to move forward into the future.

CHAPTER 6 : STRENGTHS AND ISSUES IN ADOPTING e-Systems IN THE LOCAL AUTHORITEIS AND PROVINCIAL INSTITUTIONS

6.1 Strength in Local Authority level for adopting e-Systems

The LAs are autonomous bodies that have their mandate to initiate and implement delegated public services and development work under acts related to all three types of LAs. These institutions are very close governing units to the citizen whereby democratically elected representatives are the Council Members and the Council is the prime decision-making body that has all powers vested by legislation. The Mayor/Chairman who has been selected out of the members on the preference of the Council Members is the Chief Executive Officer of the LA. The Mayor/Chairman is supported by various committees constituted of members and a team of officials. There is a proper institutional structure and necessary physical infrastructure for the implementation of policies and service delivery processes of the Council. Moreover, the LAs dispense a variety of local public services including maintenance of roads and buildings, providing health and sanitation services including drainage, sewerage, and waste management, physical planning including approval of land plots, housing units and shops, maintenance of marketplaces, providing library services, regulating trade & business by issuing licenses, establishing, and maintaining public parks and recreational facilities, etc.

The key strength of the LAs to implement the e-Systems is its institutional setup. The LAs do not require approval from any outside entity for the implementation of any project if it is not mandatory under national legislation. Therefore, deciding to go for ICT based service delivery process and implementation of such projects is at the discretion of the Council of a LA. From project design to implement the procurement process could be handled independently, without any intervention from outside institutions such as provincial or national level institutions if there are sufficient resources and technical strength. The process of project implementation is operationally independent of outside entities. Accordingly, one of the prominent strengths of LAs is operational independence concerning e-System implementation.

The participation of citizens in development activities at LA level happens quite frequently in the project designing and implementation stages. There is a close dialogue and communication between citizens and the Council Members on their development needs and views on the development activities of LAs. In the same manner, citizens could be mobilized for review and acceptance of e-Systems at the development stage which would subsequently provide an opportunity for smooth operation.

The majority of the LA staff officers recruited by the Council are citizens living in the LA area. Usually, they work in the same LA during their entire professional life. Therefore, only skill upgrading is necessary once an e-System is established. Hence, if human resource development is completed on a systematic approach respective knowledge, skills and expertise gained through training will remain in the respective LA for a long duration.

The LAs are geographically demarcated units. Any services that are to be ICT driven in the specific LA are limits to such boundaries. These institutions do not work on services to be offered island wide. Therefore, integration of any new e-System and familiarizing them to users could be completed within a limited period.

Figure 6.1-1 presents the strengths of LAs to implement an e-System as visualized by respondents. The area belonging to each strength represents its relative importance out of the total strengths. This is scaled in a 1:100 ratio.

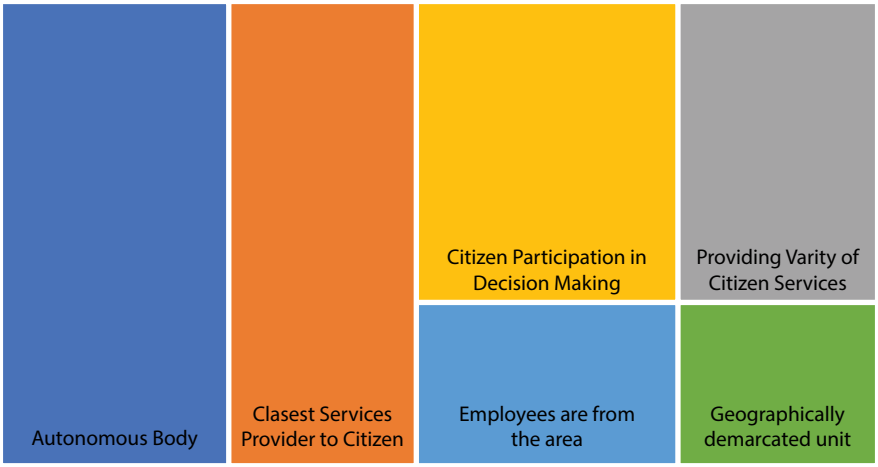


Figure 6.11 : Strength of the local authorities

6.2 Issue related to the local authority system in adopting the e-Systems

There are several issues at the LAs' level in adopting e-Systems for delivering services. These issues could be broadly categorized into a few key areas i.e., unavailability of resources, unavailability of e-Leadership within the institutions, ICT project implementation issues, project coordination issues, issues in software applications developed, security issues in software applications and hardware setups, connectivity issues and issues related to consumption of available services by the recipients of the services.

Table 6.2-1 presents critical issues as identified by the respondents to the survey.

Table 6.2-1 : Issues in implementation of e-Systems; priorities and severity of the issues.

Specific challenge/Issue	Priority of issue	Gravity of issue (Percentage of LAs in each category)			
		Least	Average	High	Very high
Unavailability of qualified IT staff	1	3%	20%	9%	69%
Unavailability of training and development	2	8%	20%	52%	20%
Unavailability of funds	3	0%	5%	36%	59%
Unavailability of IT infrastructure	4	0%	20%	40%	40%
Unavailability/Weak connectivity	5	0%	10%	40%	50%
Acceptance of citizen/Ability to use IT systems	6	0%	17%	67%	17%
Unavailability of leadership	7	0%	0%	0%	100%
Approval and implementation issues	8	0%	0%	50%	50%
No policy directives	9	0%	50%	50%	0%
Legal implication of existing laws	10	0%	25%	25%	25%
Less support from national agencies (ICTA)	11	0%	10%	30%	60%
Less support from developers /Contractual issues	12	0%	30%	30%	40%

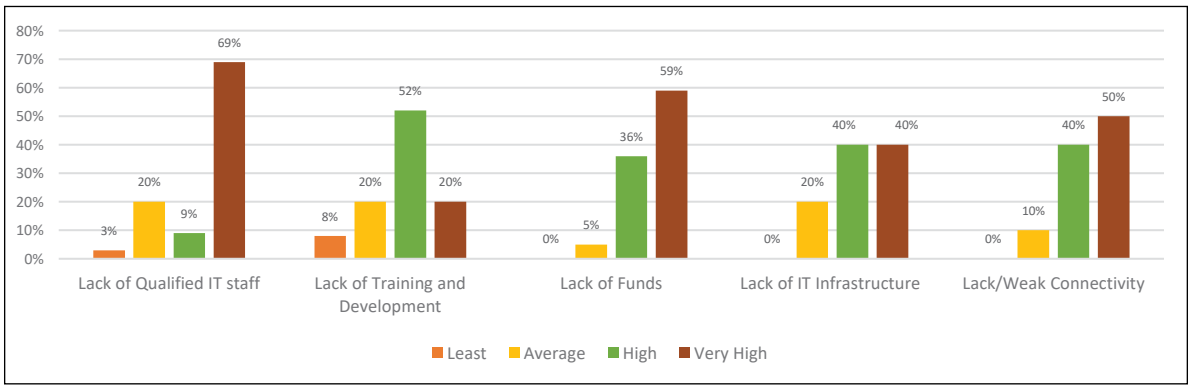


Figure 6.2-1: Issues in implementation of e-Systems and severity of the issues – Resources based

Amongst the issues, the unavailability of qualified staff to run the e-Systems is of utmost priority as per the view of the respondents. According to 72% of respondents, the severity of the issue falls into the categories of high and very high. The key officials at the central level, the provincial level, and LAs also highlighted and stressed the unavailability of cadre positions and professional staff as one of the priority issues during the interviews. There is no cadre position for ICT professional grades (Such as System Analyst, Programmer, Software Engineers, Data Base Managers, Network Managers, Hardware Technicians, and many such other professionals and technical grades) in the LA system. It was learned that only the Colombo Municipality has formally approved one or two such cadre positions in the entire system. However, as per Table 4.3-1, the study has revealed that there are five system analysts and two programmers in the entire LA system. Out of which three professionals have been outsourced from the private sector. Apart from this, almost all officers that are currently operating and handling the e-Systems in the LAs have been recruited to the labor grades on a casual basis. These employees have acquired elementary-level ICT skills as part of their education process. In absence of professional and skillful manpower, the LAs utilize them as Data Entry operators, System Administrators, Hardware Technicians, and many other related functions. However, due to limited knowledge and experience, they are unable to handle complex issues related to software and hardware maintenance. Furthermore, they lack a proper understanding of critical requirements of e-Systems such as system backing up and securities. It was learned that the Ministry of Finance has stopped creating any new cadre positions to LAs as there are excessive cadres in most of the entities already. However, the Ministry of Finance and Provincial Public Service Commission should pay special attention to this matter and must take necessary actions, at least to mandate a required minimum number of cadre positions. It is also important to pay attention to remuneration issues in the public sector for professionals. As per the current salary structure in the government sector, it is not attractive to acquire viable talent in the job market. The next issue is retaining them in the positions of LAs in remote localities for long-term assignments. Therefore, as an alternative solution system administration and maintenance could be performed through an outsourced contract. Currently, there are technologies to manage and administer the e-Systems from remote locations using software such as Team View. It is recommended to create a required number of cadre positions for ICT professional grades for managing the e-System used.

From the respondents' point of view, the second critical issue is the unavailability of proper training for staff handling the e-Systems. As per 78% of respondents, the severity of the issue falls into the categories of high and very high. Since the e-System operation and maintenance are currently done by a semi-skilled workforce, it is necessary to train and develop them for handling the respective responsibilities and tasks assigned to them. However, currently, there are no adequate training opportunities made available to them. Though there are training centers at the provincial level, these centers do not have adequate human resources or infrastructure to provide necessary training to the ICT staff. These training programs do not usually go beyond training on basic file handling, word processing, and spreadsheets. The training courses offered by the private sector institutions are not a viable alternative to all the LAs due to budget constraints.

The third critical issue is the unavailability of necessary funding for the implementation of e-Systems. As per 95% of respondents, the severity of the issue falls under the categories of high and very high. During the interviews of key officials in the LAs, issues related to the unavailability of funding were highlighted and stressed as one of the priority issues. As per the information in Table 4.1-7 in section 4.1, the total Annual Budget of 52.4 % of LAs are below 100 million. There is no considerable income from taxes and charges, particularly, for the PSs and they depend on funding from the central government and the PC. The views of the general public on the service performance of LAs are not positive and in reality, there are considerable delays in the delivery of the services. For example, in the international index of "Ease of Doing Business", Sri Lanka continuously placed in lower ranking between 90th and 100th places in recent years.[22] There is a significant reflection on the activities of LAs, over the lower ranking, as they handle many functions associated with the issuance of necessary permits to the businesses. Therefore, it is necessary to seek funding from the Central Government Authorities and the Provincial Authorities through special projects, especially for LAs that do not have sufficient income to implement e-Systems.

Inadequacy of proper ICT infrastructure is another critical issue faced by LAs. As per the information received during the Focus Group Discussions, 80% of respondents have ranked ICT infrastructure-related issues in the high or very high category (in terms of severity). Out of the LAs which were surveyed, only 21.9% (58) had server hardware sold with the software components by the manufacturers. Out of the total number of LAs, 18.5% (49 in number) had only one server hardware. The majority of the servers are over 4.2 years of age, which is usually considered as obsolete. Furthermore, it was found that the capacities of the majority of the hardware used as servers are inadequate. This is a result of using desktop computers as server hardware. Under these circumstances, the proper architecture of server computers with separate servers for user management, software applications hosting, and database hosting cannot be expected. As per the information recorded, only 5% of the LAs use a disaster recovery process. Concerning security aspects, it was revealed that there is no firewall in most of the LAs to protect the available server hardware, software systems and data. Even though LAN setup is available in 80% of LAs, there are no standard server rooms available. It is also learned that some of the LAs use server operating systems without proper licensing. Furthermore, only a few use Cloud data centers or any other outside data center. In instances where Cloud is used, it is predominantly for web hosting. Since proper Cloud facilities have not been rented some of the LAs use free space provided by Google for backing up institutional data. Given these facts, it could be concluded that the majority of LAs run their applications in a very risky hardware environment.

Systems such as Koha Library system, Payroll and CIGAS run on standalone computers in most of the LAs. Therefore, ICT infrastructure has been identified as one of the major drawbacks in the implementation of new e-Systems, therefore it is necessary to upgrade the infrastructure parallel to the introduction of new e-Systems.

Software applications are an important and integral part of the ICT infrastructure. When looking into issues related to software applications used, it is vital to understand the current situation and to find out necessary remedial measures. Several issues regarding software applications are mentioned below.

a. Stand-alone, siloed applications and databases.

b. Software architecture.

   i. The majority of e-Systems are on a client-server architecture that provides no or less opportunity for interoperability and unavailability of e-Systems based on web application architecture.

   ii. e-Systems supporting online and/or mobile service delivery are not available.

c. In the software development process, proper development steps have not been adhered to.

   i. No system study and BPR study have been conducted and as a result partially or wrong system requirements are captured. The "end to end" processes have not been captured and in the workflow wrong protocols have been established for the approval process of certain services.

22 Ease of Doing Business, World Bank, 2021, https://tradingeconomics.com/sri-lanka/ease-of-doing-business

ii. No software architecture has been established before software development.

iii. No software quality assurance processes and testing processes have been implemented during software development.

d. Less security or no security applications for workflow processes and data.

i. Single-level authentication for accessing e-Systems.

ii. Usually, databases have not been encrypted.

iii. In instances where databases are encrypted, encryption algorithms are not available with LAs (Vendor Lock).

e. In the software procurement process, no proper contract conditions have been imposed and are exploited by the vendor lock-in contracts,

f. Intellectual Property Rights (IPR) of software and sometimes data are exposed to vendors.

Internet connectivity is a mandatory requirement for offering online and mobile services. From the survey, 90% of respondents have remarked unavailability of proper connectivity in LAs at a high and very high category. In the premises of most rural and remotely located city centers, it was found that only 43% of the LAs have network connectivity. In some of these places where connectivity is available, the available connectivity is not strong enough to be used for providing services. The unavailability of strong connectivity has been one of the roadblocks to using Cloud solutions. The majority of LAs do not have a dedicated VPN, such as LGN to provide connectivity and, most of the LAs have not obtained leased line connections, predominantly due to the unavailability of funding. Therefore, 95.6 % of the LAs that have access to connections use ADSL or shared mobile connections where speed is dependent on the number of users using the connectivity simultaneously. It was also noted that there are no alternative connections for almost all the LAs and any interruption to the existing data connectivity would jeopardize the entire institution if the e-Systems are hosted in a Cloud.

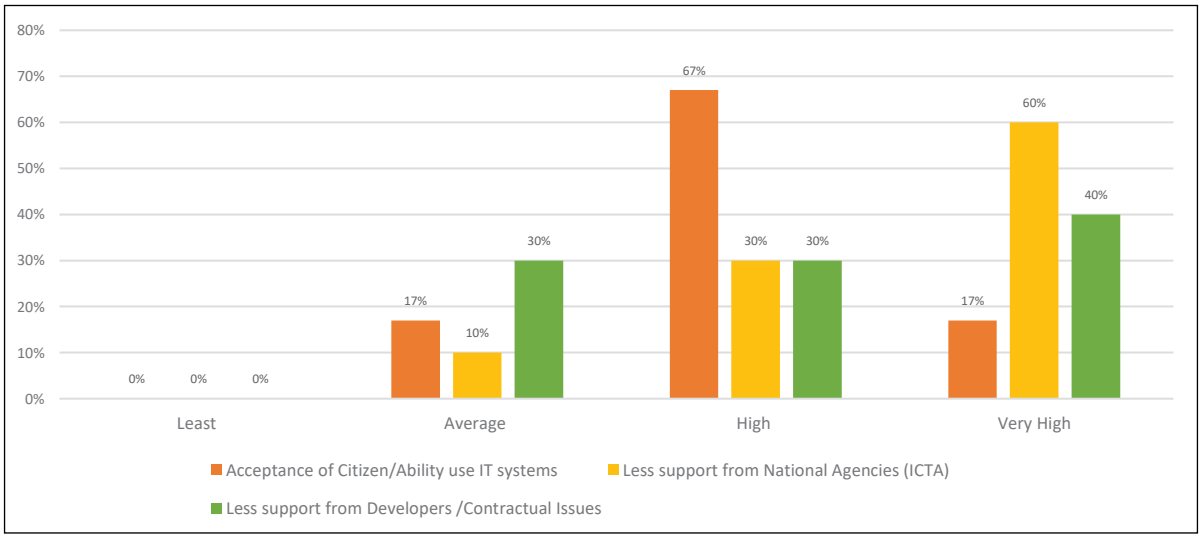


Figure 6.2-2 : Challenges and issues in e-Systems implementation – People Based

Lack of knowledge and awareness among citizens are also considered as major issues in the successful implementation of e-Systems. The respondents have placed this aspect as the sixth important aspect in their priority order. Digital literacy is a key factor in popularizing the services among citizens and consuming such services. Without widespread ICT knowledge and awareness, online services consumption and participation of citizens in decision-making cannot be propagated. Especially in rural areas knowledge and awareness of ICT and e-Services are discouraging and its promoted only among the affluent. Hence, the "Digital Divide" is a major drawback in the implementation of e-Systems in the short run, unless otherwise a rapid program

is implemented for raising awareness among citizens on consuming e-Services and e-Participation. Further, another key factor that limits the spreading of online services is that there is no strong data connectivity in rural areas to obtain online services. Nevertheless, for successful implementation of e-Systems, it is necessary to build an e-Culture, but it is deemed to be a challenge.

Effective leadership at top political levels is key for the successful implementation of e-Systems and e-Government. The respondents have placed this as the seventh most important aspect in their priority order. As per their views, 100% place the unavailability of e-Leadership in a high and very high category. The leaders who can drive the e-Systems and e-Government needs have to be found at both the provincial and the LA levels. Unless there is strong leadership to lead initiatives, there is more possibility for the collapse of the implementation process. According to the survey, leadership at the LA level has not paid due attention to the implementation of e-Systems. If the leadership is well-versed and savvy enough to foresee management issues and remove management and political roadblocks LA staff strongly believes implementation will be successful.

Managerial level officials have concerns about the approval process of projects prevailing in the LAs. The respondents have placed this aspect as the eighth most important priority. As per their views, 100% agree that the gravity of lapses and delays in the approval process falls under the category of high and very high severity. The Mayor or the Chairman is considered the Chief Executive Officer and therefore, his approval is needed for the implementation of any project. There are instances when the approval of the Council is also required for implementation. Lack of knowledge on the subject has constrained to limited financial resources and they predominantly rely on external funding for such initiatives. As another sub-factor within the approval process, coordination and project management has been identified as critical factor. It was also noted that lack of proper coordination among stakeholders and unavailability of professional project managers have been key factors for the unsuccessful implementation of e-Systems.

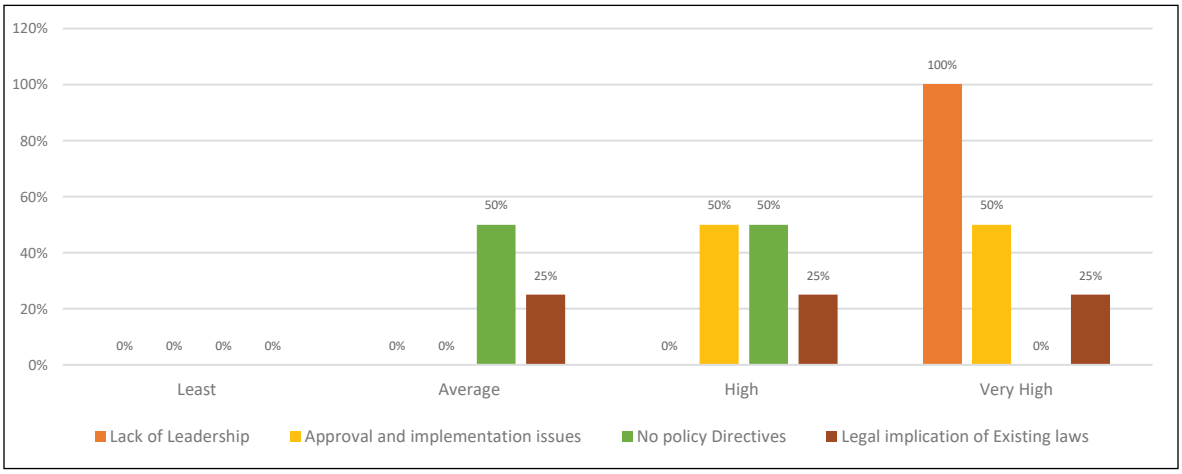


Figure 6.2-3 : Challenges and issues in e-Systems implementation –Policy Based

As a part of the leadership issue, it was noted that there are no policy directives at the subnational level for encouraging e-System development and implementation. The respondents have placed this as the ninth important aspect in their priority order. As per the views of the respondents, 50% identify the severity of the policy issue in the category of high and very high. It was noted that none of the PCs or LAs have officially adopted the e-Government policy introduced by the Central Government.

It is important to have the necessary legislation in place for the proper implementation of e-Systems and e-Government initiatives. This has been identified as the tenth most important aspect per the views of 50% of respondents. The severity of the absence of required legislation falls under the category of high and very high.

Theoretically, e-Systems and e-Governance implementation begin with enacting the necessary legislation. Without legislation, implementation will lead to the total flair of systems as the conventional statutes and laws are focused on paper-based operations. Therefore, it is a prerequisite that comprehensive e-Governance legislation, regulation, and statutes are established before commencing or on par with commencing the implementation. The majority of the respondent of LAs stated that there is a significant gap between National Law implementation and adoption of them by LAs. Some of the regulations and policies are not effective for LAs and subnational level government institutions. At the provincial level and LA level, certain functions are conducted as per the statutes approved by these autonomous bodies which are different from the laws and policies enacted by the Central Government. The best example is the use of electronic documents instead of paper documents which is empowered through Section 8 of the Electronic Transaction Act, for government agencies. However, it specifies the institutions which should adhere to the law and the PCs and LAs have not been included in this list of institutions. Therefore, PCs and LAs as institutions functioning under the subnational sphere disregard the provision of the above Act.

It is the experience of LAs that the ICTA, the central agency established for supporting government institutions, does not provide proper support during the entire life span of the e-System projects. This is a common situation even for projects implemented in collaboration with ICTA. The best example is the e-Local Government initiative which was implemented by ICTA in collaboration with a few selected LAs on a pilot basis. As per the respondents' view, ICTA provides its support at the initial stage of the project but withdraws in the middle of implementation which leads to the collapse of the entire project while it is in operation. At times when the critical issues are flagged, ICTA is not competent in providing a solution and thereby the project gets stalled. The respondents have placed this aspect as the eleventh important aspect in their priority order. As per the views of 90% of respondents, less support from the ICTA has been placed into the category of high and very high. It is their view that the ICTA's support for resolving technical issues is not adequate. Furthermore, the respondent's perception is that ICTA does not support enhancing the quality of local software initiatives commenced by in-house staff. However, ICTA as the apex body in the ICT sector of the country has concerns over extending its support for inferior quality products as detailed in the above sections.

The view of the respondents of the survey is that third-party software developers support the e-System only during the warranty period. After the warranty period, the developers usually demand exorbitant amounts for post-warranty support. Officials who handle the procurement process should oversee proper contract conditions embedded in bidding documents to prevent cost manipulations and the exploitation of LAs in post-warranty maintenance. The respondents have placed this aspect as the twelfth important aspect in their priority order. As per the views of 70% of respondents, the severity of less support from the developers has been placed into the category of high and very high.

The matrix of issues with the root issues given in Annexure 11 illustrates the root issues and their sub-issues as per their comparative importance. Accordingly, the first circle represents the root issues as per relative importance to the respondents, and the proceeding circles represent the division of root issues.

In addition to the issues raised by the LA staff, the following issues were also observed during the questionnaire administration, key informant interviews, and the focus group discussions.

Although it is not publicly declared, administering the questionnaire, resistance to change was identified as one of the key challenges to be addressed. This is mainly due to the unawareness of proper e-System implementation methodologies and lack of experience in using ICT. It should also be noted that the inhibition of corruption and malpractices makes it unappealing for a niche population of individuals in the workforce who reaps benefits from it. However, with proper awareness-building campaigns and training, this resistance can be addressed.

The issues related to Data Privacy are a key issue yet to be addressed. Currently, there is no effective legislation even at the national level for the protection of data privacy. Without laws enacted related to privacy, citizens would be reluctant to trust e-Systems.

Besides the issues listed above the following concerns were also identified during the study.

a. No facilities to issue digital signatures to the officers of the LA system.
b. Not using social media at least for information dissemination by LAs.
c. Public kiosks are not available/established for the public to access the services of LAs easily and conveniently.
d. LAs have not thought about inclusiveness. There are no provisions to receive information for differently abled people.
e. A policy on transaction commissions to the banks for online payment implementation has not been established.
f. Unnecessary influence of grass root level politicians (and other irrelevant parties).

6.3 Efficiency and resources gaps prevailing in the Local Authority system

As discussed in the introduction, when Karen Layne and Jungwoo Lee were developing their model "Developing fully functional e-Government: A four-stage model" in 2001 and as later refined by Saber et al (2006) for more clarity, it was an evolutionary process to be encompassed through emergence, interaction, transaction, and transformation. However, after two decades after the origin of this model, the applicability of encompassing different stages is now being challenged. Technology has changed drastically during the last two decades and now it is possible to leapfrog from emergence to transformation.

However, the survey found that the majority of LAs in-Sri Lanka lag in the emergence, and the digitalization of their work processes and services mostly remains unchanged. As explained in the previous sections, this situation is mainly because of the prevailing resource gap and poor attitude of the leaders in the local government sector of the country.

The poor status of the LAs in using e-system for their services delivery process is inevitable. However, these institutions should have at least reached the transaction stage by now; best to be in the transformation stage. For a gap analysis, the achievements that could have been reached at the transactions and transformation stages were benchmarked as the future state. As per this framework, it was learned that there is a vast gap between the current state and the envisaged future state. If these institutions are to be driven into the transaction and transformation stage given in the e-Government maturity model, identifying these gaps is an essential cause of action in bridging the prevailing gaps to reach the desirable state.

The current state of functionalities of the LA system has the following key features.

a. The LAs are not considerably using e-Systems for services.
    i. Out of a total number of LAs surveyed, 24.4% (65) do not operate any e-System.
    ii. Out of the total number of LAs surveyed, 12.5% of LAs operate only one service.
    iii. Out of the total number of LAs surveyed, 25.3% of LAs operate only two services.
    iv. Out of the total number of LAs surveyed, 33.5% of LAs operate only three services.
    v. Only 4.2% of LAs operate four services or more than four services.
    vi. The most prominent service is Payroll which the majority uses in their services portfolio. This is a very low-level application that can run even on a standalone computer.

vii. Only 40.4% of LAs use G2G and G2B services.

viii. In general, more than half of the functionalities are still handled manually in LAs.

Usually, a gap analysis is conducted based on factors providing input for a system. Accordingly, the following gaps related to people, process, technology, and resources were identified:

a. Process - Proper process for e-System development has not been followed

I. The developers of an application system have not followed standard methodologies of software development,

i. No application architecture or suitable hardware architecture.

ii. In almost all cases, system studies and Business Process Reengineering have not been conducted.

iii. In the development process, none of the developers have employed software quality assurance processes and software testing processes.

iv. None of the e-Systems that are currently available handle end-to-end processes.

v. No security provisions in application development.

II. The procurement management has not been properly implemented. Therefore, the conditions included in contracts with vendors are not favorable to the LAs.

b. People - There is no professional manpower available in the entire LA system.

I. Required human resources are not available to implement the e-Systems.

i. There are only six system analysts and two programmers for the entire LA setup.

ii. For hardware maintenance, only seven technical officers were found in the entire LA setup.

iii. Analysts and programmers have only diploma-level qualifications.

iv. No proper remuneration for skilled professionals.

v. There is 99 personnel in the data entry category which involves system administration, database management, network management, and most other functionalities required to operate the e-Systems. However, they are not counted as professional or technical categories.

II. No knowledgeable HR for handling procurement and drafting ICT project proposals and implementation.

c. Technology - The use of technology in the majority of the LAs is not up to the expected standards.

i. The majority of e-Systems available are standalone, client-server, or web client-based systems. This legacy of e-Systems is not interoperable with internal e-Systems of the respective LAs and/or with other external e-Systems.

ii. None of the LAs use web services to keep interoperability within the LA and with any other outside e-System.

iii. None of the e-Systems in LAs have the capability of consuming services of other commonly available e-Systems.

iv. None of the LAs operate online or use mobile services.

v. None of the LAs have allowed online payments.

vi. None of the LAs use Cloud based software hosting services although very few have used the cloud for web hosting.

vii. In the majority of LAs, there are no server rooms in line with acceptable architecture and standards.

viii. The e-Systems in the LAs are not protected with necessary security layers.

ix. The majority of LAs do not have strong internet connectivity.

d. Resources - The resource availability in the LAs for e-System implementation is very poor.

i. Out of the total LAs in the sample, 53.3% have an annual budget of less than Rs 100 million.

ii. In the majority of LAs, there are no allocations for new projects.

iii. No sufficient allocations even for available system maintenance.

iv. The LAs have no initiative to adopt revenue models for the sustainable implementation of e-Systems.

In the journey towards the implementation of e-transformation in the LA system, a vast gap could be identified in basic elements. The extent of the current gap concerning the expected future state varies from one LA to another. In Annexure 11 the gap analysis metrics are given under the same topic, it provides insight into the gaps, their severity and some of the solutions.

In the gap analysis, it is important to prioritize desirable elements which are not available in the current state. Accordingly, it is proposed that the following elements should be added.

a. Integrated application suit handling different tasks combined into one interface and a common database.

b. Implementation of a full web-based e-System that could maintain interoperability with internal sub-systems and external systems.

c. Conduct a proper system study and BPR study to ensure the end-to-end process computerization and optimization of the system by discarding redundant processes.

d. Hosting software applications and databases in LGC and providing the LAs with strong internet connectivity where possible.

e. Establish a VPN for LAs within the LGN system.

f. Establishing ICT project coordination and monitoring unit and a common support team at the Provincial Commissioner of Local Government. This unit should function as a project management supporting unit and for resolving complex issues faced by LAs in their operations.

Other than the new elements which have been identified above, it is important to strengthen weaker elements in the current state. Hence, the following improvements are needed:

a. There should be a proper server room in each LA irrespective of hosting the applications in the government cloud. If opted to continue with client-server applications, it is desirable to have a three-tier server architecture. If the LA does not to switch cloud computing, there should be adequate server facilities for software and database hosting, user management, and security purposes. The server access should always be protected through firewalls.

b. There is a limited number of client computers in the majority of the LAs. The internal LAN is to be expanded by providing each required employee to have a node to connect with the network and internal e-Systems.

c. The current availability of average client computers is 20.9 for a single LA. This needs to be enhanced by providing client computers to migrate from manual processes.

d. The scarcity of professional human resources makes a big gap between the current state and the expected future state. Even if the future software application systems are integrated systems hosted in the government cloud issue resolution happens online, hence, a skeleton staff is required for resolving day-to-day issues. Therefore, it is necessary to create two cadre positions; at least one programmer/ system administrator and one hardware technician.

e. There is a wide resource gap in the current state. To bridge this gap, the Central Government and PCs should provide necessary funding for LAS in the low-income category.

f. There is no trained staff for the implementation of e-System projects including procurement management and project management. Therefore, it is necessary to bridge the knowledge gap if new e-Systems are to be introduced. As the process of creating positions, recruitment and training would take considerable time, outsourcing the project management will be an alternative solution.

g. To have a successful future state, training and exposure programs for leadership and other staff should be made available for all the LAs.

If robust and reliable e-Systems are to be established at the LA level, it is recommended to bridge these gaps.

6.4 Strengths in the provincial institutions for adopting e-Systems

PC is an autonomous and independent body, there are several strengths at the provincial level. Some of the key strengths are listed below.

a. The Decision-making process is independent at the provincial level.

b. Financial independence is subject to the guidelines of the Finance Commission.

c. Reduced gaps between political leadership and official leadership.

d. Experienced politicians with better knowledge and understanding.

e. Experienced official leadership is available at the provincial level.

f. Provincial-level training and development units are available.

g. Provincial-level ICT resource centers are available.

h. To some extent, professional cadre positions are available.

i. The Ministries and Departments are located in the provincial capital.

j. LGN connectivity is available.

k. There are other strong connectivity lines from multiple service providers.

l. Hardware infrastructure is available to some extent.

Figure 6.4-1 presents the strengths of PCs and their institutions to implement the e-System as remarked by the respondents.

Within the PC and the institutions functioning under it, the institutional hierarchy is not complex. There is a Chief Minister and four other ministers directing and supervising all the functions. Political leadership and official leadership is taken by Chief Secretary and four other secretaries to the respective four ministries. All provincial institutions function under this institutional setup. Any decision to implement a project does not go beyond the provincial Board of Ministers.

The PCs are strong in financial resources to some extent. The provincial institutions use their income as well as grants received from the central government on the recommendation of the Financial Commission. Predominantly, the annual budget including expenditures for any new project is planned, prepared, and approved within the PC.

There is no remarkable gap between the leadership layers at the provincial level. Certain provincial political leaders are mature and experienced and some of them are from the national political layer. Most of the Heads of Institutions and Deputies have post-graduate qualifications and many of them are exposed to ICT Training.

Figure 6.4-1 : Key strengths in the provincial level for the implementation of the e-Systems

The resources such as training centers and computer resource centers are vital strengths at the provincial level. The location of offices is always in the provincial capital where better education, health, transport, and other common facilities are available. Therefore, there is less pressure in retaining the professional staff in these institutions compared to the LAs.

The VPN of the government, LGN connectivity is available for some of the provincial institutions. Some provincial institutions use leased line connectivity. If these institutions require alternative connectivity, there is no issue as these institutions are located in the provincial capitals where multiple service providers are available. The servers, networks, and other hardware infrastructure are also in a better position compared to LAs.

6.5 The issue in the provincial Institutions in adopting the e-Systems

There are several key issues in provincial-level institutions in adopting e-Systems for delivering services. However, the issues are not as bad as in LAs. Accordingly, key issues can be categorically highlighted as policy issues, resources software issues, hardware infrastructure issues, information security issues and project management issues as detailed below.

Table 6.5-1 : The matrix of critical issues related to e-Systems in the provincial institutions

Key Issues	Sub Issues
Competition for financial resources	Competition with other projects for financial resources
Inadequacy of Professional Human Resources	Professionals' cadre positions and available number of professionals are not adequate
	Technicians' cadre positions and available number of technicians are not adequate
Absence of legal and policy directives	Legislation and statutes are not ready
	e-Government policy has not been adopted

Issues related to software applications	Software development process has not been followed (other than implementations of software by ICTA)
	Standalone, legacy applications with client server architecture
	No provisions for interoperability with other systems
	Online payment cannot be accepted
	Public interfaces i.e., Web/Mobile are not available
	Digital signatures are not issued to officers for authentication purposes.
Issues related to hardware infrastructure	Server Rooms are not arranged according to the proper architecture/No cloud usage
	There are no adequate number of servers to host application with proper security
	Most of the servers are in obsolete age
	Backing up process is not implemented properly
	Disaster Recovery arrangements are not in place
Issues related to information security	No Security Policy is available with institutions
	No proper security arrangements has been employed
	Audit Trails are not provided by the applications
	Data Encryption while traveling on the wire and in databases has not been implemented
Issues related to Project Management	Procurement process has not been properly managed
	Lacking ICT Project Management skills
	IPR terms has not been properly included into the contracts

In Annexure 11, Critical issues related to e-Systems in the provincial institution are given. It illustrates the root issues and its subsequent causes concerning the comparative importance of such issues. Accordingly, the first circle represents the root issues as per relative importance to the respondents and the proceeding circles are divisions of the root issue, similarly as per their relative importance.

Though the PCs have considerable financial resources through taxes and central government grants, there is huge competition for such funding from various physical infrastructure development projects. The physical infrastructure has more visibility among citizens; thus, funding is often channeled to them. Therefore, it is necessary to pursue mission-focused outside funding for e-System development projects.

Among the issues, the unavailability of cadre positions to recruit necessary professionals for e-Systems implementation and the unavailability of qualified staff to maintain and run the e-Systems is the priority issue related to provincial institutions. On the other hand, the remuneration offered in the public sector for professionals is equally affecting the professionals working in provincial institutions as well.

During the survey, it was noted that there are no legislative or policy directives at the subnational level for encouraging e-System development and implementation. Out of the nine provincial councils, none have adopted e-Government-related laws such as the Electronic Transaction Act and Computer Crime Act as well as the e-Government policy of the central government. This situation has adversely impacted the implementation of e-Government projects.

Other than the software applications introduced by ICTA and the Ministry of Finance and a few isolated developments of the universities and private sector, there are no other interoperable, robust, and sustainable software applications in the provincial setup.

Information Security is another key area related to the systems initiated at the provincial institution level. It was also noted that no institution has institutionalized a security policy detailing the user roles and authentication levels. When mission-critical applications are running, it is necessary to have multiple-level authentication for

such e-Systems. However, it was noted that most of the e-Systems that are currently being used only provide password security when logging into the system.

The issues explained above must be resolved if provincial institutions are to step up to the next level of usage of e-Systems. The provincial institutional setup should be strengthened by employing proper strategies and necessary resources to achieve the targeted mission in e-Systems development and for the deployment of efficient e-Services.

6.6 Efficiency and resource gaps at the provincial institution level

The innovation and use of technology have been the key to institutional change during the last two decades in many parts of the world. There is a big demand for online government services and mobile-based services. However, the survey has found that the majority of provincial institutions other than the Department of Motor Traffic do not provide integrated, "one-stop shop "services

The country is at the beginning of the second decade of the 21st century and therefore arrangements should be in place to reach the transaction stage in offering services as explained in the four-stage e-Government development model.

If the anticipated future state is transactional and transformation stages, provincial institutions should now be ready to leapfrog from the emerging stage to the transactional and transformation stages. In the future state, almost all G2C and G2B citizen services are expected to be available online and via mobile platforms while keeping in-house service delivery channels active. The manual file and information management processes for decision-making are expected to be retired and all the officers are expected to be working in automated workflows. This will enable faster decision-making since all the information would be available at the fingertips.

In the gap analysis matrix (Annexure 11) highlights and analyses the gaps at the provincial level which are to be bridged for the successful implementation of the e-Systems and e-Government processes in the provincial institutions.

It is necessary to identify the desirable elements which are not available in the current state. Accordingly, it is proposed that the following new elements be added to the provincial institutional setup.

I. Integrated application interface. All the applications should be tagged into the common interface with user-friendly and proper authentication facilities.

II. The fully interoperable system enables, accommodates, and consumes web services.

III. Follow the proper step lay down in the software development life cycle.

IV. Using Lanka Government Cloud as a common system hosting platform.

V. Establishing a permanent "Process Innovation" division in the provincial level for coordination, monitoring, and supporting ICT implementation. This division may be headed by the Deputy Chief Secretary (Process Innovation). Since currently there is no such arrangement in the provincial setup, this position has to be created.

In addition to these new elements, it is important to strengthen weaker elements in the current state. Accordingly, the following improvements are proposed to be introduced into the provincial institution setup.

a. The hardware, including servers and server rooms, need to be upgraded.

b. Several client computers and LAN access points are to be upgraded and increased.

c. A gap in professional human resources needs to be bridged.

d. There should be a special funding provision for e-Systems initiation and implementation.

e. Training and exposure for all levels of officials including change management, project management, and procurement management.

To convert provincial institutions into more vibrant and innovative institutions, it is recommended to bridge these gaps with a progressive approach. The e-Systems in the provincial institutions are still not in a mature stage and those are to be transformed to a well-integrated status with the required people, appropriate processors, up-to-date technologies and adequate resources.

CHAPTER 7: SUGGESTIONS AND RECOMMENDATIONS

7.1 Suggestions and Recommendation

As per the findings of the study, there is a considerable gap between the desired state and the current state of implementation and adoption of e-Services within Government entities. In bridging this gap, several issues and challenges need to be resolved. As per the information collected, some of the provincial institutions have already initiated their journey toward establishing the concept of a connected government. However, the LA system has limited strengths in implementing e-Government and e-Systems.

Considering the current state of knowledge, technology, processes and resource availability, and requirements of provincial institutions and LAs, two sets of recommendations can be drawn: one for short and medium-term implementation and the other for long-term implementation, aiming at resolving the issues and succeeding the challenges prevailing in both systems. The short and medium-term recommendations focus on patching the current environment to prepare the provincial institutions and the LAs to be ready for the process of transforming e-Systems into the targeted future state. The long-term recommendations are to establish a more robust and solid e-System environment which will be beneficial to all provincial institutions and LAs to adapt and function in an interactive and integrated manner.

As a general recommendation, it is proposed to draft an ICT road map covering all the provincial institutions and LAs that comprises objectives, strategies, and targets after conducting a thorough assessment of resource requirements for reaching the targets. In this exercise, it is important to initiate consultations with external stakeholders for process mapping exercises, preparation of system blueprints, highlighting future e-System development, and mapping the priority processes for digitizing essential services. The road map should not only address the issues related to infrastructure development but should also address means for change management, establishing the e-Culture, and diminishing the "Digital Divide" among stakeholder communities.

7.1.1 Short- and Medium-Term Recommendations

In the short and medium term, a revolutionary change cannot be expected as per the current standards. Therefore, short and medium-term recommendations are to enhance the current momentum and are to be used as a preparatory period for desirable solutions in the long run.

During the short and medium term, the provincial institutions and the LA will run their e-Systems in the current infrastructure setup with necessary improvements.

The following are the short-term interventions proposed for overcoming issues and bridging gaps related to e-System implementation in provincial institutions and LAs.

a. Adopt policies effectively at a national level.
b. Provide a solution for human resources-related issues.
c. Institutionalize 'Change Management' processes.
d. Conduct related capacity development of staff.
e. Support improvements to the hardware infrastructure.
f. Migrate the application hosting to Clouds (LGC).
g. Implement quick-win software projects.
h. Conduct an Institutional 'Digital Readiness Assessment'.

Improvements in the regulatory and policy environment could be implemented by adopting the regulations and policies made by the central government as there are no directives currently on PCs and LAs. As per the

current provisions, the e-Government Policy is not directly applicable to PCs and LAs. Therefore, as the first step, it would be recommendable to adopt the e-Government policy for provincial institutions and the LA system.

When online payments are made, there is a commission for the financial institution. Currently, there is no provision in the LA system to pay such commissions. This additional commission fee could either be charged by the customers or could be met by the institution providing the services. It is recommended to clear this gap through effective policy decisions.

Another important recommendation is to resolve the issues related to human resource unavailability to operate e-Systems, ICT procurement, and ICT project management. This issue could be resolved through the strategies suggested below.

I. Assigning a dedicated team of qualified or trained staff to handle ICT-related tasks. It is also proposed to appoint experienced professionals with ICT-related qualifications to manage and advise on the decision-making process, particularly in the LAs. Until such a formal solution is in place, assembling a technical support team by nominating IT-savvy staff from the provincial institutions including the Department of Local Government to provide field-level support for LAs on a defined schedule would be desirable. This shall be a short-term arrangement to address the immediate shortfalls in operations and management.

II. Preparation of a policy level needs assessment paper to justify the creation of the following minimum requirements.
    - Create a minimum of two staff positions in professional and technical grades for provincial institutions, municipalities and UCs.
    - Create a minimum of one position in professional-grade and one for technical grade for PSs.
    - Obtain officers from the existing IT services at the central government level for newly created cadre positions or otherwise make recruitments at an institutional level.

III. Attach graduate development officers with science degree qualifications (with ICT) to LAs and provide continuous training on ICT.

IV. ICTA, Provincial Public Service Commission or other central agencies to recruit professional staff temporarily and attach them to provincial institutions and LAs based on the requirements.

V. Staff augmentation from the private sector through outsourced contacts.

The institutional setup of provincial institutions and LAs are a legacy system that uses traditional and manual processes. At present, the public sector working environment is changing at an unprecedented level due to technological advancements taking place in the ICT sector. The phase of technology change is accelerating and pushing the government to shift into new processes and procedures regularly. Resistance to change is a usual phenomenon. Therefore, it is vital to implement change management drivers for successful adoption. As per the change management literature explained[23], this process involves the appointment of change management teams and training on change management procedures and exposing them to institutions that have successfully absorbed the change. The change management teams should be capable to design programs for the introduction of the change and sustaining it through methodical implementation.

Based on the strategy proposed for recruiting professional staff, a training and development plan should also be drafted and implemented that will upgrade the lower-level semi-skilled officials to professional levels. The capacity development program, ideally inclusion of a basic knowledge platform for delivering digital literacy services should be focused on all levels of staff on ICT infrastructure, software systems, and e-Governance.-

[23] https://asq.org/quality-resources/change-management

Other than a few cadres in the executive and technical grades, the general staff will be serving in the respective province or in a LA their entire professional life. Therefore, investments in training staff to use e-Systems will not be a sunk cost. As PCs have training centers with necessary computer lab facilities, provincial institutions and LAs could also use them for their staff training. The provincial institutions and LAs could hire professionals from the ICT industry for training whenever there is a shortage of skilled trainers.

The unavailability of hardware infrastructure, particularly the server computers, is another important issue to be resolved in the short term. It was learned that the majority of LAs use desktop computers as server hardware. The provincial institutions also do not have properly architecture server rooms. Most of the hardware used in these provincial institutions and LAs are at the end of its lifespan as per the information gathered. Furthermore, the reliability of desktop computers for functioning as servers is unacceptable. Therefore, it is proposed to use LGC as the hosting platform wherever connectivity is not an issue. However, it is recommended to upgrade the server hardware in locations where connectivity is not strong if the new services are to be initiated. It is also proposed to streamline the existing ICT infrastructure such as network, connectivity, printers, computers, and other devices to enhance the performance of the existing functions of the provincial institutions and LAs.

It was learned that the majority of LAs do not provide any kind of G2C/G2B service. Some do not even use G2G services such as Payroll. Therefore, piloting available e-Systems including open-source software is vital for the preparation of LAs for adapting fully functional e-Systems. The Koha public library information system is one of the quickest and best options to pilot in LAs. Some of the public libraries are currently using the Koha software without its web-enabled features. Therefore, Koha e-System could be used even with a standalone computer for providing preliminary services. However, as this is a web-based application for making library information available online, it is recommended to introduce the required customizations quickly and to host it in the LGC as an online application.

If online payments are to be enabled, it is necessary to integrate payment gateways to the current applications that handle payments such as the property tax system. A payment gateway is a third-party software owned by payment gateway operators. The software applications that are based on web application architecture currently being used by LAs should be revamped to enable communication with third-party software through web services for payment-related services. This is another important recommendation to be implemented during the short and medium term if currently, available software applications are to be used for payment-related services.

The property tax payment system is another important G2C and G2B service to be made available to competent LAs. This enhances the process efficiency of property tax payment giving utmost convenience to the citizen. However, almost all current tax payment e-Systems are private sector developments other than Puranaeguma and CAT 2020. There are many weaknesses in these e-Systems developed by private sector vendors (such as client-server architecture, not capturing the end-to-end processes correctly, vendor locking situations, and security risks) and therefore, no recommendation is made for replication. In addition to the above-mentioned drawbacks, it was revealed during the survey that almost all property tax collection software applications are not compatible with the legal process laid down for LA taxation. Because, without even issuing any warrant, warrant costs up to 20% of the total tax amount are added to the customer's bill automatically at the end of every quarter. This is a highly irregular practice, however, has been continued throughout.

Further, it was learned that North Western province is testing the CAT 2020 e-System that they have built internally which comprises 28 services/modules including online payment integration. It is recommended to conduct a system audit on these software application suites and investigate the possibility of replication of this software application system in other provinces.

In the short and medium term, it is also suggested to pay attention to establishing websites for all LAs. In this stage, the websites should at least provide interactive information. Since almost all LAs provide similar services and similar functionalities, a common dummy structure could be created using popular open-source web

creation platforms without making an excessive investment. The LA could append the data and information based on their services and functionalities through a content management tool embedded in the software platform. It is important to keep the websites updated frequently through the content management tool and it could be done by trained staff. The current practice in this regard is very unsatisfactory because in many cases, LAs as well as provincial institutions do not have a routine program to update their websites regularly. Also, it is recommended to work on mobile applications in collaboration with the private sector for providing necessary information interactively.

It is also proposed to construct and launch a service-oriented web portal by the Provincial Department of Local Government on a provincial basis for providing interactive information to fill the prevailing gaps until all LAs are ready with their websites. The web portal could provide downloadable forms and other necessary services that do not require sophisticated e-Systems. At the provincial institutional level, it was noted that most of the entities already have websites, however, need to be restructured considering the service requirement.

In short and medium-term interventions, it is proposed to conduct an institutional digital readiness assessment to measure the readiness of all provincial institutions and LAs and to measure the ability to transform into digital services and the sustainable operation of those services.

7.1.2 Recommendations for long-term implementations

In the long term, it is proposed to establish more comprehensive and robust e-Systems in subnational institutions including LAs. In this process, it is necessary to introduce radical changes to the processes by streamlining and strengthening them for establishing efficient and effective service delivery mechanisms. The changes must be focused on possible and required reforms toward strengthening the subnational institutions and LAs with a clear vision, mission, and strategies to elevate them into a desirable future state. The following areas and approaches are suggested to be considered and the relevant interventions are to be undertaken:

a. Institutionalization of the e-Government activities by creating an entity at the provincial level to guide and handle the process innovation and ICT-related planning, development, operations, and management activities. This entity could be housed in the Chief Secretaries Office as Deputy Chief Secretary (Process Innovation). It should be empowered with necessary legislation, policies, and protocols for overall management and coordination of the e-Government activities at the subnational level. This entity will also undertake activities related to coordination and collaboration with central ministries and ICTA for e-System project implementation at a subnational level.

b. Establishing a process innovation coordinating unit in the Provincial Commissioner of Local Government to support and monitor process innovation and e-System implementation in all LAs.

c. Update the existing Sri Lankan ICT service minute to accommodate more cadre provisions for strengthening the human resource-related aspects of the subnational institutions including LAs.

d. A central suite of web-enabled software applications covering all G2C/G2B and G2G services should be developed. This could be implemented in several stages. However, in the development process, it is necessary to follow steps in the software development life cycle, particularly by going through proper system study and BPR study and proper steps in software implementation. Also, all the interrelated functionalities should be digitized together, and the end-to-end processes should be captured.

e. The software application should be hosted in the LGC and all LAs should be given the necessary security and access protocols to protect their data.

f. LGN should be extended to all LAs enabling them to offer services through centrally hosted applications.

g. In addition to the staff recruited in the short, medium and long term, additional professional staff required to handle complex tasks are recommended to be procured through outsourced contracts.

h. Structured training programs to be delivered for staff at all levels of the subnational institutions to enable them to work efficiently on e-Systems and effectively handle ICT resources. It is also proposed to conduct capacity need assessments of the human resources. Based on the assessment, regularly update the training programs to refresh and retain the designated staff.

i. Creating "Steering Committees" and relevant "Working Groups" at the subnational level to support the overall management of e-Government and e-System implementation projects and other related activities.

j. Focus on enacting ICT policy and data management policy at the subnational level. It is also proposed to adopt the national procurement procedures for ICT-related infrastructure procurement activities.

k. For LAs that cannot bear the cost of commercial software, a common fund may be set up at the provincial level based on the defined service indexes.

l. For LAs where funding resources are available, it is necessary to identify proper business models for implementation of e-System sustainably. As one solution under this concept, it is proposed to create public-private partnerships for sustainable implementation of e-Systems and to reduce administrative overheads in managing the functional and technical aspects of the e-System.

m. Explicit allocation of budget line items for ICT-related activities including capital and recurrent expenditures by LAs.

n. It is suggested to make necessary arrangements for performing routine ICT audits regarding all aspects of e-Systems and e-Government interventions implemented at the subnational level and LA level.

o. The public as a key stakeholder should be made aware of the services extended through these new interventions. To achieve this objective, it is necessary to have a planned public outreach program and communication and it is also necessary to obtain the involvement of the stakeholders from the beginning of implementation. Social media is one of the most powerful tools that can be applied in Sri Lanka for public outreach. It is also suggested to compile short and medium-term communication plans for each LA if e-Systems are to be implemented.

7.2 Suggestions for Best Practices

Identification and ascertaining the best software applications that are currently being used in provincial institutions and LAs was one of the key objectives of the survey. Accordingly, during the data collection, three different survey approaches were used for the identification of best practices.

Those approaches which were used in the matrix for the identification of best practices are respondents' ratings, performance indicators of software currently being used, and technology adoption in the development process. As per the criteria used, it is very hard to ascertain existing software applications as the best practices and recommend them for replication.

However, as per the findings of the survey, the following software applications have the potential for replication in the short and medium term with necessary improvements to the issues inherited by these applications. It is recommended to conduct a detailed system audit on the scope and converge, technical and security aspects of these applications before supporting replication.

Table 7.2-1: Suggest e-Systems for technical and security audit for replication in the local authority system.

S. Number	Name of the software application	Name of LAs currently being used	Functionalities	Name of developer
01	CAT 2020	Majority of LAs in NWP	28 functionalities covering all major services of a LAs (a suite of applications)	Wayamba Development Authority
02	Library Information Management System (Koha)	55 number of LAs	Book cataloging and issues and receivers	Several developers
03	Clean Up Mobile App Garbage Collection Vehicles Movement Tracking system	Kaduwela municipality	Online tracking system of garbage collection vehicles and other information	University of Moratuwa
04	Website	Municipality, Nuwara- Eliya	In order to understand how best services/ functionalities could be arranged	-
05	Payroll	177 number of LAs	Preparation of employees salary	Ministry of Finance, Colombo
06	MIS	Information management, NWP Department of local government connecting all local authorities in the province	Local authority information management	Wayamba Development authority
07	GIS	Gampaha Municipality	Geographic Information System	University of Moratuwa
08	Taxman	Property Tax System	Balangoda UC	Inhouse development by employees
09	Letter Tracking System	Tracking the movement of applications and letters received by PS	Dikwella PS	Ekraing Holding PVT Ltd

Out of the above e-Systems, Payroll software is available for all LAs free of charge. Therefore, it could be replicated immediately by the LAs where the Payroll system is not currently being used.

Other than the above applications there are several other applications implemented by private vendors in LAs. According to the survey, there are many pros and cons of these software applications. Therefore, it is recommended to do a comprehensive system audit if any of these applications are to be replicated.

In the case of provincial institutions, a few best practices already in use include the ERL and e-SLIMS. The Payroll and CIGAS are also available for all public institutions free of charge if the infrastructure is ready to use it. However, these systems have already been implemented in all the relevant institutions. Apart from them, several systems could be replicated after conducting a system audit on aspects such as the ability to be interoperable, coverage of system requirements, acceptance of users, system robustness, system securities and the cost of the applications. Table 7.2-2 presents such systems earmarked for system audits.

Table 7.2-2 : Suggestions of e-Systems for technical and security audit for replication in the provincial institution

S. Number	Name of the software application	Name of LAs currently being used	Functionalities	Name of developer
01	Exam evaluation and Result analyzer	Provincial Education Department Anuradhapura	Exam result, result evaluation & analyzer	Developed by private vendor
02	Decision support and monitoring System	Deputy Chief Secretary (Planning), NCP	Development goal setting and physical progress monitoring system	University of Rajarata
03	Expenditure Monitoring system	Deputy Chief Secretary (Planning), NCP	Monitoring of Annual Expenditure of all the departments and institutions of North Central PC	-
04	Revenue Management System	Departments Revenue SP, NWP, Sabaragamuwa, Uva)	Tax and Revenue Modules	By employees of Revenue Department of SubP with support of UNDP
05	Ethik	Department Revenue (WP)	Information gathering, Tax calculation	Ethik
06	Decision Support Information System (DSIS)	Department of Education (WP)	Project planning & monitoring, Data management	Inhouse developed by own staff
07	iProMIS	Deputy Chief Secretary (Planning) Northern PC	Project planning and monitoring	Private Developer
08	EMIS	Department of Education Northern PC	Exam Management Information System	Inhouse development by staff
09	EMIS (Mobile Application)	Department of Education Northern PC	Information Dissemination System	Inhouse development by staff
10	CAIP	Deputy Chief Secretary (Planning) EP	Preparation of Consolidated Annual Development Programme, progress monitoring, Report generation.	Inhouse development by staff
11	HRM	Deputy Chief Secretary (HR and T) SP	Managing the cadre, Employees personal data	Inhouse development by staff
12	Expenditure Management system	Deputy Chief Secretary (Planning) SP	Annual expenditure planning and monitoring system	Inhouse development by staff
13	HRM	Provincial Department of Land, SP	Managing the cadre, Employees personal data	Inhouse development by staff
14	Assets Management System	Deputy Chief Secretary (Finance) Sub. P	Managing assets of an institution, Inventory of assets	-
15	Assets Management System	Deputy Chief Secretary (Finance) NCP	Managing assets of an institution, Inventory of Assets	Inhouse development with UNDP support
16	Provincial revenue information system	Provincial Department of Revenue, Sub.P	Revenue Information Management System	Inhouse development by staff
17	MDTI Training Management System	Deputy Chief Secretary (HR and T) Sab.P	Training programme planning and Training courses management	Inhouse development by staff

S. Number	Name of the software application	Name of LAs currently being used	Functionalities	Name of developer
18	Mail Management System	Provincial Department of Education, SP	Data on frequent recipient of letters and documents with an ability to merge the letters	Inhouse development by staff Sabaragamuwa, currently using at NWP Central and Uva provinces
19	Front Office management System	Provincial Department of Land, CP	Information recording and follow up and Report generation	Inhouse development by staff
20	Mail management and tracking system	Provincial Department of Land, CP	Mail tracking and status monitoring	Inhouse development by staff
21	Complaint Management System	Department of Local Government, WP	Storing information on grievances and managing complain process, tracking the complains. (Grievances are related to the entire local authority system in the WP)	ITRD (Commercial Vendor)
22	Inventory	Department of Provincial Motor Traffic, SP	Inventory Management System	Inhouse development by staff
23	Attendance Management System	In 23 Provincial Institutions	Recording the employee's attendance.	Multiple commercial vendors
24	Chatbot	Provincial Department of Land	Information Dissemination System Chatbot provides a question answering system leveraging natural language through chatting system	Inhouse development by staff
25	HRM	Provincial Department of education, SP	Attendance management and Employee information storing	-
26	e-HRM	Deputy Chief Secretary (HR and T) UWA	Employee Personal information recording for Human resources management	Inhouse development
27	MIS	Deputy Chief Secretary (Planning) UWA, CP, NWP	Project Financial allocation, Development projects progress information	Inhouse development
28	Village Profile	Deputy Chief Secretary (Planning) UP	Information on population, employments, agriculture, industry, other resources availability, schools, post offices, other government offices etc.	Inhouse development
29	Mail Merge System	Department of Local Government (WP)	Data on the frequent recipient of Letters with an ability to merge the letters	Inhouse development by staff
30	Revenue Management System	Departments Revenue SP, CP and NWP	Revenue Management System	By employees of the Revenue Department of CP with the support of UNDP

In light of the evidence of the survey, focused attention on improving the e-Systems at the level of local authorities would go a long way towards transforming government service delivery as LAs are the closest service delivery institution to the people. However, the central government and the provincial councils also have a significant role to play in establishing efficient and effective e-Systems at the sub-national level. Furthermore, the central government and the PCs must work collaboratively in planning and in supporting the implementation of e-Systems to promote integrated, cohesive, and effective e-Government adoption across all levels of governance.

ANNEXURE 1

Literature Review

Provincial Councils and Local Government System

Sub national governance sphere in Sri Lanka currently comprises with two major governing components namely the Provincials and the Local Government Authorities. The provincial sphere of governance is comparatively a recent development which came into effect in 1988 with the 13th amendment to the Constitution as a solution for the long-standing ethnic conflict in the Island. Since the Independence from the British rule in 1948, many attempts had been made to devolve administrative decision-making process due to the centralized governing model failed to satisfy the aspirations of the people of the Island Nation. As early as 1955 there were proposals for decentralization such as Choksy Commission recommendations, but did not materialized for verity of reasons. However, there were repeated demands for decentralization and these demands resulted in the following attempts.

- 1968/69 District Councils System
- 1973/74 District Political Authority System
- 1979/80 District Development Councils System
- 1987/88 Provincial Councils System

Provincials System in Sri Lanka:

The following legal instruments facilitated the current devolution process experiencing under the Provincial council System. (In terms of the Sri Lankan point of view, devolution is the transferring of political and administrative decision-making authority from central government to elected bodies at peripheral levels [1]).

(i) The Thirteenth Amendment to the Constitution (1987)

(ii) The Provincial Councils Act No 42 of 1987

(iii) The Provincial Councils (Consequential Provisions) Act No. 12 of 1989

The Thirteenth Amendment to the Constitution provides wider space for -

- The establishment of Provincial Councils
- The appointment and powers of the Governor of Provinces
- Membership and tenure of Provincial Councils
- The appointment and powers of the Board of Ministers
- The legislative powers of the Provincial Councils
- Alternative arrangements where there is a failure in the administrative machinery
- The establishment of the High Court of the Province
- The establishment of the Finance Commission [2]

The Provincial Councils Act No 42 of 1987 provides for - The Membership of Provincial Councils

- Meetings and conduct of business in Provincial Councils
- The financial procedure in the Provincial Councils
- The establishment of the Provincial, Public Service Commission [3].

The Provincial Councils (Consequential Provisions) Act No. 12 of 1989 provides for-

- The interim provision for the Interpretation of written Law on matters set out in List I of the 9th schedule to the Constitution [4].

A notable feature of this governing sphere is that there is no legal definition for the Provincial Council. It is an autonomous body which is not coming under any government ministry. It derives its authority and power from the Constitution and Acts of Parliament. A Provincial Council undertakes functions and activities which had earlier dealt with at the center, by the Government Ministries, Departments, Corporations and Statutory Authorities [1].

There are nine (9) provincials in Sri Lanka and at present these councils are not functioning due to expiry of the tenure of all Provincial Councils. However, the administration of all Provincial Councils is carried out by the Governor of each province with his subordinate officers until the successive Councils are appointed.

Powers Devolved to Provinces:

The following powers have been devolved to the provinces by the thirteenth Amendment to the Constitution.

- Executive powers to the Governor
- Legislative powers for the Provincial Council
- Judicial Powers for Provincial High Courts

Executive Power

The Executive power relating to matters in respect of which a Provincial Council has power to make statutes is vested in the Governor of the Province. The Governor is authorized to exercise this power either directly or through the Board of Ministers or through officer's subordinate to him. However, the Governor shall act in accordance with the advice of the Board of Ministers except where he is required under the Constitution to exercise his functions in his discretion.

Legislative Power

The Provincial Council has power to make statutes on any subject assigned to it under the List I of the 9th Schedule of the Constitution subject to provisions stipulated therein. However, if any provision of a statute is inconsistent with the provisions of any law passed by Parliament, then the provisions of the law will prevail over the provisions of the statute. An exception is made in the case of laws that were in existence on the day the Thirteenth Amendment to the Constitution came into force. If any provision of a statute made by a Provincial Council is inconsistent with the provisions of a law that was in existence on that date, the operation of the provisions of such law will remain suspended so long as the statute is in force.

Judicial Power

The following Judicial powers are devolved to the High Court of the Province:

i. The exercise of original criminal jurisdiction of the High Court of Sri Lanka in respect of offences committed within the province.

ii. The exercise of appellate and revisionary jurisdiction in respect of convictions, sentences and orders entered or imposed by Magistrate's Courts and Primary Courts within the province.

iii. The exercise of such other jurisdiction and powers as Parliament by law may from time to time provide.

iv. The issue of writs of Habeas Corpus in respect of persons illegally detained within the province and writs of certiorari, prohibition, procedendo, mandamus and quo warranto against any person exercising within the Province and any power under any law or any statute made by the Provincial Council [2].

Functions of Provincial Councils:

The functions of the Government and the Provincial Councils are listed in the 9th Schedule to the Constitution, which comprises of three lists:

List I	Provincial Councils List
List II	Reserved List
List III	Concurrent List

Provincial Councils List

The subjects in this list are considered fully devolved to the Provincial Councils subject to the national policy on each such subject. Provincial Councils can make statutes on these subjects without any further requirements. However, if any provision of such a statute is inconsistent with the provision of an Act of Parliament passed before the Thirteenth Amendment, then there will be no validity in such provision of that Act.

Reserved List

The Provincial Councils cannot exercise any power in respect of any subject in this list nor can it make any statute related to them.

Concurrent List

The Provincial Councils can exercise power regarding the subjects in this list. However, before the Provincial Council could make a statute on such subject, it should consult Parliament for its opinion on the provisions contained in such statute. The Provincial Council however is not bound to give effect to whatever opinion that is expressed by Parliament.

Where Parliament desires to pass an Act on a subject in this list it can do so provided however, that it would consult Provincial Councils about the provisions of such Act. Here again, it is not mandatory for Parliament to give effect to the opinion expressed by the Provincial Council.

In this scenario Provincial Councils have been in existence in this country more than three decades as the prime sub-national sphere of governance delivering considerable amount of services entrusted upon them as devolved functions and the authority.in every Provincial Council in order to accomplish its functional domain there are six major institutions established in terms of the provisions of the Provincial Councils Act No. 42 of 1987.

- The Governor
- The Council
- The Chief Minister
- The Board of Ministers
- The Provincial Public Service Commission and
- The Chief Secretary

In every Provincial Council the Board of Ministers consists maximum of five Ministers including the Chief Minister. Under each Ministry Departments, Institutions and Statutory Authorities are functioning with the subordinate staff of such entity. However, institutional set up and achievements, level of service delivery, administrative tools such as IT application, efficiency and effectiveness of deliberations also could be varied from province to province in accordance with the resource availability.

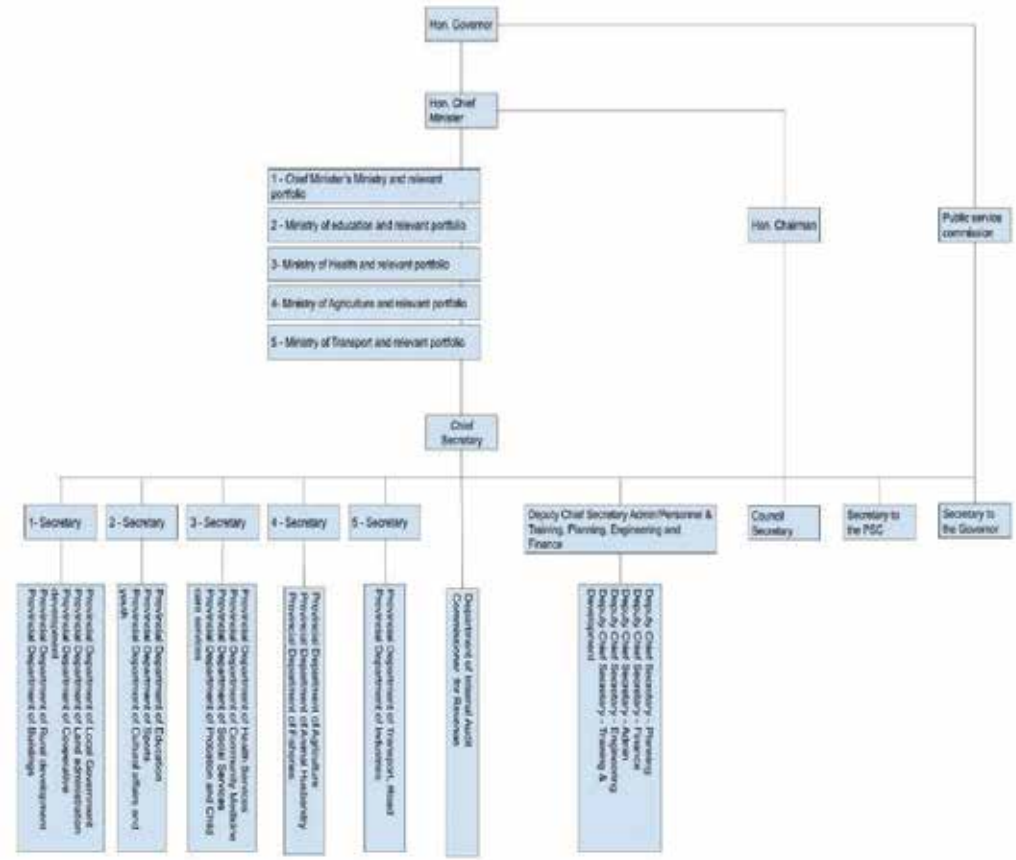
Subnational Governance:

Subnational government space in Sri Lanka has two tiers namely Provincial Councils and the Local Government Authorities. Both tiers have administrative units and public representatives. Also, both tiers have linkages in the administrative units, such that the Ministry and Department of Local Government at Provincial Administration directly supports and regulates the Local Government Authorities.

Every Provincial Council in Sri Lanka has the provision to establish a council secretariat and a maximum of five ministries to house the public representatives and govern the province. Under each ministry sector specific departments are provisioned to promote, administer and implement provincial specific activities. Secretary to the provincial ministry performs the general administrative duties as per the directions of the Minister and abide the enacted provincial and national regulations.

Chief Secretary to the province plays the key role as the accountable officer on the financial, legal and overall governance aspects of the administrative units in the province. Chief Secretary's secretariat functions as a key administrative block in the provincial administration with Deputies for Finance, Planning, Engineering, Administration, Training and development, Internal Audit and few other specific institutions. Five ministries and nearly 25 departments fall under the direct purview of the Chief Secretary's secretariat on administrative matters. Almost all of the departments have second level of administration at district level. Here the Department of Local Government at the provincial level serves as a supporting and regulating body of the Local Government Authorities.

The central government appoints the Governor to every province to oversee, support and regulate the provincial administration. Governor's secretariat performs routine activities as per the direction of the Governor and the Secretary. Also, Commissions and Boards are formed to advice and recommend the sector specific activities in the Provincial administration. So, the key provincial Institutions need to be identified to assess the ICT related aspects of administrative units. The hierarchy of institutions in the provincial council and local government.



The right institution to select and implement ICT systems shall be considered on a top down approach, so top level institutions that are critical in terms of provincial administration, in addition the aggregation and consolidation of data at these institutions was common. A general list of institutions under the Provincial Council – housing the top-level officials (law makers, decision makers and enforcing agencies) for provincial administration;

1. Governor's Secretariat
2. Provincial Council Secretariat
3. Chief Minister's Secretariat
4. Ministry of Education/ Sports/Culture/Youth
5. Ministry of Health/Women Affairs
6. Ministry of Agriculture
7. Ministry of Transport/Road
8. Chief Secretary's Secretariat
9. Office of the Deputy Chief Secretary Administration
10. Office of the Deputy Chief Secretary Finance
11. Office of the Deputy Chief Secretary Planning Office of the Deputy Chief Secretary Personnel and development
12. Office of the Deputy Chief Secretary Engineering

List of Institutions housing second level administrative officials;

1. Department of Local Government
2. Department of Rural Industries
3. Department of Building
4. Department of Transport
5. Department of Rural Development
6. Department of Internal Audit
7. Department of Health Services
8. Department of Indigenous Medicine
9. Department of Social Services
10. Department of Probation and Childcare
11. Department of Education
12. Department of Cultural affairs
13. Department of Sports
14. Department of Road development
15. Department of Land administration
16. Department of Agriculture
17. Department of Animal production
18. Department of Irrigation
19. Department of Cooperative development
20. Department of Fisheries

The above departments have district level or clustered third level administrative institutions housing frontline officials in the province. In addition, the Local Government authorities in the province will be managed under the purview of Department of Local Government. The Office of the Assistant Commissioner of Local Government as the second level administrative level for managing the Local Government Authorities at the District level [10,11].

Local Government System in Sri Lanka:

Historical Background:

Historically, Local Government was an essential component of the pre-colonial administrative system in Sri Lanka. According to the ancient Inscriptions and primary historical evidence during the period of 4th century B.C. village and city administration was in existence based on principle of autonomy. Village Councils were regarded as minor administrative units and were independently administered within the framework of established customs and traditions. This traditional local administrative system due its indigenous values and rich culture, lasted unchanged until 1818 despite the Portuguese and Dutch rule of the maritime provinces of the Island. However, this unique system of administration was abolished in 1818by the British to supplement it with colonial administration in the Island [5].

Although Sri Lanka's Local Government heritage which goes back to the ancient and mediaeval periods, the present system of Local Government was introduced by the British with the creation of Colombo & Kandy Municipal Councils in mid -19th century. During the period of 1865-1920 Verity of Local Government bodies such as Village Committees, Sanitary Boards, Local Boards, Nuwara Eliya Board of Improvement and Urban, General, Rural District Councils. However, the true modern Local Government system in the island commenced in 1931 with the implementation of Donoughmore Commission recommendations. Under these reforms the first Ministry of Local government, Department of Local Government, Unified system of Local Government, Universal franchise, Urban Councils, Town Councils, Village Councils, and many other naval features were introduced. The Local Government Structure created under 1931 reforms lasted unchanged until District Councils were established in 1981. The current structure i.e. Municipal Councils (MCs), Urban Councils (UCs) and Predeshiya Sabhas (PSs) came into effect from 1987 with the creation of PSs combining former Village Councils and Town Councils. [6,7]

What is Local Government?

Local Government is generally accepted as the level of governance closest to citizen in every political system. According to *Tony Byrne* "Local Government is a self-government, involving administration of public affairs in each locality by a body of representatives of the local community. Although subject to the central government in many ways, it possesses considerable amount of responsibility and discretionary power". This definition of veteran British author confirms that the concept of Local Government is meant for managing local affairs by members of the community of any locality in an organized manner aiming at better public services and the creation of more livable environment for such communities exercising its authority [8].

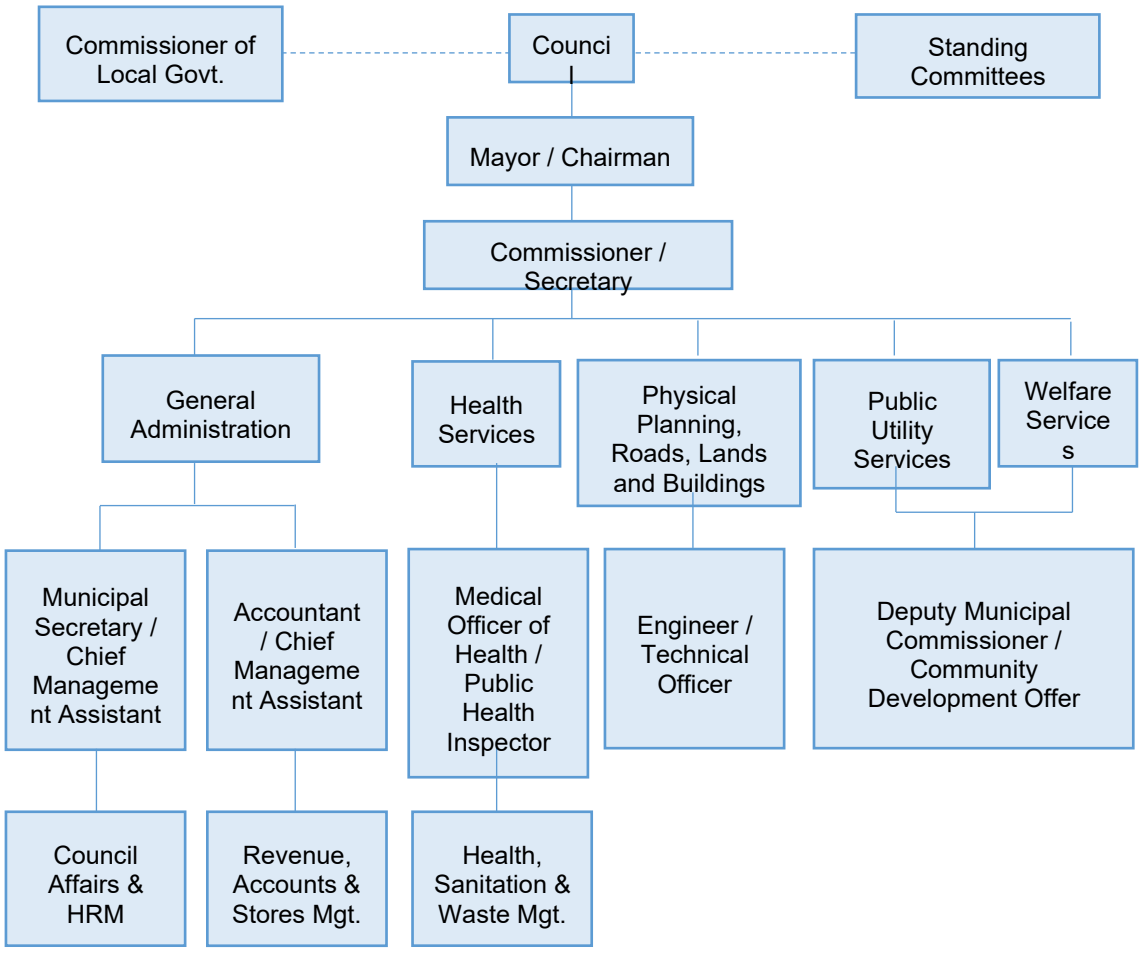
The entire Local Government System in Sri Lanka was created by Law and exists within a legal framework. It was designed based on the British Local Government System in the latter part of the 19th Century. Structure form and constitution of Local Authorities as well as the powers, duties and functions have been determined by law. The Local Authorities are empowered to carry out certain functions and are not empowered to exercise powers beyond the given scope. Local Authorities are legal entities which have been organized as a corporate body with perceptual succession. These authorities can sue and can be sued. They can acquire hold or sell

properties, enter into agreements and are free to formulate policies and make by-laws for the administration of affairs entrusted to them by law. There are three types of Local Authorities in the Present Structure of Local Government as indicated below:

Municipal Councils - 24

Urban Councils - 41

Pradeshiya Sabhas - 276 = 341



Governing Legislations of Local Authorities:

Governing Legislation in the Local government sphere in Sri Lanka as follows.

i. Municipal Councils Ordinances No. 29 of 1947 – (Chapter 252)

ii. Urban Councils Ordinance No. 61 of 1939 (Chapter 255)

iii. Pradeshiya Sabhas Act No. 15 of 1987.

Legal Provisions for entire operational aspect of Municipal Councils, Urban Councils and Pradeshiya Sabhas have been given in the aforesaid governing legislation.

At the same time to ensure the smooth functioning of the complex role of these authorities, considerable enabling provisions are made through other legislation under the main laws.

1. *Municipal Councils Ordinance (Chapter 252)*

   The purpose of this Ordinance was to amend and consolidate the law relating to Municipal Councils.

   There are about 44 amendments to this Ordinance up to now.

2. *Urban Councils Ordinance (Chapter 255)*

   The purpose of this Ordinance was to make provision for the establishment of Urban Councils to carry out Local Government in Sri Lanka. Forty seven (47) amendments have been made to this Ordinances up to now.

3. *Pradeshiya Sabhas Act No. 15 of 1987.*

   The purpose of this Act is to provide greater opportunities for people to participate effectively in the decision-making process relating to administrative and development activities at local level and to specify the powers, functions, and duties of such Pradeshiya Sabhas. Six (6) amendments have been made to this Act up to now.

Powers of Local Authorities:

Powers of Local Authorities could be categorized under seven major areas,

1. General Powers
2. Powers relating to Streets and Throughfares
3. Powers relating to Public Health
4. Powers relating to Financial Matters
5. Power of Recovery of Taxes
6. Power to Recover Dues through Court
7. Power of Application of the Common Fund of the Local Authority

Role of Local Governments:

Role of Local Authorities are twofold.

1. Role of Promotion
2. Role of Regulation

1. *Role of Promotion*

Promotion of comfort, convenience, and welfare of the people with the provision of services and facilities, improve them and encourage to improve.

2. *Role of Regulation*

Regulation supervision and control of all activities disturbing the comfort convenience and welfare of the people from every business, trade establishment and factory by way of licensing, issuing of permits, constitute legal action and imposing punishments.

Local Government Finances:

The financial functions of all three categories of local authorities are very similar. All local authorities impose and levy rates, taxes, rents, license duties, and other revenues as they are empowered to do so under respective statutes or By-Laws. Further, they also earn income by investing surplus funds. In addition, these revenue sources, local authorities receive funds from the government and Provincial Councils. The revenue of local authority could be summarized under following major components [9].

i. Rates and Taxes
ii. Rent
iii. License Duties
iv. Service Charges
v. Warrant Cost, Penalties, and fines
vi. Other Revenue
vii. Revenue Subsidy
viii. Capital Receipts

Status of eGovernance in Sub National Level in Sri Lanka

Pursuit of digitizing government services in Sri Lanka fast tracked after the year 2000by introducing several new enactments, though the foundation was laid in early 80s with the establishment of Computer and Information Technology Council of Sri Lanka (CINTEC) by the Parliamentary Act No.10 of 1984 and as per the recommendations of National Computer Policy. In 2003 Information and Communication Technology Agency (ICTA) was established as a successor of CINTEC by the ICT Act No.27 of 2003. In addition, Electronic Transaction Act No.19 of 2006, Computer Crimes Act, No. 24 of 2007 and Personal Data Protection Act ("PDP Bill"- September 24, 2019) were introduced to regulate ICT related affairs. [12]

"Use by government agencies of information technologies (such as wide area networks, the Internet and mobile computing) that have the ability to transform relations with citizens, businesses and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens; improved interactions with business and industry; citizen empowerment through access to information; or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions." (The World Bank) [13]

The eGovernment mostly includes informational service, interactive service and also transaction services. Extent of eGovernment service usage is dependent on the level of need and also the factors such as knowledge, socio-economic status and internet access plays important role in diffusion of eGovernment services. The relative advantage of eGovernment services are convenience, time saving, reduced paperwork, cost saving, easy navigation, online tracking and trial-ability. Also, a key takeaway is that the citizen who are educated, are familiar with new technology and exposed to infrastructure are more likely to adopt the eGovernment services. [14]

The recent trend in e Governance led to the recognition of the use of ICT to achieve more efficiency in public sector governance and thereby improve the delivery of services to organizations and citizen. This paves the need for a well-defined framework to monitor and compare the status of e-Government systems and processes. So, the following feasible, relevant and internationally comparable indicators were proposed to assess the favorable environment for eGovernment initiatives and to formulate policies and strategies. [15]

EG1 Proportion of persons employed in central government organizations routinely using computers

EG2 Proportion of persons employed in central government organizations routinely using the Internet

EG3 Proportion of central government organizations with a local area network (LAN)

EG4 Proportion of central government organizations with an intranet

EG5 Proportion of central government organizations with Internet access, by type of access

EG6 Proportion of central government organizations with a web presence

EG7 Selected Internet-based services available to citizens, by level of sophistication of service

E-Government Development Index depicts the E-Government Development status of the United Nations Member States. Website development patterns in a country were assessed and the E-Government Development index incorporates the access characteristics, such as the infrastructure and educational levels, to reflect how a country is using information technologies to promote access and inclusion of its people. Three important dimensions of e-government were measured by EGDI, namely: provision of online services, telecommunication connectivity and human capacity.

The E-Government Development Survey assess the progress of e-government development under the guidelines of E-Government Development Index (EGDI). The EGDI, measures national level egovernment development and presents a composite index based on the weighted average of three normalized indices. One-third is derived from the Telecommunications Infrastructure Index (TII) based on data provided by the International Telecommunications Union (ITU), one-third from the Human Capital Index (HCI). [16]

According to a framework developed by UNDP, it includes six components, three core and three cross cutting. [17]

- E-administration: Public investment in ICT in order to strengthen the transparency and accountability of public bodies.
- E-service: Public investment in ICT in order to strengthen the effectiveness and transparency of public institutions in the way in which they provide public services in all sectors.
- E-participation: Public investment in ICT to strengthen interaction between public bodies and citizens, with the aim of promoting better public policies, services and functioning.
- Access to ICT and connectivity: Public investment in information and public and private communication systems, connectivity, and equipment infrastructure, to enable wider use by the greatest number of people.
- Access to information: Public investment to promote the digitalization and dissemination of public information within the population.
- Regulation and political environment: Public investment to support the creation and implementation of new technology strategies for development and e-governance, legislation, and regulation, and for strengthening competencies within public bodies

Some of the critical success factors to consider the successful implementation of eGovernment projects include the following.

- Funding.
- ICT infrastructure.
- Adequate legal and policy formulation.
- Awareness.
- Top management and government support.
- User computer efficacy.
- Stakeholder involvement.
- Communication and change management.
- Clear vision and strategy.
- Training.
- Government departmental goals.
- Citizen empowerment (as opposed to marginalizing groups).

E-Government systems design and sustainable implementation also needs consideration on the political, economic, technological, social, cultural, and legal status of the country. So, the significant design challenge faced by developing countries were from emerging economies, high corruption, political instabilities, unclear legal structures, and diverse social and cultural norms. [18]

Some of the design and sustainability challenge sources are identified and listed below.

- Political & organizational leadership
- Formulation of strategy and policy
- Prioritization of initiatives
- Availability of financial resources
- Public-private partnership
- ICT literacy of public sector employees
- ICT literacy of end user
- Formulation of legal framework
- Formulation of security and privacy guidelines
- Cultural factors
- Infrastructure
- Integration of backend processes
- Awareness of opportunities

System design is crucial for a successful implementation and to measure the usability and successful adoption. User experience shall contribute significantly to ease of access, availability of language support. Offline and online channels of delivery and thereby provide significant values to the public. [19]

Herewith the ICTA's e-Governance policy objectives serves a national framework and a methodology to migrate the manual systems to digital services. [12].

Objective 1 – Make government information available and accessible electronically to citizens through multiple channels

Objective 2 – Make government services electronically available and accessible to all citizens via multiple channels in a citizen friendly manner

Objective 3 – Improve/Re-engineer government processes to be citizen centric

Objective 4 – Use eGovernment to eliminate duplication in ICT Infrastructure, information collection, government processes and ICT solutions within and across government organizations

Objective 5 – Use of ICT to achieve, measure, monitor and publish defined service levels for all government services

Objective 6 – Address the requirements/needs of marginalized communities through ICT

Objective 7 – Implement processes and systems in government organizations to be highly responsive and interactive using ICT

Objective 8 – Enable citizen engagement through electronic means for consensus driven, public policy and decision-making process wherever authorized Objective 9 - Strengthen rule of law with ICT

Objective 10 – Establish and implement of a proper enabling operational framework for successful eGovernance.

ANNEXURE 2

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ANNEXURE 3

Screening Survey Questionnaire

STUDY ON SUBNATIONAL GOVERNANCE E-SYSTEMS MAPPING OF PROVINCIAL AND LOCAL ADMINISTRATION INSTITUTES IN SRI LANKA

BASIC INFORMATION GATHERING

Name of Enumerator: ..... Date: .....

1. BASIC INFORMATION

1.1 Located District : .....

1.2 Name of Local Authority (LA) : .....

1.3 Address : .....

1.4 Contact Person - Name : .....

1.5 Contact Numbers : Phone : ..... Email : .....

2. AVAILABLITY OF E-SYSTEMS

2.1 Have your Local Authority implemented or using any computer system/ e-system/ software application to provide Government to Citizen (G2C), Government to Business (G2B), or Government to Government (G2G) services?

2.1.1 Yes, |__| (Select the services listed below in 2.2)

2.1.2 No, |__| (There is no any e-system/ software application used in this LA)

2.2 Availability and usage of e-systems /software applications (Please put the relevant number for the answer; 1 or 2)

Nature of e systems/ software applications		Subject Areas of e -systems/software applications	Availability Not (1. 2. Available Available)	If available, usage for providing services (1. Not using 2. Using for work)
A) e –systems /software applications for Citizen Services (G2C, G2B)	A.1	Property tax payment		
	A.2	Garbage collection		
	A.3	Building approval		
	A.4	Public library system		
	A.5	Grievance redressal system		
	A.6	Building and shop rent payment		
	A.7	Web site (if available, pls. provide the Address)		
	A.8	Front office management software		
		Any other (please list)		

B) e –systems /software applications for enhancement of internal efficiency (G2G)	B.1	Accounting systems/ financial management systems		
	B.2	Payroll		
	B.3	Inventory control		
	B.4	HR management		
	B.5	GIS software		
	B.6	Application tracking system		
	B.7	Vehicle fleet management system		
	B.8	Road and infrastructure planning		
	B.9	Management Information Systems		
	B.10	Project management applications		
	B.11	Workflow management system		
	B.12	Queue management system		
	B.13	Store management		
	B.14	Procurement management		
	B.15	Training management		
	B.16	Procurement management		
		Any other (please list)		

ANNEXURE 4

Outline of Key Informant Interviews (KII)

Name of Interviewer		
Designation		
Duration in the post		
Organization		
Strategic Area		**Interview Points**
1.	Whether organizational change is needed and acceptable	1.1 Changes are acceptable 1.2 What nature changes 1.3 Can it be managed 1.4 Do you welcome ICT technologies to your working environment
2.	Status of the eSystems availability	2.1 Available and using 2.2 Not available, but planning 2.3 Not available, no plan 2.4 If not available, no plan, what are the reasons
3.	Organizational to preparedness use	3.1 Employees are conversant with ICT 3.2 Infrastructure is ready for implementation of eSystems 3.3 Services recipient are conversant with ICT 3.4 Services recipient are equipped for consuming the services (Computes, Smart Mobile Phones, Connectivity, Mobile payment, Credit/Debit card-based payments)
4.	The impact of eSystems	4.1 Impact on organizational performance 4.2 impact on employee performance 4.3 impact on services delivery 4.4 impact on customer satisfaction 4.5 impact on citizens participation in decision making 4.6 impact on cost
5.	Professionals/ skills requirements	5.1 Availability of necessary carder positions 5.2 availability of necessary professional 5.3 employee's willingness to learn and use 5.4 opportunities for training and development 5.5 Ability retention of professionals (due to wages and other factors)
6.	status of data connectivity and infrastructure	6.1 Requirement of internet connections to implement eSystems 6.2 LGN availability and adequacy for the use of eSystems 6.3 Availability of other strong data connections 6.4 What is your view on using clouds for data storage (local/foreign)
7.	Status of regulatory and policy environment	7.1 Availability of legislation and policy at national level 7.2 legislative and policy initiatives at sub national levels (provincial and Local Authority levels) 7.3 Extent of relevancy of available legislative and policies 7.4 Extent of effectiveness of available legislative and policies 7.5 Extent of implementation feasibility of available legislative and policies 7.6 Extent of acceptability of available legislative and policies to the employees and service recipients of 7.7 Extent of adoption/ implementation of available legislative and policies 7.8 What are the necessary legal and policy improvements? 7.9 New policies that are required for……. 7.10 Would you like to have open data policy?
8.	Connected e - System environments	8.1 Do you prefer to share your data with other systems (online)? 8.2 Do you trust data of eSystems in other entities? 8.3 What is your thinking on connected government where all government organisation trust the system of data owners without producing duplicated data? 8.4 What do you think about Lanka interoperability framework? Is it being followed at sub national levels?

9.	Cyber Security	9.1 Has attention been paid on the information security aspects? 9.2 Do you think it is safer to host government data outside to the organisation (Cloud/Datacenter) 9.3 What are the benefits and risks of providing services online? 9.4 Do you trust online payment system?
10..	Best Practices	10.1 What are the best practices (eSystems) in your sector as you see? 10.2 How do you identify them as the best practices
11..	Gaps	11.1 What is the impediment or gaps to implement E-Systems? (in terms of People, Process, Technology and Resources) 11.2 What are the resources that you are having which can be shared with other government organizations at subnational level?
12.	Expectation /Planning	12.1 In terms of implementation of e-Systems what are the challenges and impediment that you are facing. 12.2 In terms of implementation of e-Systems what are the strength and weakness that sub national level organizations are having? In terms of E-Systems what are your future plans and expectations

ANNEXURE 5

Study on Subnational Governance E-Systems Mapping of Provincial and Local Administration Institutes in Sri Lanka

Data Collection Questionnaire – Local Authorities

SECTION ID - ENUMERATOR IDENTIFICATION (Auto Update)

Enumerator Name	
Date	Day / Month /Year
Time at the beginning of the interview	
Time at the end of the interview	

1. Basic Information

1.1 District	
1.2 Name of Local Authority (LA)	
1.3 Address	
1.4 Medium of Work (Software)	
1.5 Number of Sub offices	
1.6 Number of Employees - Permanent staff	
1.7 Number of Employees - Casual/ Contract staff	
1.8 Number of Household Properties	
1.9 Number of Commercial Properties	
1.10 Total Population in the Area	
1.11 Number of Wards in the LA	
1.12 Number of Council Members	
1.13 Budgeted Total Revenue for Year 2020	
1.14 Contact Person - Name (Admin)	
1.15 Admin - Designation	
1.16 Admin - Telephone Number	
1.17 Admin - Mobile Number	
1.18 Admin - Official E-mail	
1.19 Name of Contact Person - IT	
1.20 IT Person - Designation	
1.21 IT Person - Telephone Number	
1.22 IT Person - Mobile Number	
1.23 IT Person - Official E-mail	

1.24 In case of Pradeshiya Sabha – Yes / No

IF YES

1.24.1 Whether the entire area has been declared as a built-up area? Yes / No, but partly declared / No

1.24.2 Whether the entire area has been declared as a developed area under UDA law? Yes / No, but partly declared / No

2. Hardware Systems Available

2.1 Server hardware

2.1 Whether in-house server hardware is available for your LA? Yes/ No

IF YES

2.1.1. If yes, how many servers?

2.1.2. What are the types of servers, their capacity and operating system?

Type of Servers	Number	Operating System	Storage Capacity GB	Storage capacity (Used in GB)	Processor Capacity
Database server					
File / Application server					
Web server					
Backup servers					
Firewall		Software firewall/ Hardware firewall	-	-	

2.1.3. Whether the servers are new or outdated

1-3 years number, no.	3-6 years, no.	More than 6 years, no

2.1.4 What is the operation system used for data center hardware? If know

Windows	Linux	Any other Please Name

2.2 Client hardware

2.2.1 Whether this is a network hardware or stand-alone hardware? Networked / Stand-alone

2.2.1.1 If networked,

What are the types of hardware, their capacity and operating system?

No.	Type of hardware	Operating system	Purpose of use

2.2.1.2 If stand-alone,

What are the types of hardware, their capacity and operating system?

No.	Type of hardware	Operating system	Purpose of use
_	_	_	_
_	_	_	_

3. Productivity software using

3.1 Do you have following productivity software?

No.	Productivity software	Yes/ No	Number of officers using
1	Word processing		
2	AutoCAD/ Drafting		
3	Spread sheet		
4	Database		
5	Any other (Please indicate) …….		

4. Application Software/Software Developed/Customized for use of Specific Tasks

4.1 Application of software

Do you have the following application software in your LA? Yes/No

IF YES

4.1.1.1 Complete the following table.

Name of Application Package /Software system	Name and type of software	Purpose of the software	Type of access ([1] Web Based/ Client Server/ Stand alone System/[2] Web services)	Mode of availability (off the Shelf software/ Customized software/ Developed from the scratch)	Hosted location (In house data center/ Local cloud/ Foreign cloud)	Software stack (OS/ Data Base/ Interfaces/ client access software etc.)	Intellectual Property Right (IPR) Owned/ Shared with Developer/ Under user license	If under license[3], No. of concurrent user licenses	No. of officers daily using the Software Application	No. of officers daily using the Software Application	Support and maintenance (Internally / Externally)	Number of Sub offices connected	Nature of Services G2C / G2B/ G2G	[4]Monthly operational cost	Does the application system uses the data available in other government systems (ID/Bank)	How long this system has been in operation (No. of years)	Do you have Security tracking built in to the software (Yes Application level/ Yes Database level/ No / Not known)
	Payroll																
	Assessment rates																
	Other revenues																
	Accounting																
	Library																
	Stores management																
	Application tracking																
	Grievances handling																
	Any other																

1 - Web Based – The platform for LA official use

2 - Web services – Services via platform offered for the client (public) to use

3 - Number of licenses – If the entity owns any IP

4 - Monthly operational cost – all-inclusive cost of maintaining the software package for a month

4.1.2 Does your organization hosting website for public? Yes/No

IF YES

4.1.2.1 Complete the following table.

Web site Address	Provide Information and Forms downloading services	Provide instructiveness	Could link with other government system and could obtained the services	Provide "One Stop Shop" services	How frequently update your information	Can staff work from home on the applications listed below through web interface

4.1.3 Whether your products are well "Process Defined"? Yes / No

"defined process" =a series of actions or steps taken in order to achieve a particular end.

IF YES

4.1.3.1. If yes, please explain ……..

Network Connectivity Systems

Whether following types of network connectivity available with your LA? Yes/No IF YES

Complete the following table.

No.	Type	Specification	Connectivity speed	Number of officers used	Security/ Firewall (Y/N)	Data quota per month (GB)
	LAN	Wired/Wi-Fi				
	WAN	4G/Fiber/ADSL/VPN				
	*Web based	LGN/ Individual Wifi routers/ both (LGN + wifi)				
	Any other connections					

*Web based-be able to host services over a network (e.g.- work from home)

5. ICT Professionals

5.2 Do you have officer in-charge for IT related activities? Yes/ No

IF YES

5.2.1 Complete the following table.

No.	Designation	Number		Contractual arrangement		Qualification (# only)			
		Male	Female	In house	outsourced	Certificate/ NVQ	Diploma	Bachelors	Masters
	Analyst								
	Programmer								
	Database manager								
	Data entry officer								
	Network manager								
	ICT Technical Officer								
	Any other related ……								

6. Innovations

6.1 Do you have any innovative products as E-Systems? Yes / No

6.1.1 If yes, please specify ……..

7. Backup

7.1 Do you have back-up for E-Systems you are using?

E-System	Yes / No
Hardware	
Software	
Network	
Human Resources	

8. Challenges/issues and Recommendations

8.1 Do you face any challenge or issue in implementing E-Systems? Yes / No

8.1.1 If yes, please specify……..

8.2 Do you have any suggestion/recommendation to enhance E-Systems in local governance? Yes / No

8.1.2 If yes, please specify……..

ANNEXURE 6

Guiding Questions for Focus Group Discussions (FGDs)

1. Do you welcome changes to your office environment and current practices?
2. In your opinion, what can be done improve the performance levels of your organization?
3. Can ICT/ eSystem be the changing tool?
4. How does your organisation currently offer the services to client, manually, fully automated and web based?
5. Currently, are you working with an eSystems?
6. Are you comfortable/knowledgeable in using an eSystems?
7. If not, does anyone else do your work using ICT, (out-sourced)?
8. In the working environment which one is safer, ICT systems or manual files?
9. Do you think eSystems make organizational performance better than manual system?
10. What is the nature of your e-services? Is it G2C, G2B, G2G or all?
11. How does your customer/client accept the eSystems, do they comfortable of using it?
12. Do you think that necessary legislative and policy framework is in place for implementation of eSystems?
13. Do you have political and official leadership backing for implementation of in eSystems?
14. If not, what is lacking (required legislation, policy, support of political/official leadership)?
15. Do you have computers and other equipments to implement eSystems?
16. Are you satisfied with the current data connectivity?
17. Do you have skilled staff to operate and maintain eSystems?
18. Would you like to share your electronic data with other entities? If not why?
19. Do you like to use others' data as input to your eSystem?
20. Do you trust other's data?
21. What do you think about open data policy?
22. Do you have adequate annual budget to maintain eSystems?
23. Do you have any plan to expand your eSystems future?
24. What is your plan for next 5 years?
25. Do you have plan to initiate eSystems in your office to provide services to the customers (G2C, G2B)?
26. What are the strengths of your organisation is implementing eSystems?
27. What are the weaknesses as you see in your organisation in implementing eSystems?
28. What are the main issues that you are facing when using the eSystems?
29. What are the barriers in using the eSystems? What are the enablers?
30. What are the main challenges in creating and sustaining an "eSystems in your Organization"?
31. Are you comfortable with using the E-Systems t? Do you think there is a need for training? (if yes, explore who would need training, how and where?)
32. How would you make it easier to use/implement?
33. What is your priority issue out of the matters discussed above?
34. What are your strengths in implementing the eSystems?
35. If you think that there are no strengths, please explain reasons?

ANNEXURE 7

Methodology for Best Practice Analysis

It is expected that the organizations that have a culture of innovation and efficiency will be on the constant lookout for best practices that can be propagated throughout the organization in order to make it optimal in all aspects. Identification of such best practices will support seamless replication of the similar type processors in the similar organizations enabling those organizations to enhance the efficiency and effectiveness effortless manner. Accordingly, the following matric is proposed for identification of such processors. Selection of the most suitable cage for the respective processors handled by the respective organization and assigning them the "points" will provide support for selection of the best practices.

Criteria	Benefits	Process Defined	Mature	Value Proven
Deemed Essential	5	6	7	8
Repeatable	4	5	6	7
Sustainable	3	4	5	6
Innovative	2	3	4	5

Criteria for Y axis

Innovative : Is this a unique idea, Does it break new ground, Does it significantly enhance an existing Practice?

Sustainable : Does it require more effort than it is worth, Is it dependent on an individual, Does it have sponsorship, Is it funded?

Repeatable : Is it restricted for any local reasons? Or can it be easily replicated elsewhere? Standards Compliant does it comply with local and/or industry standards?

Deemed Essential : Can the business do without it, Has it become embedded in the business operations?

Criteria for X axis

Benefits : Identified what does it deliver, How is this unique, Who/what does it benefit?

Process Defined : Are the processes well defined? Fully and well documented, Is the documentation complete and up to date?

Mature : How long has it been in operation, How stable is it, Is it well integrated?

Value Proven : What benefits has it delivered; Can the benefits be financially quantified?

ANNEXURE 8

Dummy Tables of Expected Outputs

Quantitative survey output tables

Availability of server hardware

Province	District	Local Authority	Total No of Servers	Total No of Grade 1 servers (Tower/Rack, 2socket CPU, 16-64GB RAM, 1TB or more Hard drive with RAID1, under warranty, 24/7 used, Virtualization support)	Total No of Grade 2 servers (Tower/Rack, 1socket CPU, 4 to 8GB RAM, 1TB Hard drive, under warranty, 24/7 used, Virtualization support)	Total No of Grade 3 servers (Grade 1 or Grade 2 server without RAID, without warranty, unused or unboxed)

Measure of network hardware

Province	District	Local Authority	No of LAN segments	No of device nodes connected	No of End users	Edge security firewall

LAN equipment availability

Province	District	Local Authority	No of LAN segments	No of routers	No of Switches	No of access points

WAN connection availability

Province	District	Local Authority	No of 4G Links	No of Fiber Links	No of ADSL Links	VPN/LGN	Other

WAN connection characteristics

Province	District	Local Authority	No of WAN connections	Average speed	Total data per quota month	No of end users	Overall satisfaction level of connections

Availability of Security appliance

Province	District	Local Authority	No of Security appliances	Firewall	IPS/IDS	WAF

Availability of security levels

Province	District	Local Authority	Physical security	Hardware level security	Application level security	Network level security	HR /Social engineering awareness

Availability of client hardware per staff population

Provinc e	District	Local Autho rity	No of permanent staff		No of Client computing hardware		LAN only connection	LAN and WAN connection	Windo ws	Linu x
			Male	Female	Allocated for Male	Allocated for Female				

Availability of Office automation devices

Province	District	Local Authority	Printers	Copiers	Scanners	N/w Storage	Multimedia Projectors	Biometric systems	Info help kiosks	other

Usage of productivity software by user count

Province	District	Local Authority	Documentation packages	Designing packages	Data management tools	Communication tools	Others

Availability of eSystems based on functionality

Province	District	Local Authority	Operational systems	Finance systems	Utility service management	Regulatory service management	Public relations mgmt	Human resource mgmt

Available eSystem types in LA

Province	District	Local Authority	G2C systems	G2B systems	G2G systems

eSystems characteristics – Accessibility

Province	District	Local Authority	No of Web only systems	No of Mobile only systems	No of Web & Mobile systems	Trilingual availability

eSystems characteristics – Deployment

Province	District	Local Authority	Off the shelf systems		Centrally developed		InHouse developed	
			No of systems on proprietory platforms	No of systems on open source platforms	No of systems on proprietory platforms	No of systems on open source platforms	No of systems on proprietory platforms	No of systems on open source platforms

eSystems characteristics – Availability and easy of use

Province	District	Local Authority	No of eSystems	Provision for employees to work from home	Interconnected with other institutions	No of systems Available 24/7	Provision for citizen to access from home	No of systems with User manual

eSystem characteristics – Security provision

Province	District	Local Authority	No of systems with secure authentication	No of systems with Role based access control	No of systems with data encryption	No systems with SSL enabled	No of systems audited by SLCERT or any third party

eSystem characteristics – Financial value ROI

Province	Distri ct	Local Authority	No of system s with more 5 system users	System functionality coverage		Work from home provision for employees	Total no of client s	Access from home facility for Citizen	Average no of transacti ons	Monthly operational cost		
				Full	Partial					Bucket 1	Bucket 2	Bucket 3

eSystem characteristics – Data privacy and security

Province	District	Local Authority	No of systems with data classification	No of systems with data	No of systems with data leak	No of systems with
				privacy definitions	prevention measures	welldefined data policy

eSystems characteristics – measure of transactions

Provin ce	Distri ct	Local Authority	No of systems with daily transactio ns	No of systems with weekly transactio ns	No of systems with monthly transactio ns	No of systems with quar-terly transactio ns	No of systems with half yearly transactio ns	No of systems with BiAnnual transactio ns	No of systems with Annual transactio ns

ANNEXURE 9

Screening study on availability of eGov systems in LAs from 5 Provinces

Southern, Western, North Western, Central and Sabaragamuwa Provinces

Submitted by EML

To

UNDP Sri Lanka

16/Feb/2021

Introduction

- Objective of the study is to identify the potential list of LAs from five provinces (WP, SP, NWP, SGP and CP).
- The identified list will enable the EML team to further investigate the LAs with the detailed assessment on the status of eGovernance systems.
- The data set contains quantitative information on the number of eGov systems available in LAs with the breakdown of **9** G2C or G2B systems and **16** G2G systems.
- The dataset contains defined set of variables and also can be correlated with extended variables from secondary data.

Methodology followed for data collection

- All of the LAs (207) from the five provinces were covered under this data collection exercise (data not available from few LAs)
- Data collection tool with the following variables have been used for the survey;
  - District
  - LA type
  - Type of eGov systems (G2C, G2B & G2G)
  - Availability of eGov systems
  - Current usage or operational status of eGov systems
- Data collection tool is administered by mixed data collection methods, including face to face session, telephonic session, data request through email or fax or by post.
- Data quality is verified by the supervision team from the EML.
- Data cleaning and processing is also done by EML team after the completion of the survey.

Methodology of sample selection

- District-wise overall eGov systems *availability* and *usage* will be studied.
- District-wise overall G2C/G2B and G2G systems *availability* and *usage* will be studied.
- District-wise stratification of eGov systems *availability* and *usage* will be prepared.
- The clustering of LAs based on the number of eGov systems *available* and *currently in use* shall be considered.
  - Cluster 1 – includes LAs with (0 to 2) eGov systems available and currently in use
  - Cluster 2 – includes LAs with (3 to 5) eGov systems available and currently in use
  - Cluster 3 – includes LAs with (6 to 8) eGov systems available and currently in use
  - Cluster 4 – includes LAs with (9 +) eGov systems available and currently in use

Selection criteria

- Selection criteria is primarily based on the number of eGov systems available in the LA and that currently in operation.
- Since this being a preliminary screening study, the variables are kept at minimum to identify the potential LAs for further investigation.
- This will also expedite the data collection process and simplify the processing and data analysis.
- Initial list will include LAs with maximum number of eGov systems that are identified from the "availability and usage" variables with reference to defined clusters.
- Additional secondary list of LAs shall be used in case any of the LAs fall out on the detailed assessment.
- If necessary external variables shall be used from secondary data sources to coorelate with the available variables.
- For example, the number of properties in the LA shall be used to relate with the forecasted number of transactions per year in the available property tax system. This will depict the volume data handled by the property tax system in each LA and the critical nature of the system.

Key Outputs

- Overall availability of eGov systems at Provincial level, District level and LA level.
- Identification of stratified clusters based on the availability
- Distribution of eGov systems across LAs – G2C/G2B and G2G
- Shortlisting of potential LAs for detailed assessment

Statistical information on the results

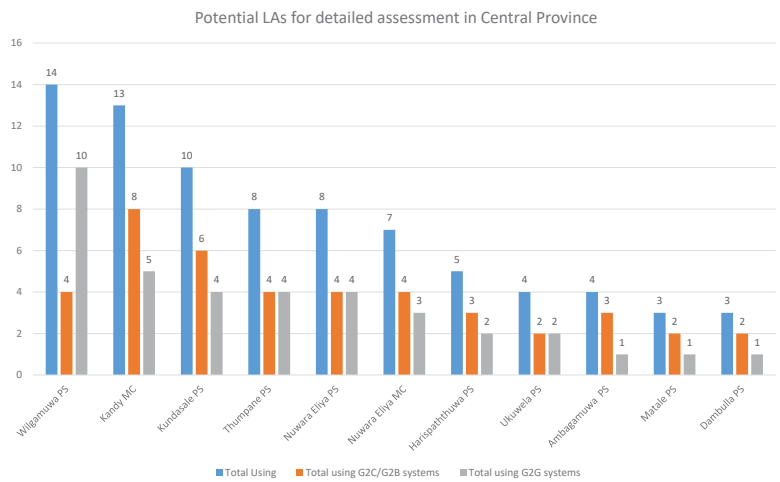
- District-wise overall eGov system availability and usage.
- District-wise overall G2C/G2B systems and G2G systems availability and usage.
- District-wise summary of Las with availability and usage of eGov systems
- District-wise overall stratified clusters
- District-wise overall for cluster 2, cluster 3 and cluster 4
- District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4.
- Provincial availability distribution of eGov systems
- District-wise availability distribution of eGov systems

Potential LAs identified for detailed assessment

Province	District	MC	UC	PS	Total
Central	Kandy	1	0	3	**4**
	Matale	0	0	4	**4**
	Nuwaraeliya	1	0	2	**3**
Southern	Galle	0	1	3	**4**
	Matara	1	0	3	**4**
	Hambantota	1	0	1	**2**
Western	Colombo	3	0	2	**5**
	Gampaha	1	1	5	**7**
	Kalutara	0	3	0	**3**
Sabaragamuwa	Kegalle	0	0	5	**5**
	Ratnapura	0	2	4	**6**
North Western	Kurunegala	1	2	6	**9**
	Puttalam	0	1	3	**4**
Total		**9**	**10**	**42**	**61**

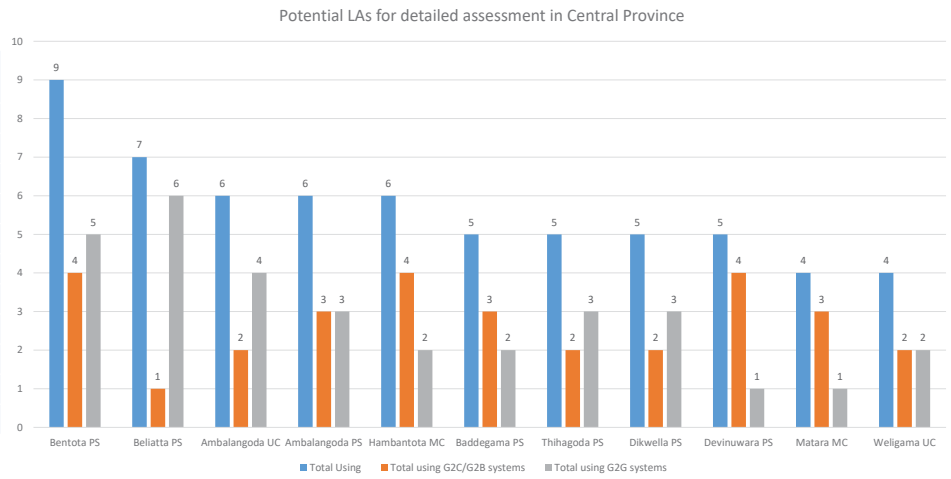
Central Province

S.No	District	Name of LA (MC/UC/PS)
1	Matale	Wilgamuwa PS
2	Kandy	Kandy MC
3	Kandy	Kundasale PS
4	Kandy	Thumpane PS
5	Nuwara Eliya	Nuwara Eliya PS
6	Nuwara Eliya	Nuwara Eliya MC
7	Kandy	Harispaththuwa PS
8	Matale	Ukuwela PS
9	Nuwaraeliya	Ambagamuwa PS
10	Matale	Matale PS
11	Matale	Dambulla PS



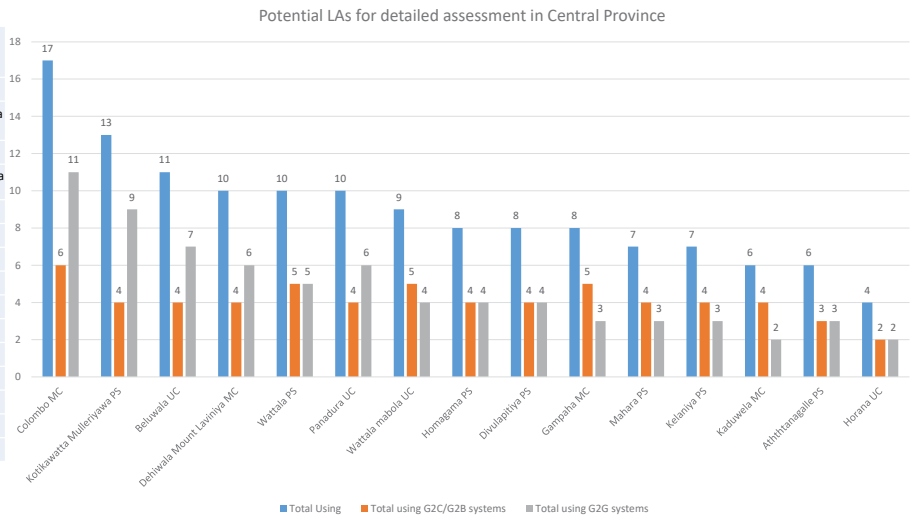
Southern Province

S.No	District	Name of LA (MC/UC/PS)
1	Galle	Bentota PS
2	Hambantota	Beliatta PS
3	Galle	Ambalangoda UC
4	Galle	Ambalangoda PS
5	Hambantota	Hambantota MC
6	Galle	Baddegama PS
7	Matara	Thihagoda PS
8	Matara	Dikwella PS
9	Matara	Devinuwara PS
10	Matara	Matara MC
11	Matara	Weligama UC



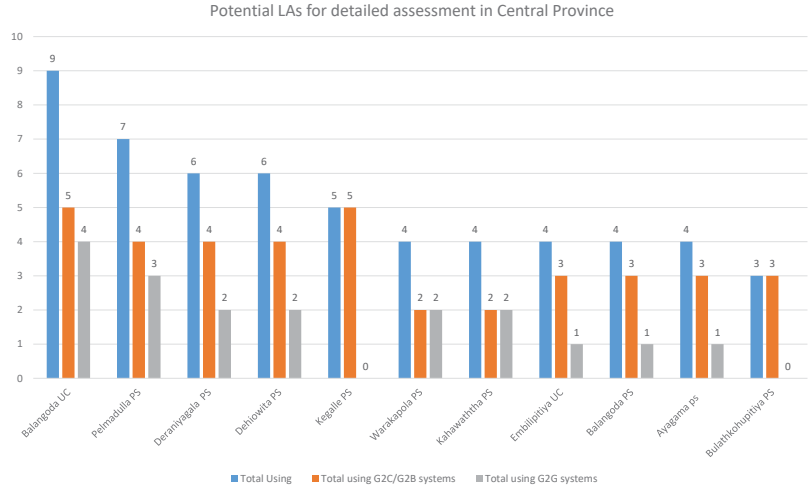
Western Province

S.No	District	Name of LA (MC/UC/PS)
1	Colombo	Colombo MC
2	Colombo	Kotikawatta Mulleriyawa PS
3	Kalutara	Beluwala UC
4	Colombo	Dehiwala Mount Laviniya MC
5	Gampaha	Wattala PS
6	kalutara	Panadura UC
7	Gampaha	Wattala mabola UC
8	Colombo	Homagama PS
9	Gampaha	Divulapitiya PS
10	Gampaha	Gampaha MC
11	Gampaha	Mahara PS
12	Gampaha	Kelaniya PS
13	Colombo	Kaduwela MC
14	Gampaha	Aththtanagalle PS
15	Kalutara	Horana UC



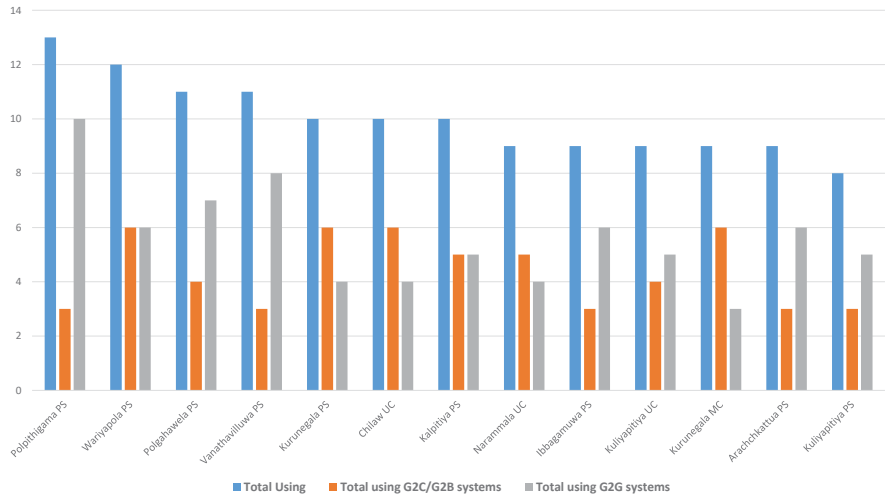
Sabaragamuwa Province

S.No	District	Name of LA (MC/UC/PS)
1	Ratnapura	Balangoda UC
2	Rathnapura	Pelmadulla PS
3	Kegalle	Deraniyagala PS
4	Kegalle	Dehiowita PS
5	Kegalle	Kegalle PS
6	Kegalle	Warakapola PS
7	Rathnapura	Kahawaththa PS
8	Rathnapura	Embilipitiya UC
9	Rathnapura	Balangoda PS
10	Rathnapura	Ayagama ps
11	Kegalle	Bulathkohupitiya PS



North Western Province

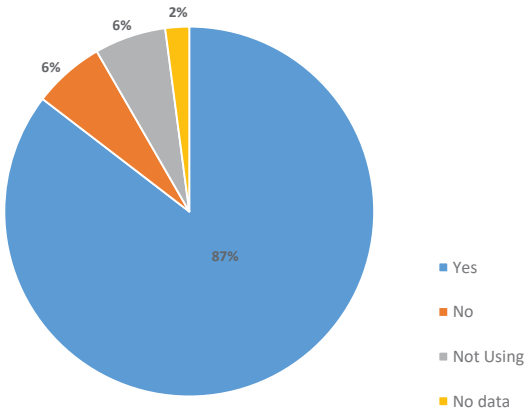
S.No	District	Name of LA (MC/UC/PS)
1	Kurunegala	Polpithigama PS
2	Kurunegala	Wariyapola PS
3	Kurunegala	Polgahawela PS
4	Puttalam	Vanathavilluwa PS
5	Kurunegala	Kurunegala PS
6	Puttalam	Chilaw UC
7	Puttalam	Kalpitiya PS
8	Kurunegala	Narammala UC
9	Kurunegala	Ibbagamuwa PS
10	Kurunegala	Kuliyapitiya UC
11	Kurunegala	Kurunegala MC
12	Puttalam	Arachchkattua PS
13	Kurunegala	Kuliyapitiya PS



Central Province

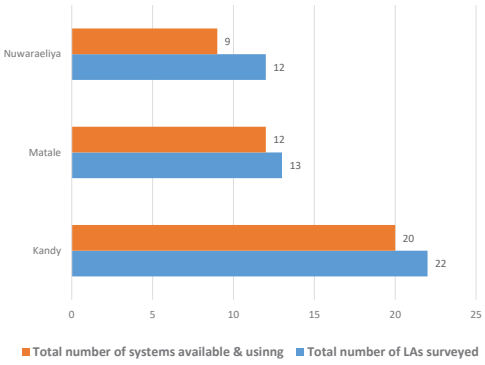
Central Province - overall eGov system availability

Availability	No of LAs	% of LAs
Yes	41	87%
No	3	6%
Not Using	3	6%
No data	1	2%



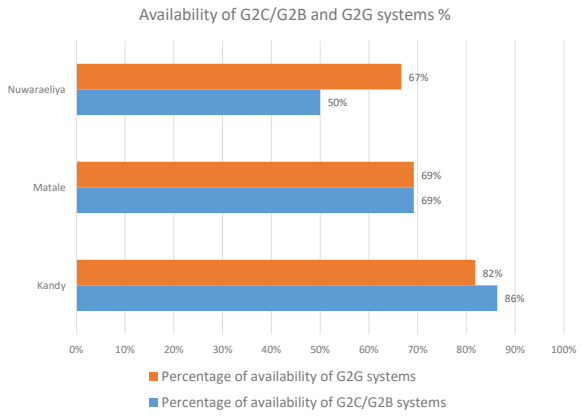
District-wise overall availability and usage of eGov systems

District	Total number of LAs surveyed	No of LAs with systems available & using	% of LAs with systems available and using
Kandy	22	20	91%
Matale	13	12	92%
Nuwaraeliya	12	9	75%



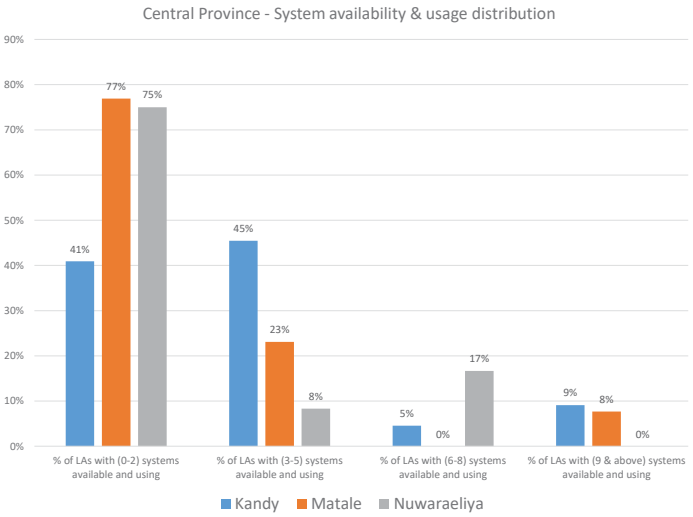
District-wise overall G2C/G2B systems & G2G systems availability & usage

District	Total number of LAs surveyed	Overall Availability of G2C/G2B systems	Percentage of availability of G2C/G2B systems	Overall Availability of G2G systems	Percentage of availability of G2G systems
Kandy	22	19	86%	18	82%
Matale	13	9	69%	9	69%
Nuwaraeliya	12	6	50%	8	67%



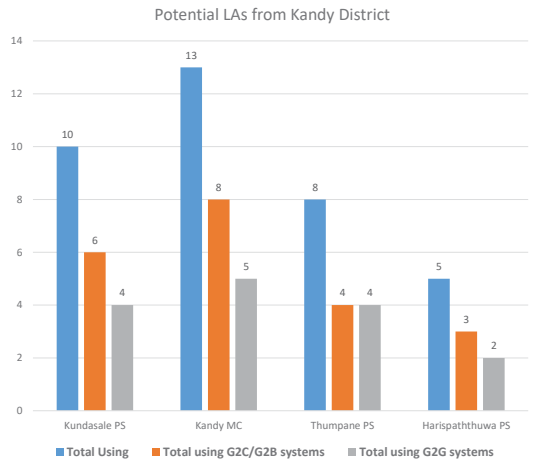
District-wise overall distribution stratified clusters

District	Kandy	Matale	Nuwaraeliya
% of LAs with (0-2) systems available and using	41%	77%	75%
% of LAs with (3-5) systems available and using	45%	23%	8%
% of LAs with (6-8) systems available and using	5%	0%	17%
% of LAs with (9 & above) systems available and using	9%	8%	0%



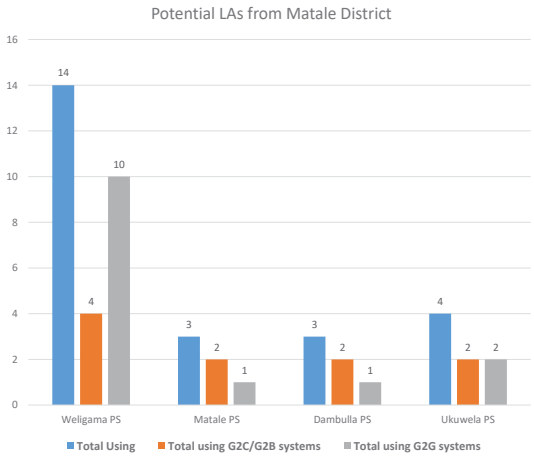
Kandy - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

1.2 Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Kundasale PS	15	10	6	6	9	4
Kandy MC	13	13	8	8	5	5
Thumpane PS	9	8	4	4	5	4
Harispaththuwa PS	6	5	4	3	2	2



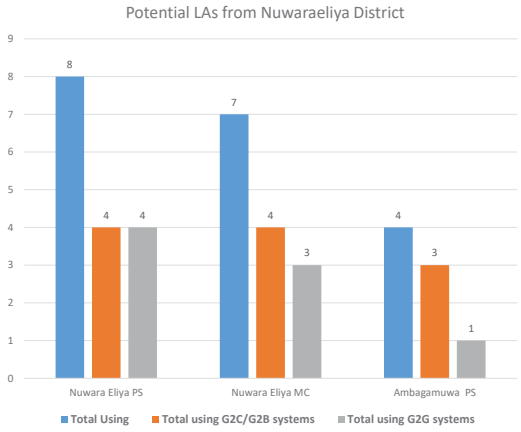
Matale - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

1.2 Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Wilgamuwa PS	14	14	4	4	10	10
Matale PS	5	3	3	2	2	1
Dambulla PS	3	3	2	2	1	1
Ukuwela PS	5	4	3	2	2	2



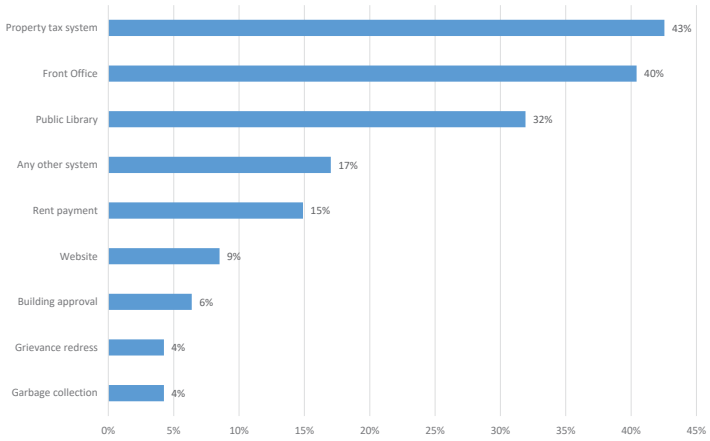
Nuwaraeliya -District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

1.2 Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Nuwara Eliya PS	8	8	4	4	4	4
Nuwara Eliya MC	9	7	5	4	4	3
Ambagamuwa PS	4	4	3	3	1	1



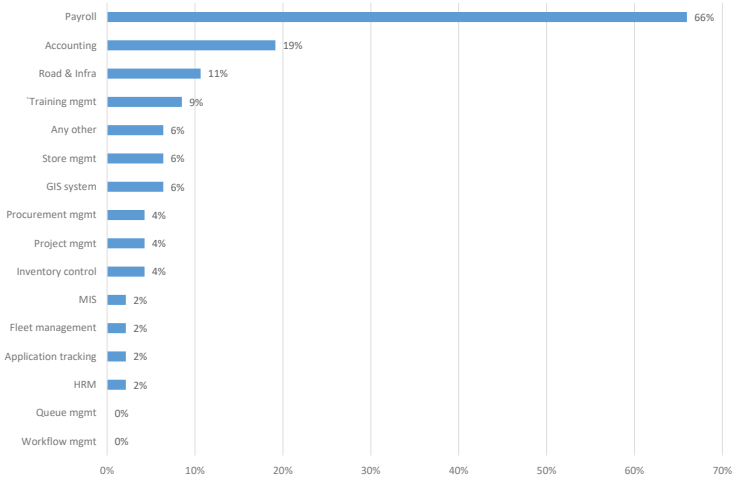
Central Province - Availability distribution of eGov systems – G2C/G2B

eGov System	No of LAs with systems Available and using	% of LAs with systems available and using
Garbage collection	2	4%
Grievance redress	2	4%
Building approval	3	6%
Website	4	9%
Rent payment	7	15%
Any other system	8	17%
Public Library	15	32%
Front Office	19	40%
Property tax system	20	43%



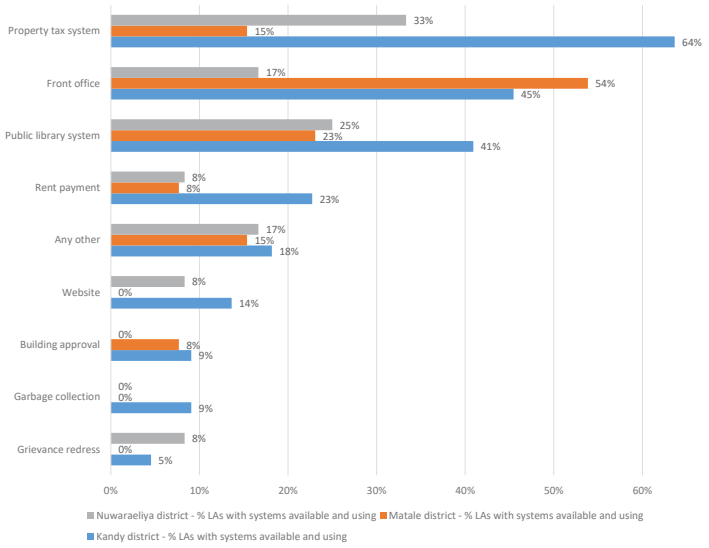
Central Province - Availability distribution of eGov systems – G2G

eGov System	No of Available and using	% of available and using
Workflow mgmt	0	0%
Queue mgmt	0	0%
HRM	1	2%
Application tracking	1	2%
Fleet management	1	2%
MIS	1	2%
Inventory control	2	4%
Project mgmt	2	4%
Procurement mgmt	2	4%
GIS system	3	6%
Store mgmt	3	6%
Any other	3	6%
`Training mgmt	4	9%
Road & Infra	5	11%
Accounting	9	19%
Payroll	31	66%



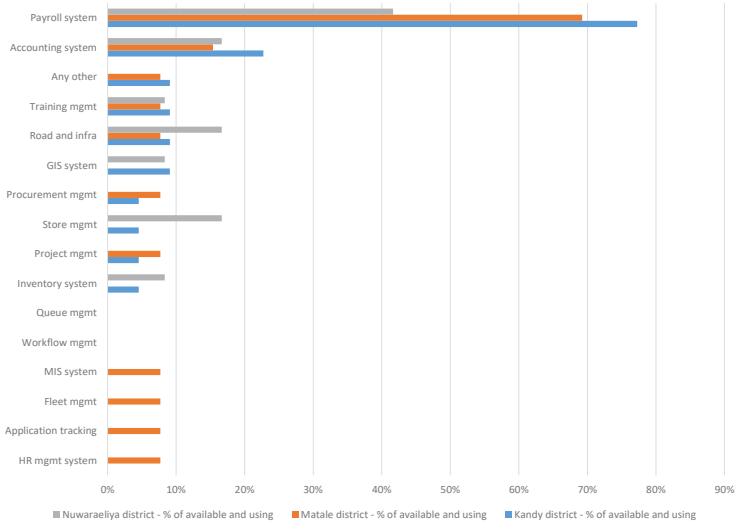
District-wise Availability distribution of eGov systems – G2C/G2B

eGov System	Kandy district - % LAs with systems available and using	Matale district - % LAs with systems availabl e and using	Nuwarael iya district - % LAs with systems available and using
Grievance redress	5%	0%	8%
Garbage collection	9%	0%	0%
Building approval	9%	8%	0%
Website	14%	0%	8%
Any other	18%	15%	17%
Rent payment	23%	8%	8%
Public library system	41%	23%	25%
Front office	45%	54%	17%
Property tax system	64%	15%	33%



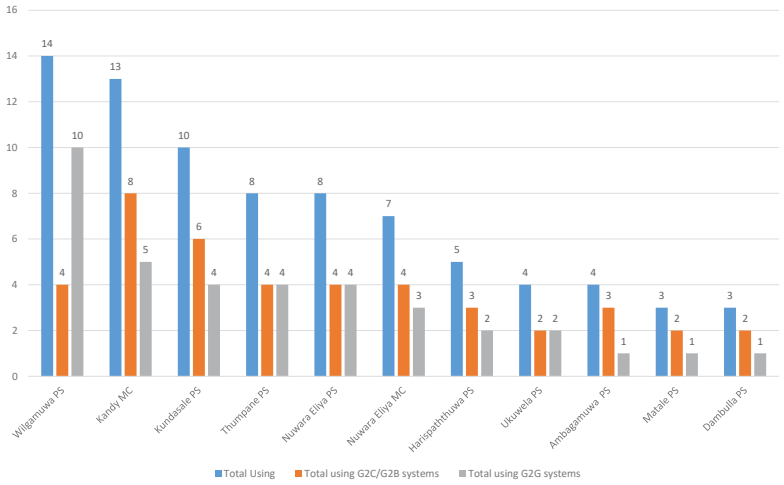
District-wise Availability distribution of eGov systems – G2G

eGov System	Kandy district - % of available and using	Matale district - % of available and using	Nuwaraeliya district - % of available and using
HR mgmt system	0%	8%	0%
Application tracking	0%	8%	0%
Fleet mgmt	0%	8%	0%
MIS system	0%	8%	0%
Workflow mgmt	0%	0%	0%
Queue mgmt	0%	0%	0%
Inventory system	5%	0%	8%
Project mgmt	5%	8%	0%
Store mgmt	5%	0%	17%
Procurement mgmt	5%	8%	0%
GIS system	9%	0%	8%
Road and infra	9%	8%	17%
Training mgmt	9%	8%	8%
Any other	9%	8%	0%
Accounting system	23%	15%	17%
Payroll system	77%	69%	42%



Selected/Potential list of LAs in Central Province

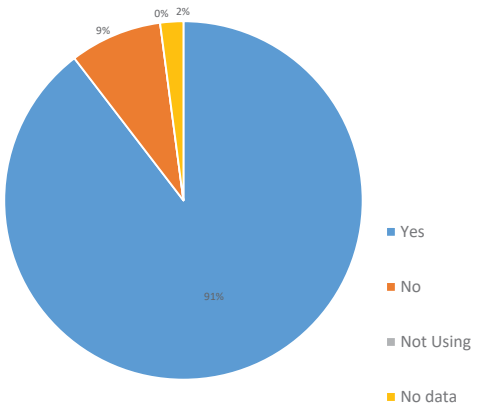
District	Name of LA (MC/UC/PS)
Matale	Wilgamuwa PS
Kandy	Kandy MC
Kandy	Kundasale PS
Kandy	Thumpane PS
Nuwaraeliya	Nuwara Eliya PS
Nuwara Eliya	Nuwara Eliya MC
Kandy	Harispaththuwa PS
Matale	Ukuwela PS
Nuwaraeliya	Ambagamuwa PS
Matale	Matale PS
Matale	Dambulla PS



Southern Province

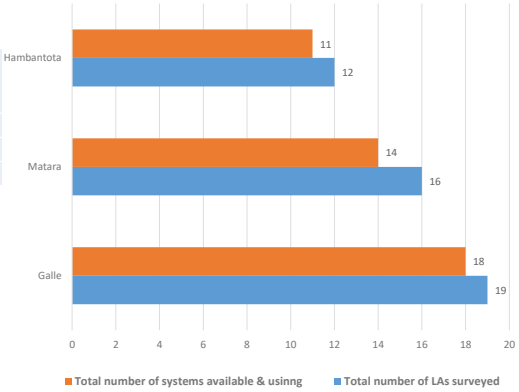
Southern Province - overall eGov system availability

Availability	No of LAs	% of LAs
Yes	43	91%
No	4	9%
Not Using	0	0%
No data	1	2%



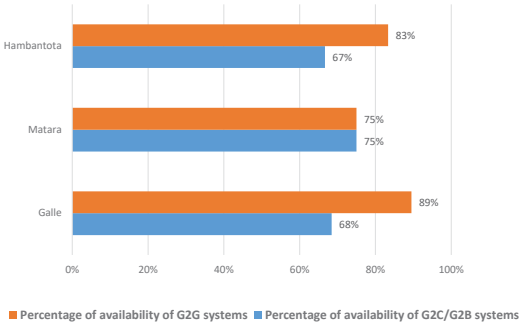
District-wise overall availability and usage of eGov systems in Southern Province

District	Total number of LAs surveyed	No of LAs with systems available & using	% of LAs with systems available and using
Galle	19	18	95%
Matara	16	14	88%
Hambantota	12	11	92%



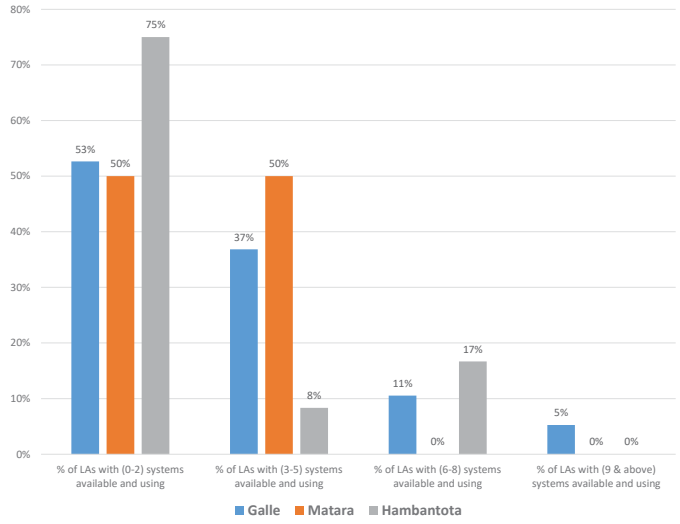
District-wise overall G2C/G2B systems & G2G systems availability & usage in Southern Province

District	Total number of LAs surveyed	Overall Availability of G2C/G2B systems	Percentage of availability of G2C/G2B systems	Overall Availability of G2G systems	Percentage of availability of G2G systems
Galle	19	13	68%	17	89%
Matara	16	12	75%	12	75%
Hambantota	12	8	67%	10	83%



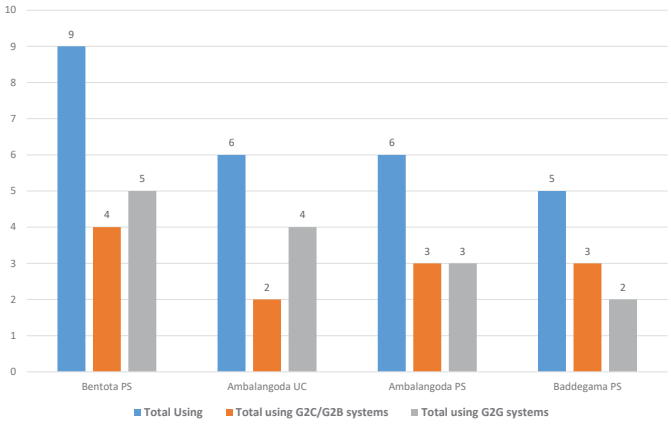
District-wise overall distribution stratified clusters in Southern Province

District	Galle	Matara	Hambantota
% of LAs with (0-2) systems available and using	53%	50%	75%
% of LAs with (3-5) systems available and using	37%	50%	8%
% of LAs with (6-8) systems available and using	11%	0%	17%
% of LAs with (9 & above) systems available and using	5%	0%	0%



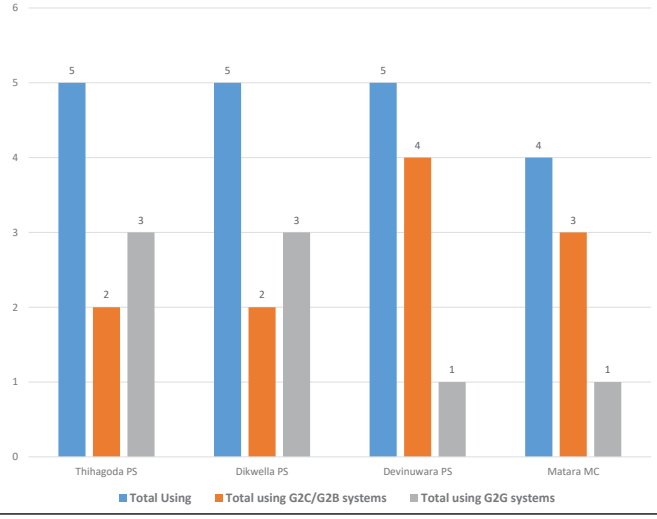
Galle - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Bentota PS	10	9	5	4	5	5
Ambalangoda UC	8	6	3	2	5	4
Ambalangoda PS	8	6	5	3	3	3
Baddegama PS	7	5	4	3	3	2



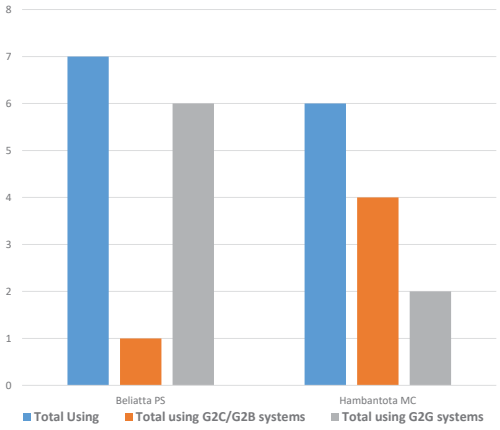
Matara - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Thihagoda PS	5	5	2	2	3	3
Dikwella PS	5	5	2	2	3	3
Devinuwara PS	5	5	4	4	1	1
Matara MC	4	4	3	3	1	1



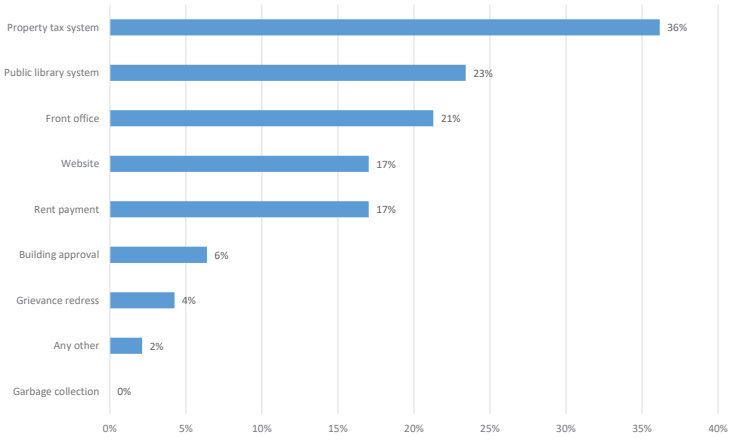
Hambantota -District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Beliatta PS	9	7	3	1	6	6
Hambantota MC	6	6	4	4	2	2



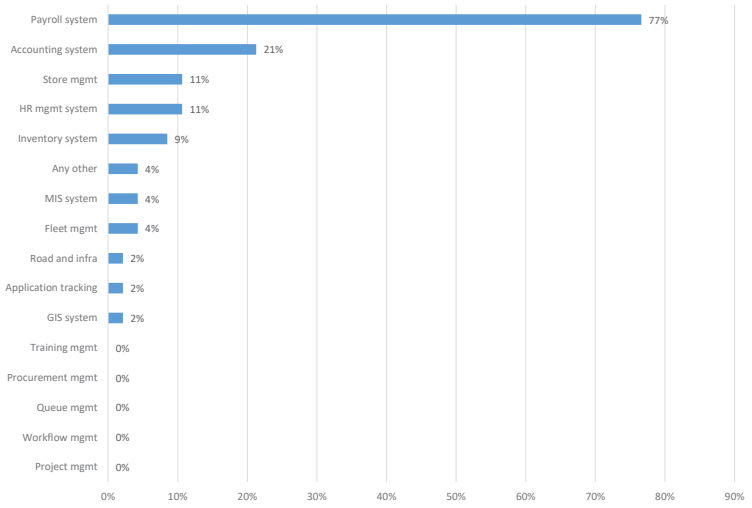
Southern Province - Availability distribution of eGov systems – G2C/G2B

eGov System	No of LAs with systems Available and using	% of LAs with systems available and using
Garbage collection	0	0%
Any other	1	2%
Grievance redress	2	4%
Building approval	3	6%
Rent payment	8	17%
Website	8	17%
Front office	10	21%
Public library system	11	23%
Property tax system	17	36%



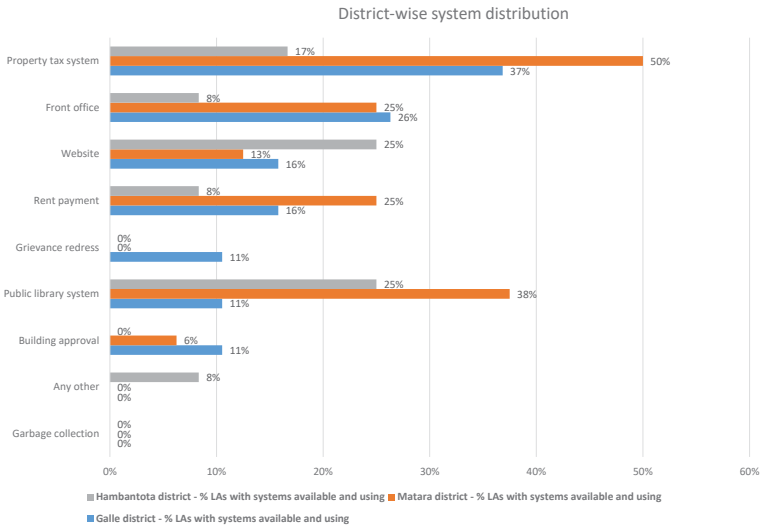
Southern Province - Availability distribution of eGov systems – G2G

eGov System	No of Available and using	% of available and using
Project mgmt	0	0%
Workflow mgmt	0	0%
Queue mgmt	0	0%
Procurement mgmt	0	0%
Training mgmt	0	0%
GIS system	1	2%
Application tracking	1	2%
Road and infra	1	2%
Fleet mgmt	2	4%
MIS system	2	4%
Any other	2	4%
Inventory system	4	9%
HR mgmt system	5	11%
Store mgmt	5	11%
Accounting system	10	21%
Payroll system	36	77%



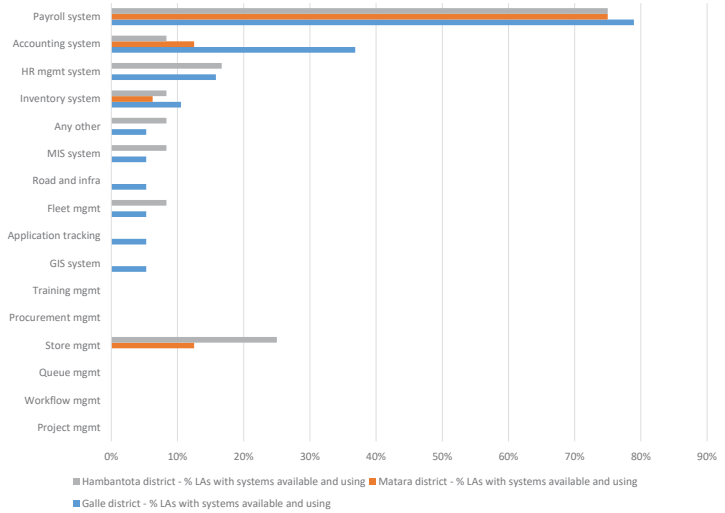
District-wise Availability distribution of eGov systems – G2C/G2B

eGov System	Galle district - % LAs with systems available and using	Matara district - % LAs with systems available and using	Hambantota district - % LAs with systems available and using
Garbage collection	0%	0%	0%
Any other	0%	0%	8%
Building approval	11%	6%	0%
Public library system	11%	38%	25%
Grievance redress	11%	0%	0%
Rent payment	16%	25%	8%
Website	16%	13%	25%
Front office	26%	25%	8%
Property tax system	37%	50%	17%



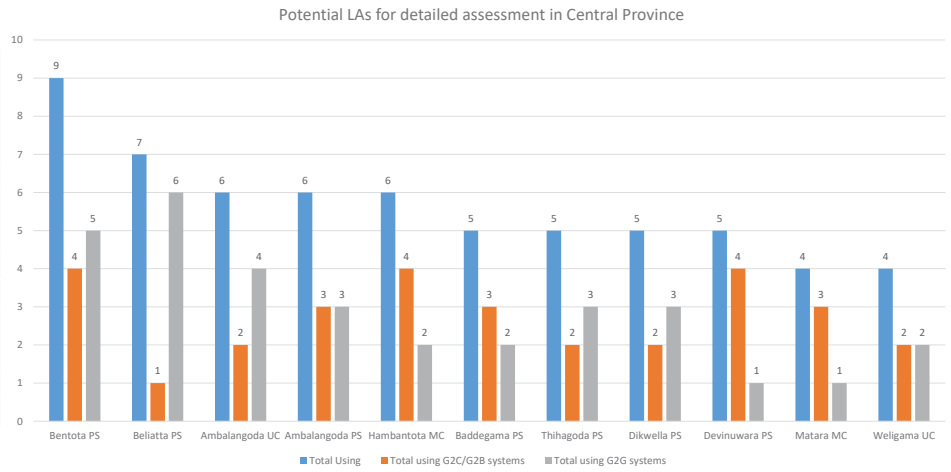
District-wise Availability distribution of eGov systems – G2G

eGov System	Kandy district - % of available and using	Matale district - % of available and using	Nuwaraeliya district - % of available and using
Project mgmt	0%	0%	0%
Workflow mgmt	0%	0%	0%
Queue mgmt	0%	0%	0%
Store mgmt	0%	13%	25%
Procurement mgmt	0%	0%	0%
Training mgmt	0%	0%	0%
GIS system	5%	0%	0%
Application tracking	5%	0%	0%
Fleet mgmt	5%	0%	8%
Road and infra	5%	0%	0%
MIS system	5%	0%	8%
Any other	5%	0%	8%
Inventory system	11%	6%	8%
HR mgmt system	16%	0%	17%
Accounting system	37%	13%	8%
Payroll system	79%	75%	75%



Southern Province

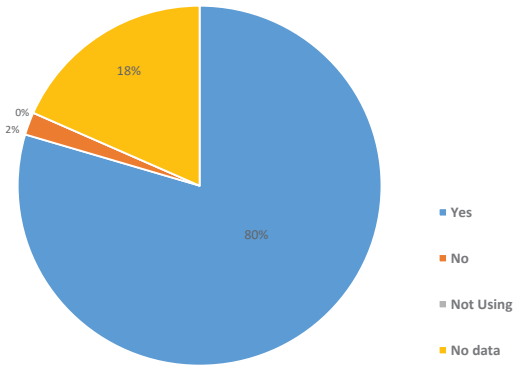
S.No	District	Name of LA (MC/UC/PS)
1	Galle	Bentota PS
2	Hambantota	Beliatta PS
3	Galle	Ambalangoda UC
4	Galle	Ambalangoda PS
5	Hambantota	Hambantota MC
6	Galle	Baddegama PS
7	Matara	Thihagoda PS
8	Matara	Dikwella PS
9	Matara	Devinuwara PS
10	Matara	Matara MC
11	Matara	Weligama UC



Western Province

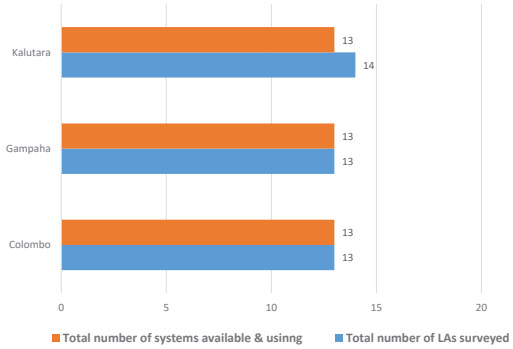
Western Province - overall eGov system availability

Availability	No of LAs	% of LAs
Yes	39	80%
No	1	2%
Not Using	0	0%
No data	9	18%



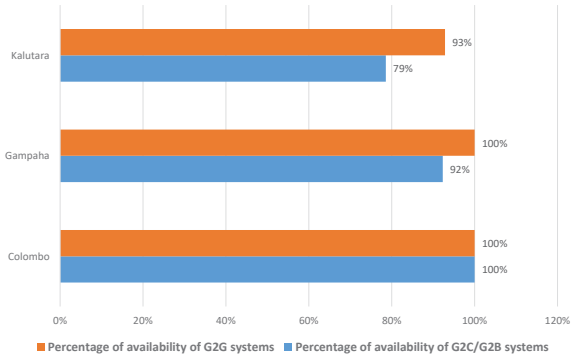
District-wise overall availability and usage of eGov systems in Western Province

District	Total number of LAs surveyed	No of LAs with systems available & using	% of LAs with systems available and using
Colombo	13	13	100%
Gampaha	13	13	100%
Kalutara	14	13	93%



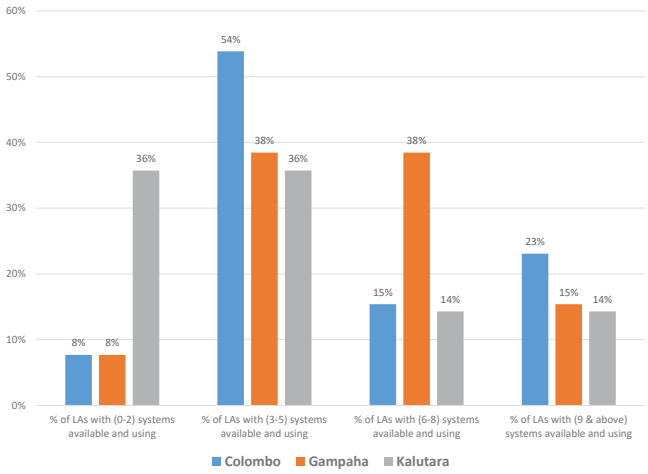
District-wise overall G2C/G2B systems & G2G systems availability & usage in Western Province

District	Total number of LAs surveyed	Overall Availability of G2C/G2B systems	Percentage of availability of G2C/G2B systems	Overall Availability of G2G systems	Percentage of availability of G2G systems
Colombo	13	13	100%	13	100%
Gampaha	13	12	92%	13	100%
Kalutara	14	11	79%	13	93%



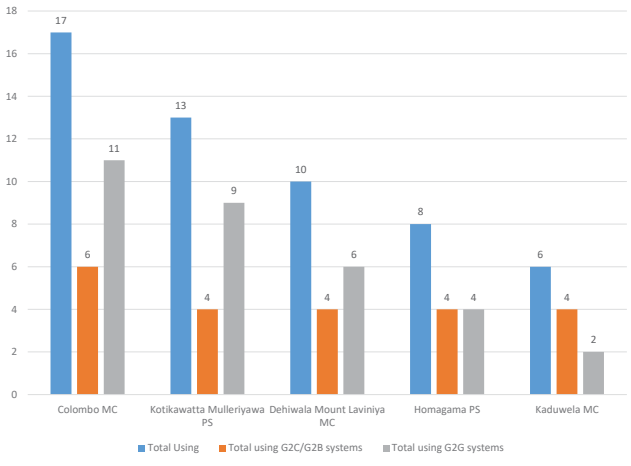
District-wise overall distribution stratified clusters in Western Province

District	Colombo	Gampaha	Kalutara
% of LAs with (0-2) systems available and using	8%	8%	36%
% of LAs with (3-5) systems available and using	54%	38%	36%
% of LAs with (6-8) systems available and using	15%	38%	14%
% of LAs with (9 & above) systems available and using	23%	15%	14%



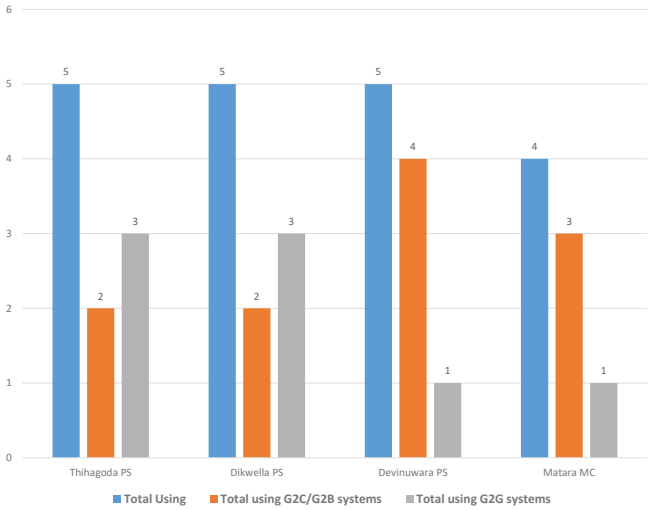
Colombo - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Colombo MC	17	17	6	6	11	11
Kotikawatta Mulleriyawa PS	15	13	5	4	10	9
Dehiwala Mount Laviniya MC	11	10	4	4	7	6
Homagama PS	24	8	9	4	15	4
Kaduwela MC	7	6	4	4	3	2



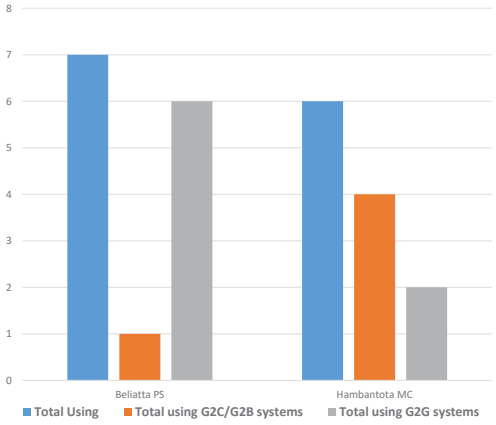
Gampaha - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G 2B systems	Total available G2G systems	Total using G2G systems
Thihagoda PS	5	5	2	2	3	3
Dikwella PS	5	5	2	2	3	3
Devinuwara PS	5	5	4	4	1	1
Matara MC	4	4	3	3	1	1



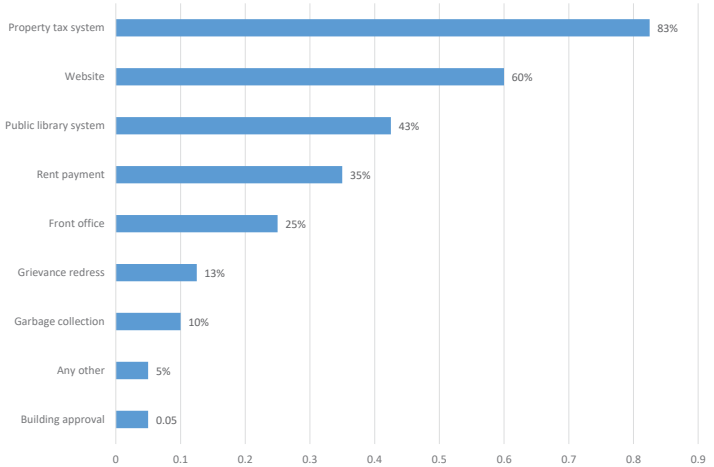
Kalutara -District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G 2B systems	Total available G2G systems	Total using G2G systems
Beliatta PS	9	7	3	1	6	6
Hambantota MC	6	6	4	4	2	2



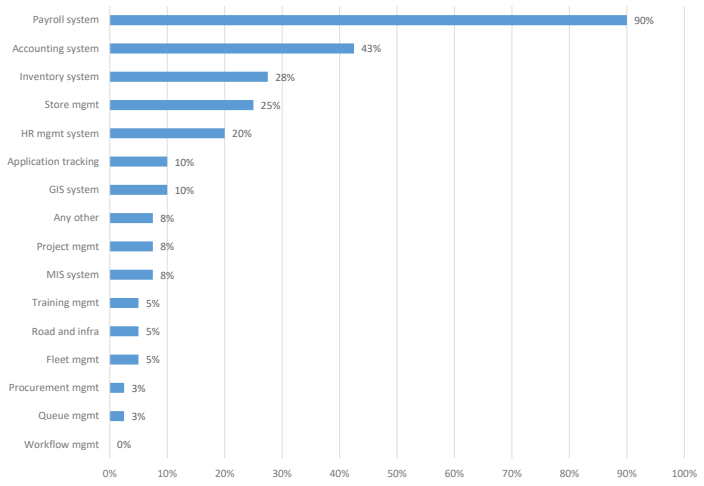
Western Province - Availability distribution of eGov systems – G2C/G2B

eGov System	No of LAs with systems Available and using	% of LAs with systems available and using
Building approval	2	0.05
Any other	2	5%
Garbage collection	4	10%
Grievance redress	5	13%
Front office	10	25%
Rent payment	14	35%
Public library system	17	43%
Website	24	60%
Property tax system	33	83%



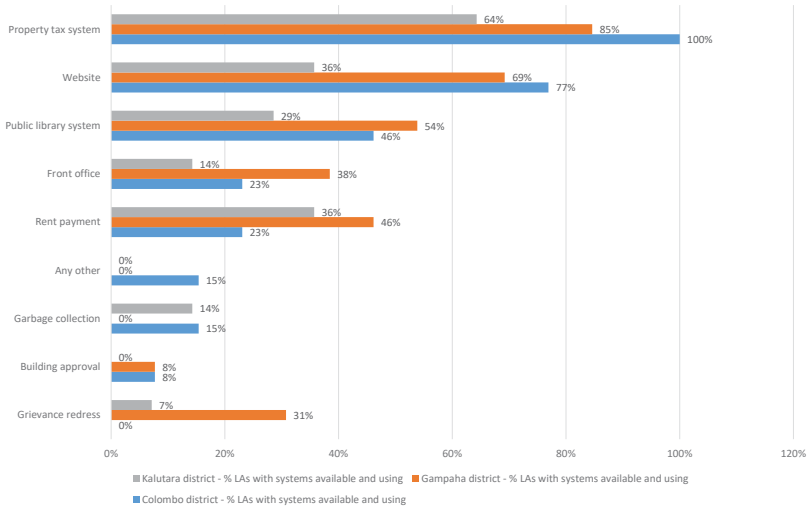
Western Province - Availability distribution of eGov systems – G2G

eGov System	No of Available and using	% of available and using
Workflow mgmt	0	0%
Queue mgmt	1	3%
Procurement mgmt	1	3%
Fleet mgmt	2	5%
Road and infra	2	5%
Training mgmt	2	5%
MIS system	3	8%
Project mgmt	3	8%
Any other	3	8%
GIS system	4	10%
Application tracking	4	10%
HR mgmt system	8	20%
Store mgmt	10	25%
Inventory system	11	28%
Accounting system	17	43%
Payroll system	36	90%



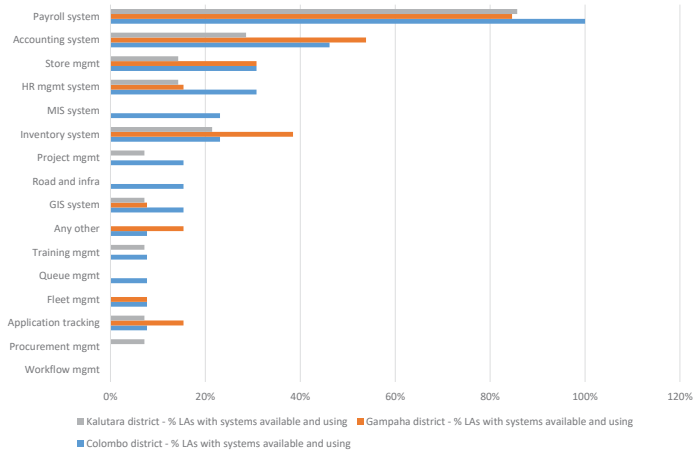
District-wise Availability distribution of eGov systems – G2C/G2B

eGov System	Colombo district - % LAs with systems available and using	Gampaha district - % LAs with systems available and using	Kalutara district - % LAs with systems available and using
Grievance redress	0%	31%	7%
Building approval	8%	8%	0%
Garbage collection	15%	0%	14%
Any other	15%	0%	0%
Rent payment	23%	46%	36%
Front office	23%	38%	14%
Public library system	46%	54%	29%
Website	77%	69%	36%
Property tax system	100%	85%	64%



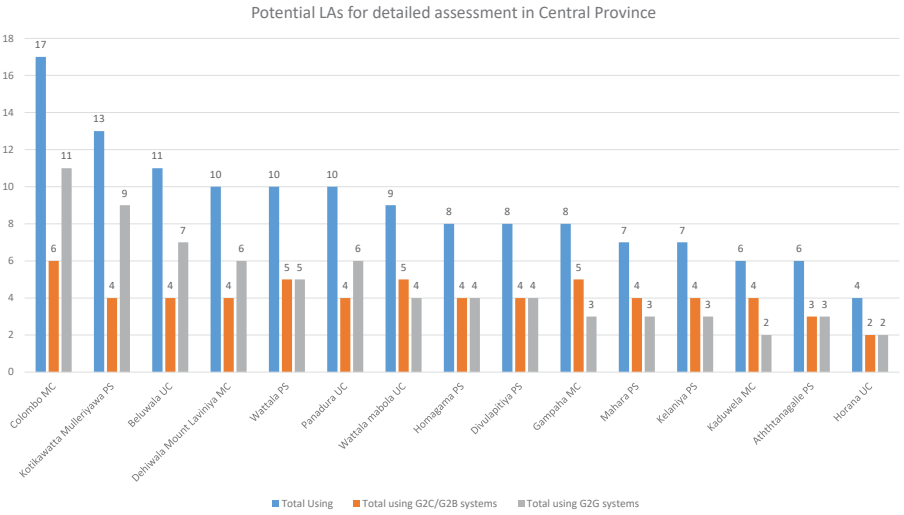
District-wise Availability distribution of eGov systems – G2G

eGov System	Colombo district - % of available and using	Gampaha district - % of available and using	Kalutara district - % of available and using
Workflow mgmt	0%	0%	0%
Procurement mgmt	0%	0%	7%
Application tracking	8%	15%	7%
Fleet mgmt	8%	8%	0%
Queue mgmt	8%	0%	0%
Training mgmt	8%	0%	7%
Any other	8%	15%	0%
GIS system	15%	8%	7%
Road and infra	15%	0%	0%
Project mgmt	15%	0%	7%
Inventory system	23%	38%	21%
MIS system	23%	0%	0%
HR mgmt system	31%	15%	14%
Store mgmt	31%	31%	14%
Accounting system	46%	54%	29%
Payroll system	100%	85%	86%



Western Province

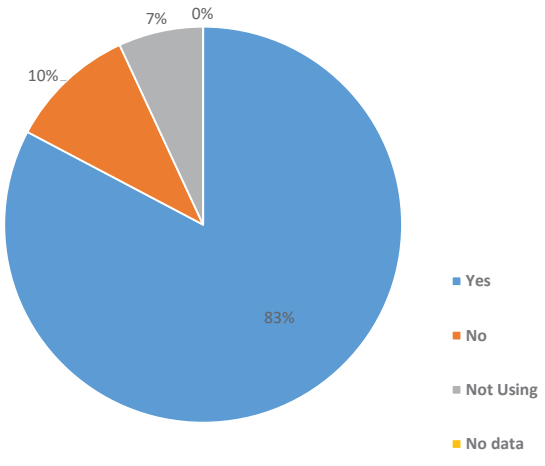
S.No	District	Name of LA (MC/UC/PS)
1	Colombo	Colombo MC
2	Colombo	Kotikawatta Mulleriyawa PS
3	Kalutara	Beluwala UC
4	Colombo	Dehiwala Mount Laviniya MC
5	Gampaha	Wattala PS
6	kalutara	Panadura UC
7	Gampaha	Wattala mabola UC
8	Colombo	Homagama PS
9	Gampaha	Divulapitiya PS
10	Gampaha	Gampaha MC
11	Gampaha	Mahara PS
12	Gampaha	Kelaniya PS
13	Colombo	Kaduwela MC
14	Gampaha	Aththtanagalle PS
15	Kalutara	Horana UC



Sabaragamuwa Province

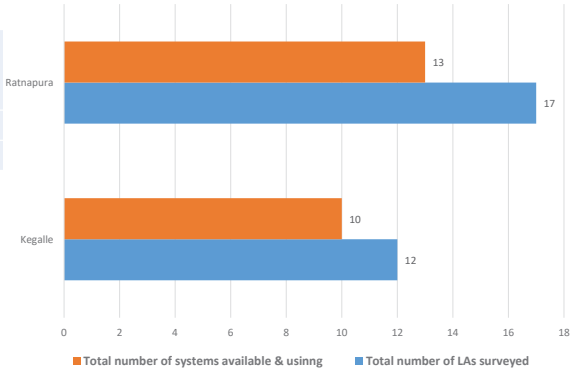
Sabaragamuwa Province - overall eGov system availability

Availability	No of LAs	% of LAs
Yes	24	83%
No	3	10%
Not Using	2	7%
No data	0	0%



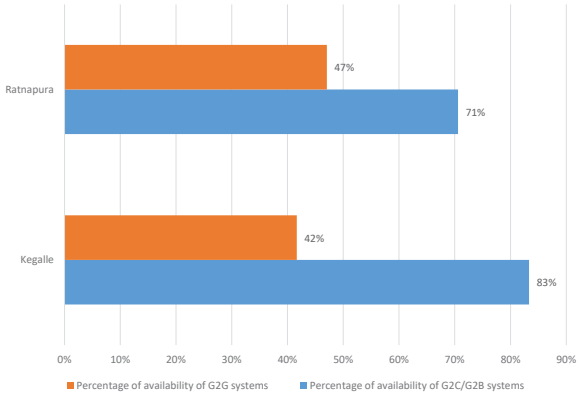
District-wise overall availability and usage of eGov systems in Sabaragamuwa Province

District	Total number of LAs surveyed	No of LAs with systems available & using	% of LAs with systems available and using
Kegalle	12	10	83%
Ratnapura	17	13	76%



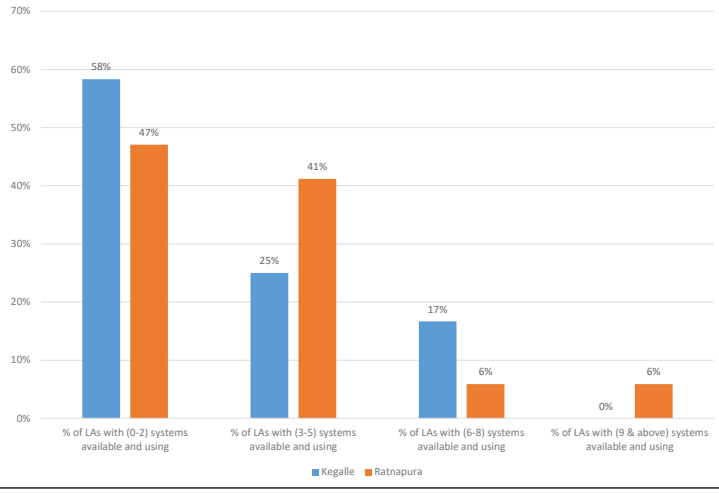
District-wise overall G2C/G2B systems & G2G systems availability & usage in Sabaragamuwa Province

District	Total number of LAs surveyed	Overall Availability of G2C/G2B systems	Percentage of availability of G2C/G2B systems	Overall Availability of G2G systems	Percentage of availability of G2G systems
Kegalle	12	10	83%	5	42%
Ratnapura	17	12	71%	8	47%



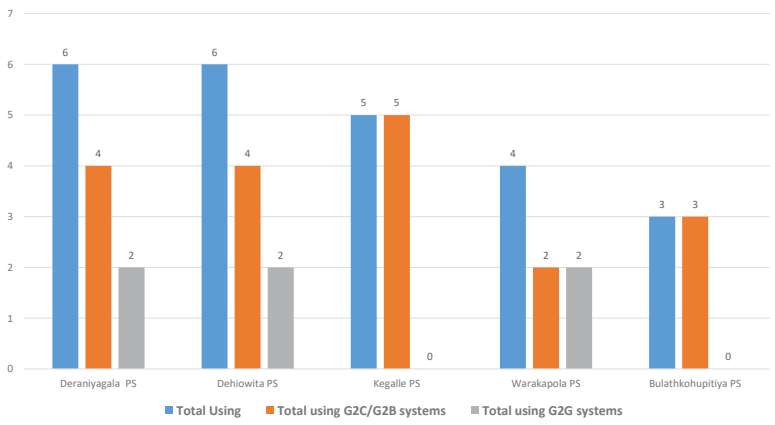
District-wise overall distribution stratified clusters in Sabaragamuwa Province

District	Kegalle	Ratnapura
% of LAs with (0-2) systems available and using	58%	47%
% of LAs with (3-5) systems available and using	25%	41%
% of LAs with (6-8) systems available and using	17%	6%
% of LAs with (9 & above) systems available and using	0%	6%



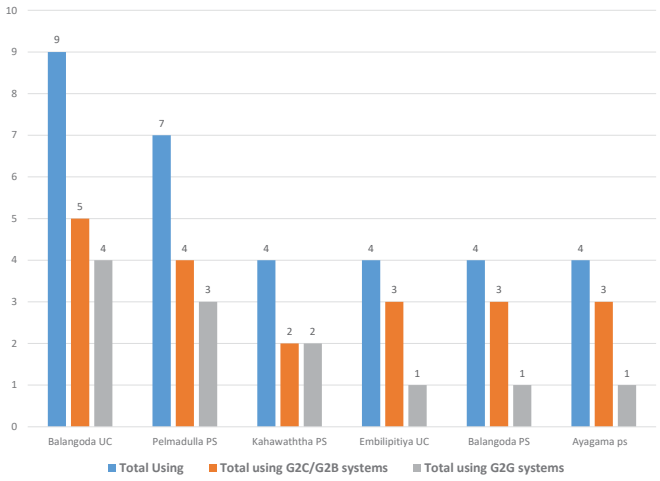
Kegalle - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/ G2B systems	Total available G2G systems	Total using G2G systems
Deraniyagala PS	6	6	4	4	2	2
Dehiowita PS	6	6	4	4	2	2
Kegalle PS	5	5	5	5	0	0
Warakapola PS	4	4	2	2	2	2
Bulathkohupitiya PS	3	3	3	3	0	0



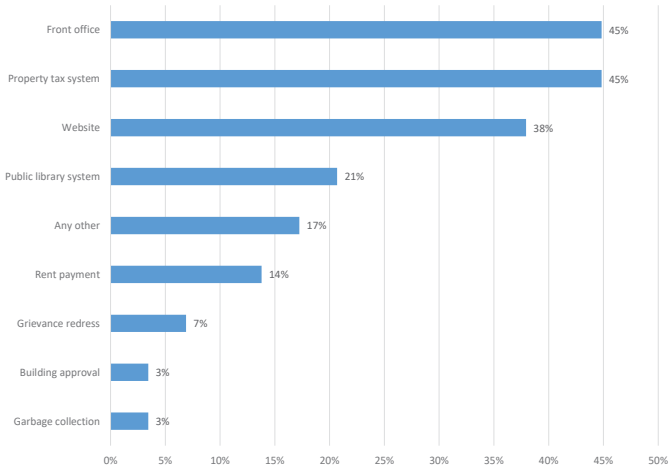
Ratnapura - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Balangoda UC	10	9	5	5	5	4
Pelmadulla PS	8	7	5	4	3	3
Kahawaththa PS	8	4	4	2	4	2
Embilipitiya UC	6	4	5	3	1	1
Balangoda PS	5	4	4	3	1	1
Ayagama ps	4	4	3	3	1	1



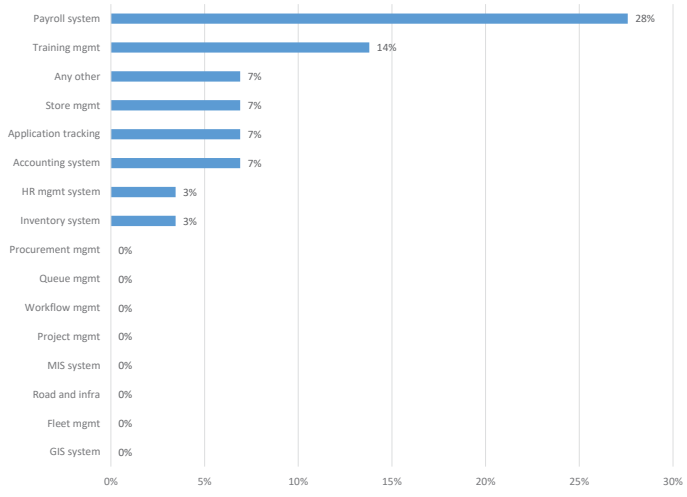
Sabaragamuwa Province - Availability distribution of eGov systems – G2C/G2B

eGov System	No of LAs with systems Available and using	% of LAs with systems available and using
Garbage collection	1	3%
Building approval	1	3%
Grievance redress	2	7%
Rent payment	4	14%
Any other	5	17%
Public library system	6	21%
Website	11	38%
Property tax system	13	45%
Front office	13	45%



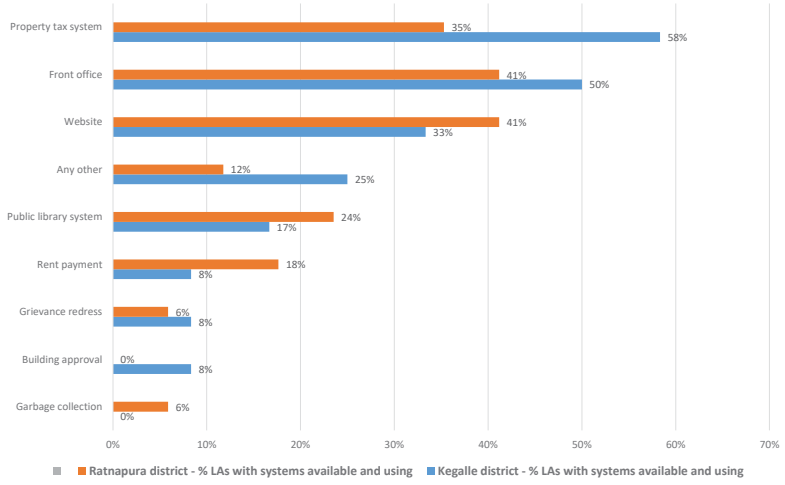
Sabaragamuwa Province - Availability distribution of eGov systems – G2G

eGov System	No of Available and using	% of available and using
GIS system	0	0%
Fleet mgmt	0	0%
Road and infra	0	0%
MIS system	0	0%
Project mgmt	0	0%
Workflow mgmt	0	0%
Queue mgmt	0	0%
Procurement mgmt	0	0%
Inventory system	1	3%
HR mgmt system	1	3%
Accounting system	2	7%
Application tracking	2	7%
Store mgmt	2	7%
Any other	2	7%
Training mgmt	4	14%
Payroll system	8	28%



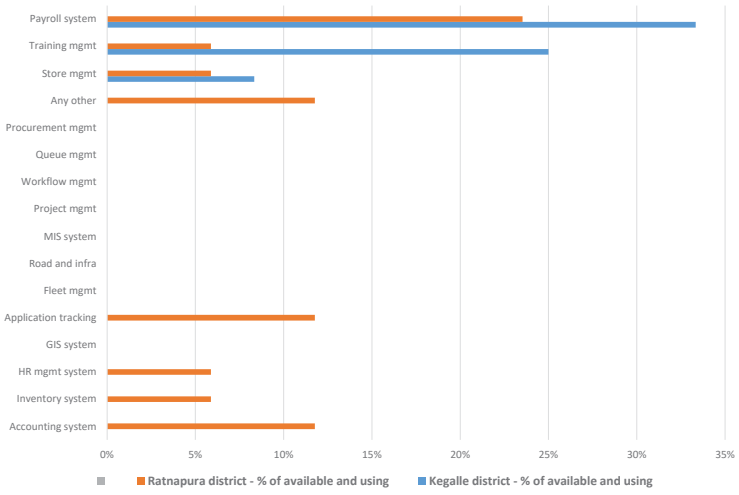
District-wise Availability distribution of eGov systems – G2C/G2B

eGov System	Kegalle district - % LAs with systems available and using	Ratnapura district - % LAs with systems available and using
Garbage collection	0%	6%
Building approval	8%	0%
Grievance redress	8%	6%
Rent payment	8%	18%
Public library system	17%	24%
Any other	25%	12%
Website	33%	41%
Front office	50%	41%
Property tax system	58%	35%



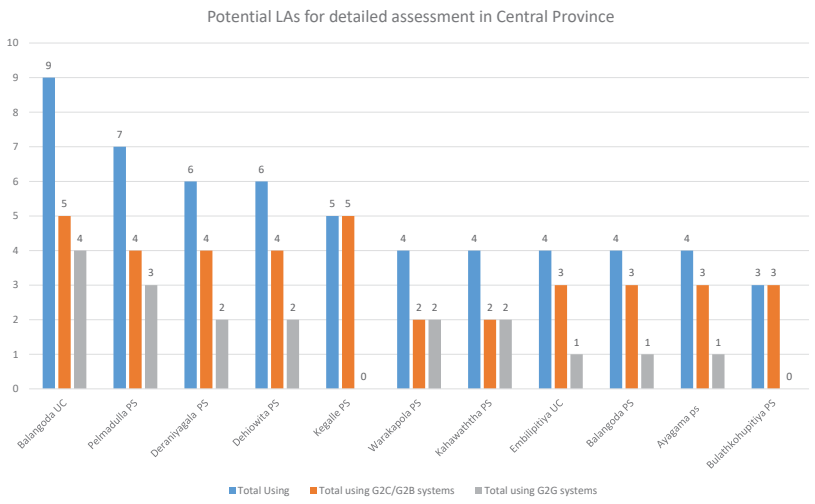
District-wise Availability distribution of eGov systems – G2G

eGov System	Kegalle district - % of available and using	Ratnapura district - % of available and using
Accounting system	0%	12%
Inventory system	0%	6%
HR mgmt system	0%	6%
GIS system	0%	0%
Application tracking	0%	12%
Fleet mgmt	0%	0%
Road and infra	0%	0%
MIS system	0%	0%
Project mgmt	0%	0%
Workflow mgmt	0%	0%
Queue mgmt	0%	0%
Procurement mgmt	0%	0%
Any other	0%	12%
Store mgmt	8%	6%
Training mgmt	25%	6%
Payroll system	33%	24%



Sabaragamuwa Province

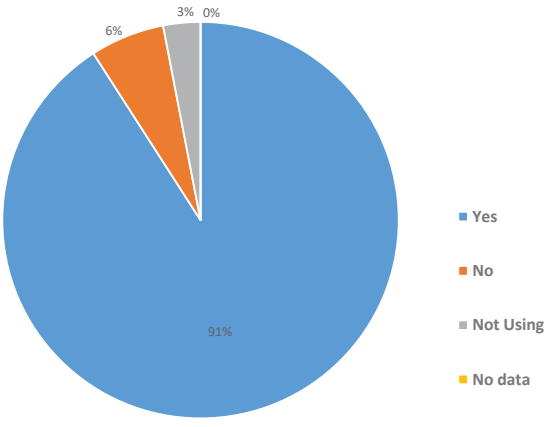
S.No	District	Name of LA (MC/UC/PS)
1	Ratnapura	Balangoda UC
2	Rathnapura	Pelmadulla PS
3	Kegalle	Deraniyagala PS
4	Kegalle	Dehiowita PS
5	Kegalle	Kegalle PS
6	Kegalle	Warakapola PS
7	Rathnapura	Kahawaththa PS
8	Rathnapura	Embilipitiya UC
9	Rathnapura	Balangoda PS
10	Rathnapura	Ayagama ps
11	Kegalle	Bulathkohupitiya PS



North Western Province

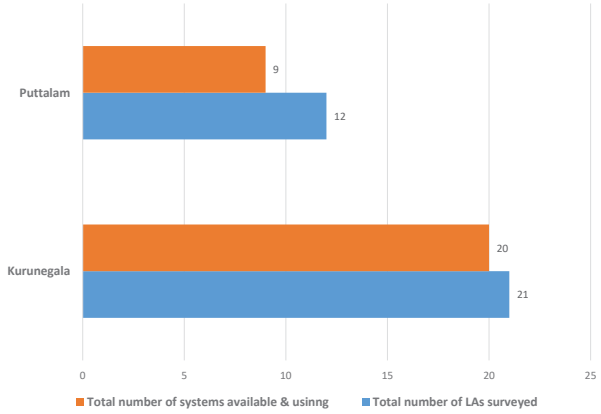
North Western Province - overall eGov system availability

Availability	No of LAs	% of LAs
Yes	30	91%
No	2	6%
Not Using	1	3%
No data	0	0%



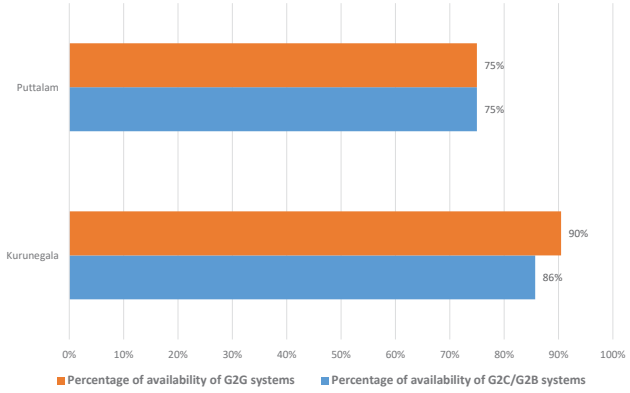
District-wise overall availability and usage of eGov systems in North Western Province

District	Total number of LAs surveyed	No of LAs with systems available & using	% of LAs with systems available and using
Kurunegala	21	20	95%
Puttalam	12	9	75%



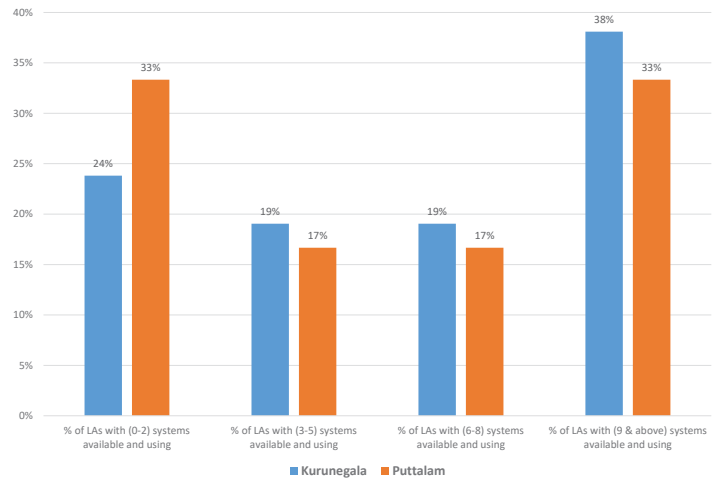
District-wise overall G2C/G2B systems & G2G systems availability & usage in North Western Province

District	Total number of LAs surveyed	Overall Availability of G2C/G2B systems	Percentage of availability of G2C/G2B systems	Overall Availability of G2G systems	Percentage of availability of G2G systems
Kurunegala	21	18	86%	19	90%
Puttalam	12	9	75%	9	75%



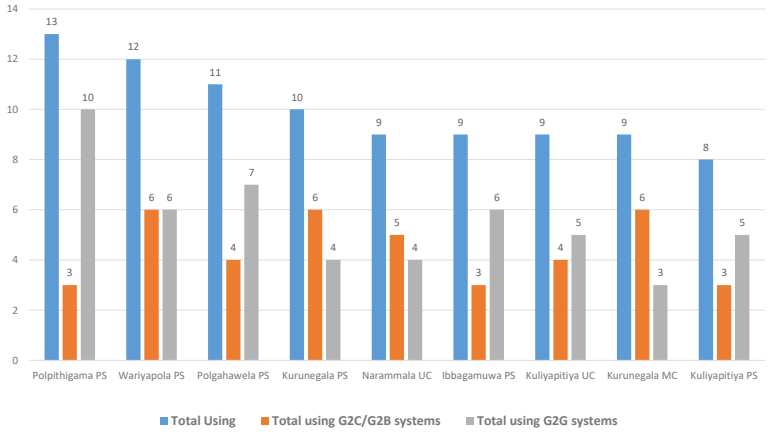
District-wise overall distribution stratified clusters in North Western Province

District	Kurunegala	Puttalam
% of LAs with (0-2) systems available and using	24%	33%
% of LAs with (3-5) systems available and using	19%	17%
% of LAs with (6-8) systems available and using	19%	17%
% of LAs with (9 & above) systems available and using	38%	33%



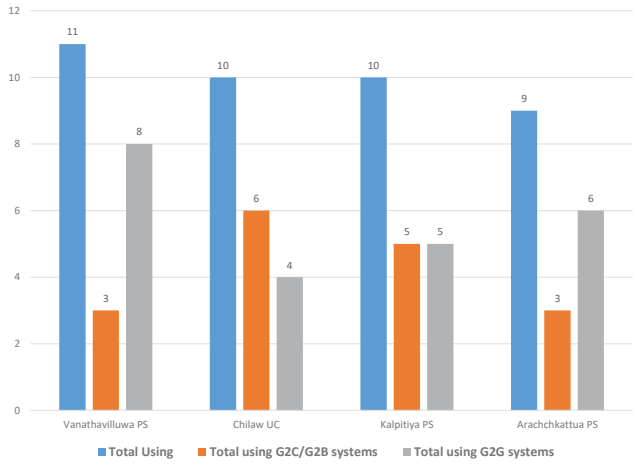
Kurunegala - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Polpithigama PS	13	13	3	3	10	10
Wariyapola PS	12	12	6	6	6	6
Polgahawela PS	12	11	5	4	7	7
Kurunegala PS	13	10	7	6	6	4
Narammala UC	9	9	5	5	4	4
Ibbagamuwa PS	10	9	4	3	6	6
Kuliyapitiya UC	9	9	4	4	5	5
Kurunegala MC	10	9	6	6	4	3
Kuliyapitiya PS	9	8	3	3	6	5



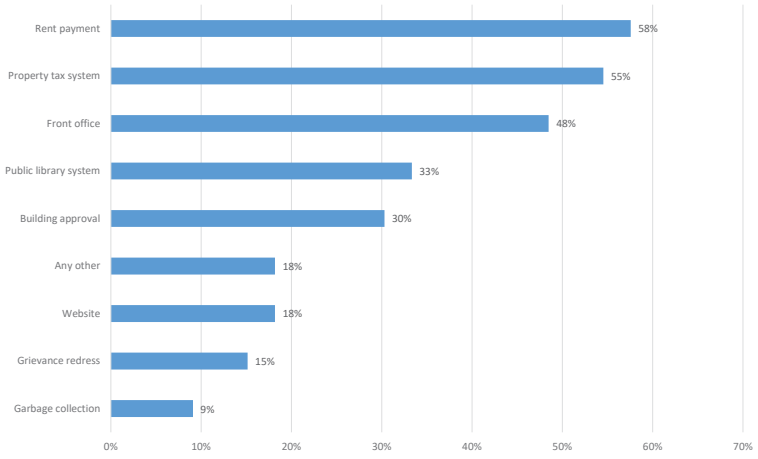
Puttalam - District-wise summary of LAs with highest number of eGov systems that that falls within cluster 2, cluster 3 and cluster 4

Name of LA (MC/UC/PS)	Total Avail	Total Using	Total available G2C &G2B systems	Total using G2C/G2B systems	Total available G2G systems	Total using G2G systems
Vanathavilluwa PS	11	11	3	3	8	8
Chilaw UC	11	10	7	6	4	4
Kalpitiya PS	10	10	5	5	5	5
Arachchkattua PS	10	9	4	3	6	6



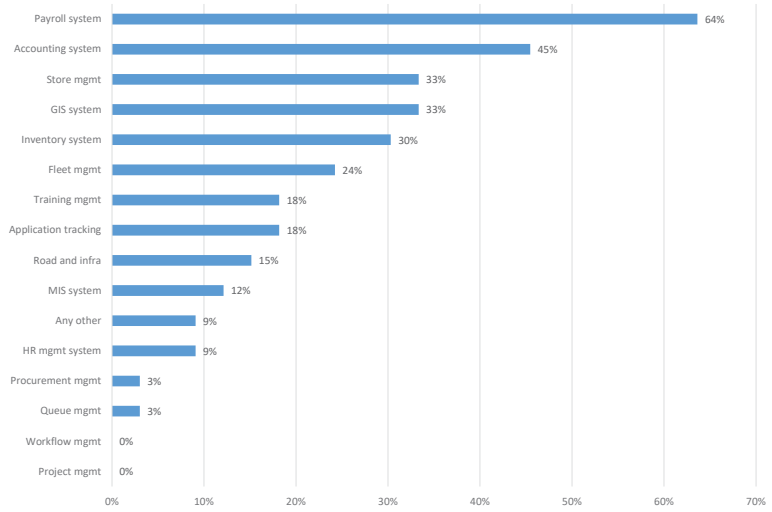
North Western Province - Availability distribution of eGov systems – G2C/G2B

eGov System	No of LAs with systems Available and using	% of LAs with systems available and using
Garbage collection	3	9%
Grievance redress	5	15%
Website	6	18%
Any other	6	18%
Building approval	10	30%
Public library system	11	33%
Front office	16	48%
Property tax system	18	55%
Rent payment	19	58%



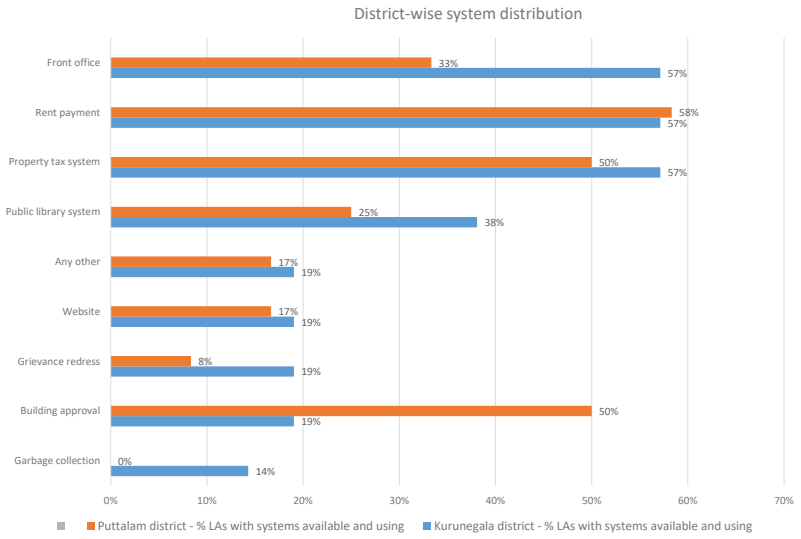
North Western Province - Availability distribution of eGov systems – G2G

eGov System	No of Available and using	% of available and using
Project mgmt	0	0%
Workflow mgmt	0	0%
Queue mgmt	1	3%
Procurement mgmt	1	3%
HR mgmt system	3	9%
Any other	3	9%
MIS system	4	12%
Road and infra	5	15%
Application tracking	6	18%
Training mgmt	6	18%
Fleet mgmt	8	24%
Inventory system	10	30%
GIS system	11	33%
Store mgmt	11	33%
Accounting system	15	45%
Payroll system	21	64%



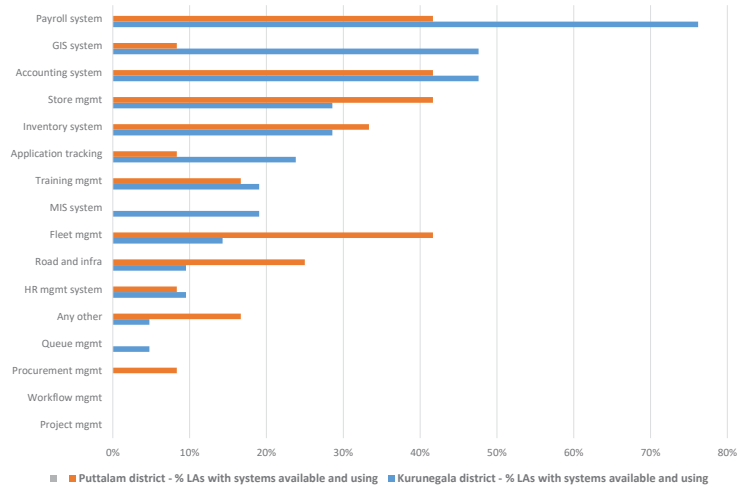
District-wise Availability distribution of eGov systems – G2C/G2B

eGov System	Kurunegala district - % LAs with systems available and using	Puttalam district - % LAs with systems available and using
Garbage collection	14%	0%
Building approval	19%	50%
Grievance redress	19%	8%
Website	19%	17%
Any other	19%	17%
Public library system	38%	25%
Property tax system	57%	50%
Rent payment	57%	58%
Front office	57%	33%



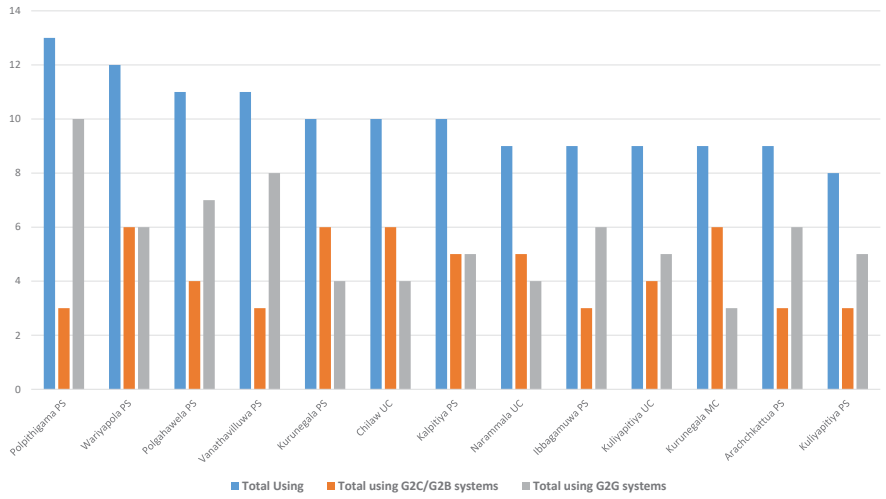
District-wise Availability distribution of eGov systems – G2G

eGov System	Kurunegala district - % of available and using	Puttalam district - % of available and using
Project mgmt	0%	0%
Workflow mgmt	0%	0%
Procurement mgmt	0%	8%
Queue mgmt	5%	0%
Any other	5%	17%
HR mgmt system	10%	8%
Road and infra	10%	25%
Fleet mgmt	14%	42%
MIS system	19%	0%
Training mgmt	19%	17%
Application tracking	24%	8%
Inventory system	29%	33%
Store mgmt	29%	42%
Accounting system	48%	42%
GIS system	48%	8%
Payroll system	76%	42%



North Western Province

S.No	District	Name of LA (MC/UC/PS)
1	Kurunegala	Polpithigama PS
2	Kurunegala	Wariyapola PS
3	Kurunegala	Polgahawela PS
4	Puttalam	Vanathavilluwa PS
5	Kurunegala	Kurunegala PS
6	Puttalam	Chilaw UC
7	Puttalam	Kalpitiya PS
8	Kurunegala	Narammala UC
9	Kurunegala	Ibbagamuwa PS
10	Kurunegala	Kuliyapitiya UC
11	Kurunegala	Kurunegala MC
12	Puttalam	Arachchkattua PS
13	Kurunegala	Kuliyapitiya PS



ANNEXURE 10

ManKiwwa

Incident reporting & management platform for Local Authorities

Introduction

Sri Lanka's population of 21.1Mn is served by multiple Local authorities in Sri Lanka .

To maintain high quality standards within Authority limits, the Authority should attend and solve public issues immediately.

These issues happen everyday and the citizens need to report these issues to get the attention of the authorities to prevent or fix.

ManKiwwa offers a fully integrated solution that can enhance the public experience by easily reporting an incident along with the location by a single click with the user's smartphone.

The Authorities get instant notification of the incident with a picture and location. Since the solution is fully automated Authorities can handle incidents, centrally with minimal resources 24x7.

Solution

ManKiwwa" fills the gap of lengthy communications as the service Local authorities will receive the information related to the issues reported in real time. This facilitates the authority to assign the tasks/job digitally and transfer the information to the respective officers who are responsible to fix the issue. A photo and the actual location of the incident is sent to the authorities.

How the Citizens report

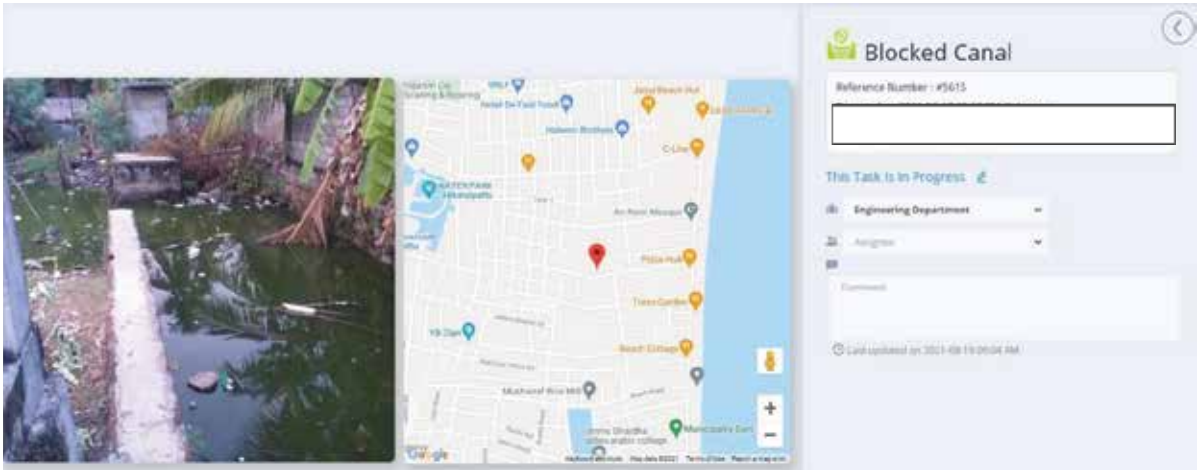
What Authorities get

Once the images of the incident are captured and submitted, the incident information will be updated in the Authority dashboard instantly

Dashboard

Details of Issues

Work Order Form



The reported incidents can be assigned to the relevant departments/ Authorized personal and could obtain feedback and progress levels

Current Status

Considering that the local authorities are the closest authority to the citizens, we introduced this service in the local governments to help the citizens to connect with them and the authorities to manage these reports in a cloud based platform.

At present the Gampaha MC, Kotte MC, Akkaraipattu MC, Kuliyapitiya UC, Biyagama PS & Attanagalla PS are connected to the platform.

Advantages

Advantages to Citizens

- Real-time Reporting (Citizens can report anything, anywhere at any time without visiting any of the Local Authorities in Sri Lanka)
- Get feedback on the issues reported
- Communicate with the Authority

Advantages to Local Authorities

- Real-time Notification
- Rapid Response
- Accuracy
- Trust and Transparency
- Paperless Incident Management
- Minimum Resources
- Historical Data for Future planning
- Build an efficient service

Approval Received

We have received the recommendation on this software solution by the Information & Communication Technology Agency of Sri Lanka (ICTA) that it is suitable for the purpose of Incident reporting and management.

Recognition Received

ManKiwwa, Sri Lanka's only self-help citizen led governing app, has received 10 National awards for innovation and social impact at Sri Lanka's top ICT awards.

1. Indigenous & Community Service Award at NBQSA 2020, National Best Quality ICT Awards
2. Best Software/Application Developed Awards at the SLT Zero One Awards for Digital Excellence 2019
3. Best Use of Mobile Awards at the SLT Zero One Awards for Digital Excellence 2019
4. Best Social Innovation of the year award at the CSSL National ICT Awards 2019
5. The Highest Social Impact Innovation Award at Disrupt Asia 2019
6. The Winner of Inclusion & Empowerment category at e-Swabhimani 2019, Digital Social Impact Awards organized by ICTA
7. Merit award winner of Regional, Rural & Remote Services category at NBQSA 2019, National Best Quality ICT Awards

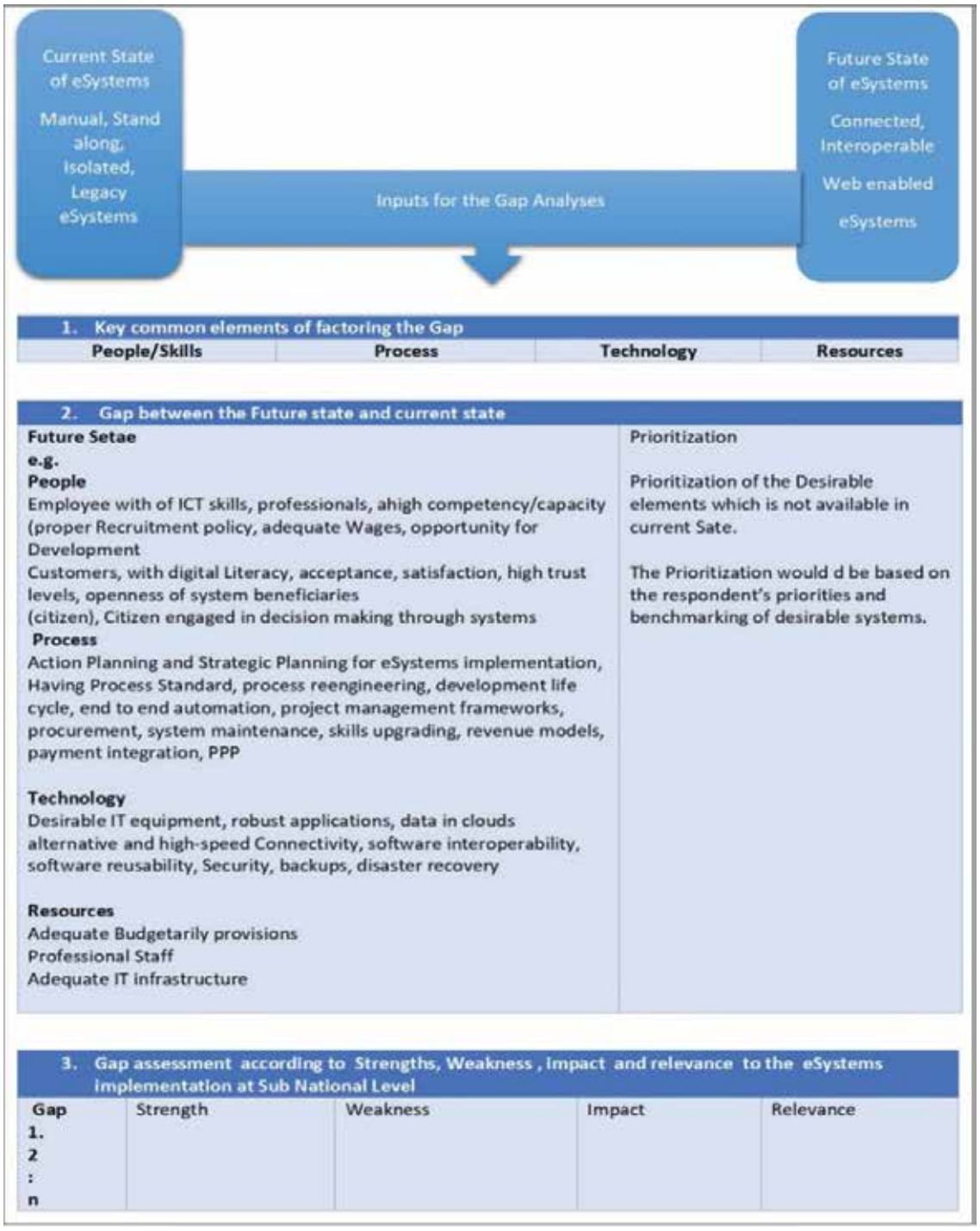
8. Silver award winner of Inclusion & Empowerment category NBQSA 2018, National Best Quality ICT Awards
9. Merit award winner of Inclusion & Empowerment category at e-Swabhimani 2018, Digital Social Impact Awards organized by ICTA
10. 1st Runner up for Best Use of Mobile in the Information Industry category at the SLT01 Awards organized by SLT

Please reach us if you would like to introduce this platform in your local authority area

Deegenics Pvt Ltd
0773651881 / 0777340377
shohan@deegenics.com

ANNEXURE 11

Gap Analysis Framework

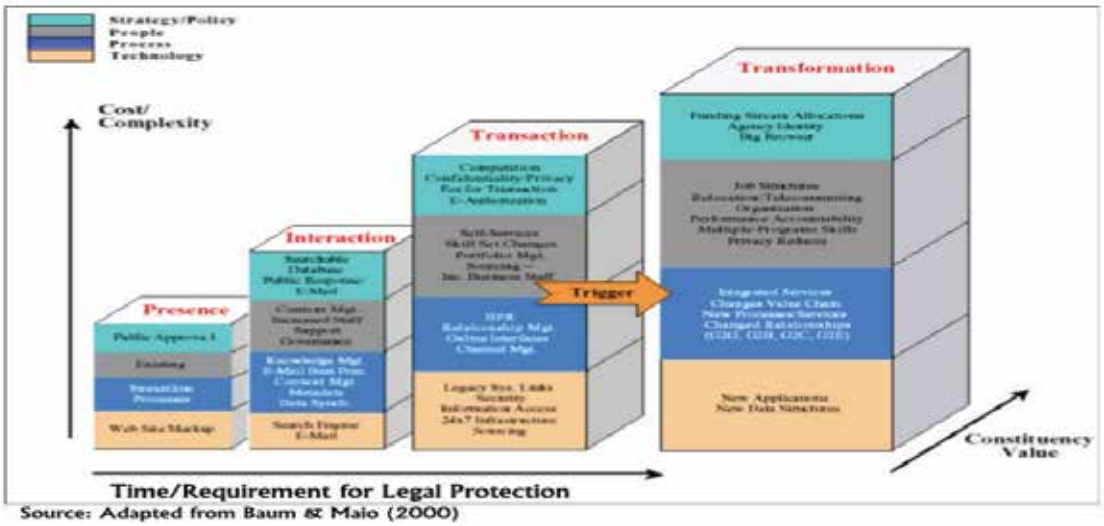


1. Key common elements of factoring the Gap			
People/Skills	**Process**	**Technology**	**Resources**

2. Gap between the Future state and current state	
Future Setae **e.g.** **People** Employee with of ICT skills, professionals, ahigh competency/capacity (proper Recruitment policy, adequate Wages, opportunity for Development Customers, with digital Literacy, acceptance, satisfaction, high trust levels, openness of system beneficiaries (citizen), Citizen engaged in decision making through systems **Process** Action Planning and Strategic Planning for eSystems implementation, Having Process Standard, process reengineering, development life cycle, end to end automation, project management frameworks, procurement, system maintenance, skills upgrading, revenue models, payment integration, PPP **Technology** Desirable IT equipment, robust applications, data in clouds alternative and high-speed Connectivity, software interoperability, software reusability, Security, backups, disaster recovery **Resources** Adequate Budgetarily provisions Professional Staff Adequate IT infrastructure	Prioritization Prioritization of the Desirable elements which is not available in current Sate. The Prioritization would d be based on the respondent's priorities and benchmarking of desirable systems.

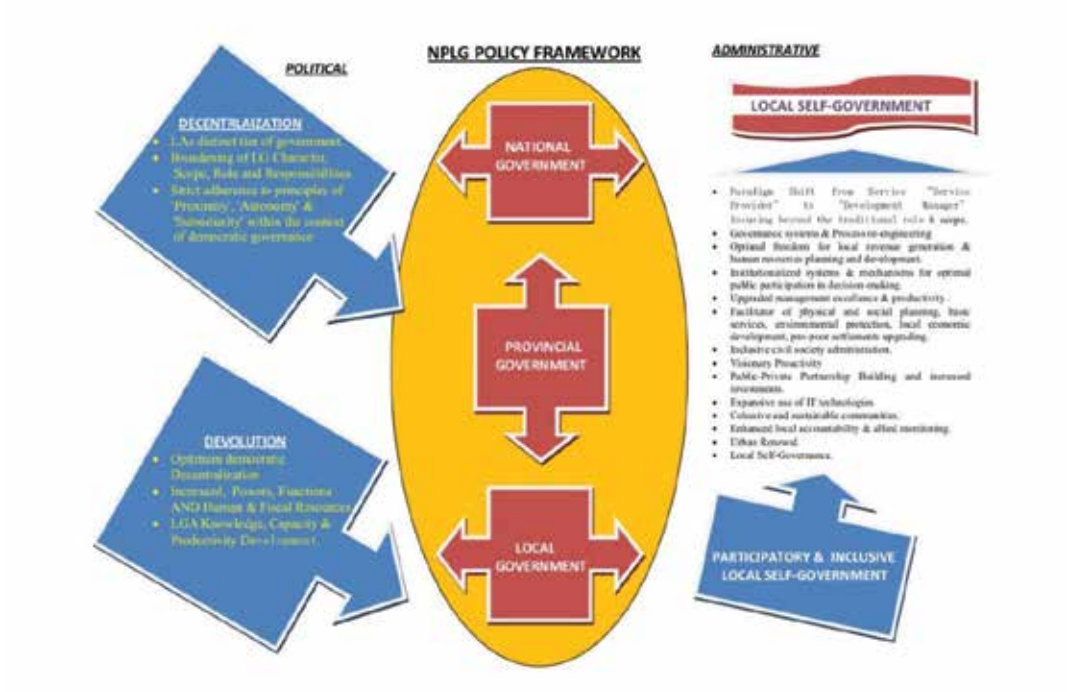
3. Gap assessment according to Strengths, Weakness , Impact and relevance to the eSystems implementation at Sub National Level				
Gap	Strength	Weakness	Impact	Relevance
1.				
2				
:				
n				

Changing role of legislation and policies with progression of e-Government



Source: Adapted from Baum & Maio (2000)

NPLG Policy Framework for Local Governments



Gap Analysis - Local Authorities

Focus Areas	Desired Future State	Current State	Identified Gap (only a rough estimate)	Action Plan/Items
Key area focused on	*Where would you like to be?*	*Where are you now?*	*Difference between desired state*	*process that will employee to*
eSystems Development Process	To be followed System Study Process and BPR process *Measured by: followed 100% during the Development*	Currently not followed proper process for local level development,. Measured by: Current availability about 10%	90%	should be a part of the software development Contracts. The ICT professional to be placed at local level shall ensure end to end process capturing.
	To be followed software Quality assurance and testing process *Measured by: followed 100% during the Development*	Currently not followed proper process for local level development,. Measured by: Not practicing (0%)	100%%	should be a part of the software development Contracts
	Legislation Policies to be available for facilitating the eSystem use in the LA level *Measured by: 100% availability of required Statutes and Policies*	Currently there is not any Statutes and Policies directing and promoting the use of eSystems at the provincial Organisations Measured by: None availability (0%)	100%%	Adoption of Legislation of Central Government and ICT policy approved by the central government
eSystems Integration and Maintenance Process	Professional staff and Users to be engaged from system designing to implementation *Measured by: follow 100 % during the entire process*	Currently not followed proper process for integration in local level development,. Measured by: about 30% (MoF Development process)	80%	Establish a Teams of Officials for driving the innovation and engage Leaders and Teams with software development team Obtain Shared IPR rights to gov. entity and source code, System manual, procedural manual, user Manual are with government entity.
	Foolproof system with proper hardware and software maintenance and bug fixing *Measured by: 99.9 % availability of system*	Currently no proper maintenance contract after warranty period Measured by: system availability less than 95%	5 to 10%	Conditions in contract for keeping 99.9% system in live, Hire a minimum one professional for system maintenances, Disaster recovery arrangements to be established
People	Minimum 1 Professional and 1 Technician in each organisation for system maintenance *Measured by: Availability of carder position and staff 100 %*	Currently Less, or no Professional and Technical Staff Measured by: about 10% organisations	90% of Organisations to have minimum 2 persons	Hire on contract until government recruitment are happening
	Continues training for professionals on new technologies and general staff on eSystem usage *Measured by: Number and availability of the training 100% of users and professionals*	Currently responsibility is with Heads of Organisations, No central support agency Measured by: availability 20%	80%	Through training organized at provincial training center and the private sector training organisations. Training the Staff on ICT project management and ICT procurements.
	To be available minimum 2 officers with knowledge and skills in ICT project Management and Procurement (1 in each discipline)in each LA *Measured by: 100 % availability of the officers*	Currently, there is no knowledgeable and skill full staff on ICT procurement and project Management Measured by: availability 0%	100%	Training and development plan for continues improvement of knowledge and skills of officers on ICT procurement and project management. Establish ICT project coordination unit at PCLG office
	To be having strong knowledge and friendly attitudes among the Mayors, chairmen and Members of LAs on eServices *Measured by: 70-80 % availability of the knowledge and attitudes*	Less number of Mayors, Chairmen and Members with strong knowledge and positive attitudes for implementation of eSystems Measured by: 10-15 % availability of the knowledge and attitudes	55-65%	ICT as a part of Training and development plan and programs for for Mayors,Chaimen and Members of LA
	To be having well aware Citizen for consuming the services of LA through Online and Mobile *Measured by: 80-90 % availability of the knowledge and skills*	Currently very less number of elderly population whom are using the services are having the necessary knowledge and skills to use the services Measured by: 20-25 % availability of the knowledge and attitudes	60%	Planning and implementation of public outreach programs for awareness building on services availability and use of them for the citizen by LAs . External funding needs to made aviable for this purpose.
Technology	To be available interoperable system with the ability of vertical and horizontal integration and service oriented architecture *Measured by: Availability systems 100 %*	Currently standalone, siloed and semi connected systems and manual operations Measured by: about 10% processors having semi connected systems services	90% of processors to be under go technology change and innovation	Draw an enterprise architecture for PCc and Department and other organisations functioning under it and make it mandatory to follow the guidelines established under it. Adhering to the Lanka Interoperability Framework (LIFe) and Digital Signatures to be made available
	Online and mobile services delivery channels to be available *Measured by: 50 % of the services availability online and mobile*	Currently online and mobile services are not available other than for application down loading and application tracking (except revenue Licenses) Measured by: about 10% processors having online and mobile services delivery	100%	All the appropriate systems to be developed with online and mobile interface to the public in new development and shall host in cloud space for enabling the access. Provide LGN facility to all Local Authorities
	To be hosted all the applications in technologically advance Cloud/ Number of "one stop shops" established *Measured by: 100 % usage of cloud services*	Currently revenue Licenses, eSLIMS and web sites are only hosted in cloud Measured by: 20% services in Cloud	80-90%	Use government cloud for hosting applications
	To be having well secured information systems *Measured by: No security vulnerabilities 99.9 %*	Currently, security aspects are compromised and there is a room for internal and external hacking Measured by: more than 50% of security vulnerabilities	50-60% improvements	Drown a security Policy and implimentation, Backing up policy and implementation, Multiple security layers to be implemented, Data encryption when data traveling over the wire and in data bases.
Financial Resources	To be be available and priority will be granted for new system and existing system maintenance *Measured by:* At least 2% of Budget of LA for ICT driven process Mainatance	currently ICT and innovation projects gets least priority. Measured by: Less than 1.0% of LAs Budget for ICT driven process Mainatance	100%	Outside funding for software development and implementations. The maintenance of eSystem is a responsibility of respective LA

Gap Analysis Matrix

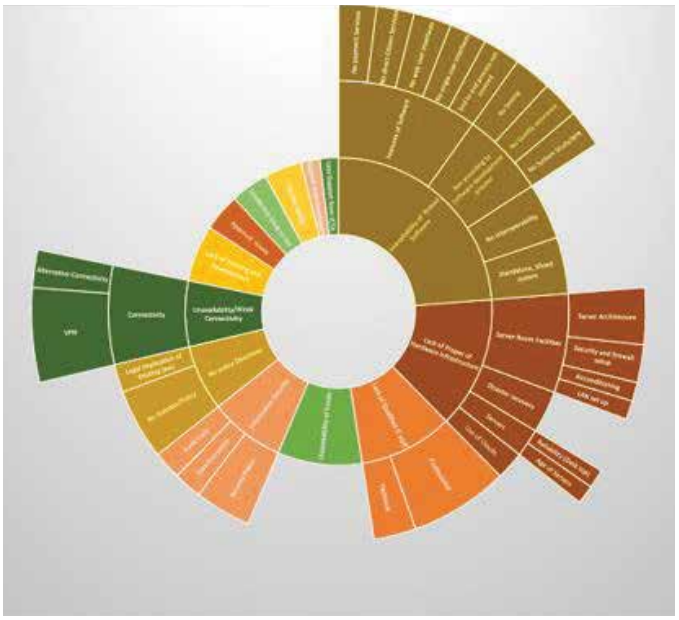
Gap Analysis - Provincial Organisations

Focus Areas	Desired Future State	Current State	Identified Gap (only a rough estimate)	Action Plan/Items
Key area focused on	*Where would you like to be?*	*Where are you now?*	*Difference between desired state and current state*	*process that will employee to bridge gap*
eSystems Development Process	To be followed System Study Process and BPR process *Measured by: followed 100% during the Development*	Currently not followed proper process for local level development,. Measured by: Current availability about 30% (only in ICTA and MoF Development process)	70%	should be a part of the software development Contracts. The ICT professional to be placed at local level shall ensure end to end process capturing.
	To be followed software Quality assurance and testing process *Measured by: followed 100% during the Development*	Currently not followed proper process for local level development,. Measured by: about 30% (only in ICTAs and MoF Development process	70%	should be a part of development Contracts
	Legislation Policies to be available for facilitating the eSystem use in the PCc level *Measured by: 100% availability of required Statutes and Policies*	Currently there is not any Statutes and Policies directing and promoting the use of eSystems at the provincial Organisations Measured by: None availability	100%%	Adoption of Legislation of Central Government and ICT policy approved by the central government
eSystems Integration and Maintenance Process	Professional staff and Users to be engaged from system designing to implementation *Measured by: follow 100 % during the entire process*	Currently not followed proper process for integration in local level development,. Measured by: about 30% (only in ICTAs and MoF Development process)	80%	Establish a Teams of Officials for driving the innovation and engage Leaders and Teams with software development team Obtain shared IPR rights to gov. entity and source code, System manual, procedural manual, user Manual are with government entity
	Foolproof system with proper hardware and software maintenance and bug fixing *Measured by: 99.9 % availability of system*	Currently no proper maintenance contract after warranty period Measured by: system availability less than 95%	5 to 10%	Conditions in contract for keeping 99.9% system in live, Hire a minimum one professional for system maintenances, Disaster recovery arrangements to be established
People	Minimum 1 Professional and 1 Technician in each organisation for system maintenance *Measured by: Availability of carder position and staff 100 %*	Currently Less, or no Professional and Technical Staff Measured by: about 10% organisations	90% of Organisations to have minimum 2 persons	Hire on contract until government recruitment are happening
	System Innovation Division in all PCc under a Deputy Chief Secretary System Innovations *Measured by: 100 % availability of the division*	Currently responsibility is with Heads of Organisations, No central support agency Measured by: availability 0%	100%	Team of professionals and Technicians will be attached to this division to support in complex issues and in initial system development and in innovative initiatives
	To be available 10 officers with knowledge and skills in ICT project Management and Procurement (5 in each discipline)in each PC *Measured by: 100 % availability of the division*	Currently less number of knowledgeable and skill full staff Measured by: availability 10-20%	80-90%%	Training and development plan for continues improvement of knowledge and skills of officers
Technology	To be available interoperable system with the ability of vertical and horizontal integration and service oriented architecture *Measured by: Availability systems 100 %*	Currently standalone, siloed and semi connected systems and manual operations Measured by: about 10% processors having semi connected systems services	90% of processors to be under go technology change and innovation	Draw an enterprise architecture for PCc and Department and other organisations functioning under it and make it mandatory to follow the guidelines established under it. Adhering to the Lanka Interoperability Framework (LIFe)
	Online and mobile services delivery channels to be available *Measured by: 50 % of the services availability online and mobile*	Currently online and mobile services are not available other than for application down loading and application tracking (except revenue Licenses) Measured by: about 10% processors having online and mobile services delivery	100%	All the appropriate systems to be developed with online and mobile interface to the public in new development and shall host in cloud space for enabling the access.
	To be hosted all the applications in technologically advance Cloud/ Number of "one stop shops" established *Measured by: 100 % usage of cloud services*	Currently revenue Licenses, eSLIMS and web sites are only hosted in cloud Measured by: 20% services in Cloud	80-90%	Use government cloud for hosting applications
	To be having well secured information systems *Measured by: No security vulnerabilities 99.9 %*	Currently, security aspects are compromised and there is a room for internal and external hacking Measured by: more than 50% of security vulnerabilities	50-60% improvements	Drown a security Policy and implimentation, Backing up policy and implementation, Multiple security layers to be implemented, Data encryption when data traveling over the wire and in data bases.
Financial Resources	To be recognized as one of the most important priority area *Measured by:* At least 3-5% of Provincial capital Budget for ICT driven process Enhancement	currently ICT and innovation projects gets least priority. Measured by: Less than 1.0% of Provincial capital Budget for ICT driven process Enhancement	300%	Outside funding for implementations of new projects if Provincial Council will g to meet the maintenance cost. Central government should provide specific amount of funding that can be used only for innovative systems development

Language Efficiency in Each District

	Language						
Province	**Sinhala**	**Sinhala %**	**Tamil**	**Tamil %**	**Bilingual**	**Bilingual %**	**Total**
Eastern	0	0%	2	50%	2	50%	4
North Central	8	100%	0	0%	0	0%	8
Uva	8	100%	0	0%	0	0%	8
Northern	0	0%	8	100%	0	0%	8
Western	3	75%	0	0%	1	25%	4
North Western	8	100%	0	0%	0	0%	8
Central	2	33%	0	0%	4	67%	6
Southern	7	100%	0	0%	0	0%	7
Sabaragamuwa	7	100%	0	0%	0	0%	7
Total	**43**	**72%**	**10**	**17%**	**7**	**12%**	**60**

Gap Analysis Matrix



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