

# Planning E-Government Startup: A Case Study on E-Sri Lanka

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This paper analyzes the proposed implementation strategies of e-government in Sri Lanka. First, *the vision of e-Sri Lanka* – the information and communication technology development roadmap to achieve e-governance – is presented. Second, a literature study on e-government startup is given. Also given in the literature study is an approach for analyzing implementation strategies; this approach is based on the theory of connection. Third, the proposed implementation strategies are presented. Fourth, the strategies are analyzed.

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## 1. Introduction

As the Internet's reach has expanded, so has the movement of government services online. Nearly all the countries in this world now have some sort of Internet presence, or so-called *e-governance*. Some countries still in entry-level publish only stage, and many countries are in the advanced transaction stage. Industrialized countries take advantage of e-governance to achieve benefits such as providing citizens and enterprises with more convenient access to government information and resources, delivering public services to citizens, and doing transactions with the businesses and with those working in the public sector. In addition to these benefits, the objectives of any developing country to utilize e-governance should be development of the nation's economy and improvement of the quality of life and opportunities to all the citizens of that country, as the digital divide is paramount in developing countries.

### 1.1 E-Sri Lanka

In November 2002, the government of Sri Lanka launched *e-Sri Lanka* – the information and communication technology development roadmap to achieve e-governance by the year 2007. Sri Lanka's first ever e-government conference was held in May 2003. The event was given utmost importance by the government of Sri Lanka, and was supported by some of the inter-governmental organizations such as the United States Agency for International Development (USAID) and the Swedish International Development Agency (SundayLeader, 2003).

According to the official document, the main purpose of e-Sri Lanka is to achieve the desired levels of development, by enhancing national competitiveness, reduce or eradicate poverty by realizing enhancements in the quality of life of its citizens (GoSL, 2003). The government of Sri Lanka believes that the vision will take the dividends of information and communication technology (ICT) to every village, to every citizen, to every business and also transform the way Government works (SundayLeader, 2003).

Zhou (2001) identifies that in a model of e-government, a society has three constituents: government, citizens, and businesses (figure-1). Accordingly, we classify the benefits of e- Sri

Lanka pointed out in the GoSL (2003) into three different category; the benefits of e-Sri Lanka are:

**For the government:**

- Empower civil servants with information and communication tools, to facilitate coordination across government agencies, and to improve competition and transparency in public procurement.
- Integrate marginalized regions and communities within an equitable resource distribution framework, to facilitate effective decentralization and broadening of public participation in development policy formulation and program implementation, and to transform government services cost-effective and citizen-centered.
- To provide quality education at all levels and to all parts of the country. To provide students and teachers throughout the country access to world-class educational curriculum via the Internet.

**For businesses:**

- To revitalize Sri Lanka's main and traditional industries like agriculture, tourism, and apparel, so that the share of value-addition to the end product is increased, and to penetrate into new markets via Internet-based sales channels.
- To emerge as a major transportation hub for air and sea cargo, by modernizing ports and by developing a modern trade net that dramatically reduced the transaction costs for

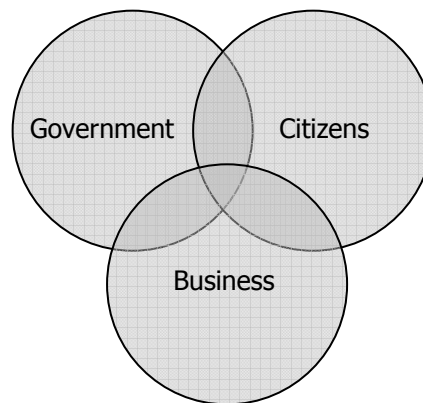


Figure-1: Three constituents of a society in e-Government

importers and exporters. To enable businesses to become increasingly competitive and to attract foreign investors.

- To reduce transaction costs to businesses.
- To create a communication environment that allows optimal opportunities for businesses to engage in all forms of e-commerce

**For citizens:**

- To improve the delivery of public services, and knowledge and education to all, and to make government accessible and accountable to the average citizen
- To create a communication environment that allows optimal opportunities for all Sri Lankan citizens to participate fully in the global information economy, and for all citizens to support their economic, learning and personal needs.

- To facilitate inexpensive contact with family abroad via email and voice over Internet via Cyber Cafes in all towns.

### **1.3 In this paper**

The main purpose of this paper is to analyze the official publication on e-Sri Lanka entitled “Policy on E-Government” (GoSL, 2003) that was released on May 2003. GoSL (2003) explains the goals, plans, and implementation strategies of realizing e-Sri Lanka. In order to do the analysis, we first go through literature study that is relevant to e-government startup.

The literature study is presented in section 2. Section 3 presents the proposed strategy for implementing e-Sri Lanka. In section 4, these implementation strategies are analyzed with the help of an approach that is based on the theory of connection. The results of the analysis and further work are presented in section 5.

## **2. Literature Study**

In the first part of this section, we present literature study on e-government, especially on e-government startup. In the second part on this section, we present the basis of our approach for analysis called the theory of connection.

### **2.1 A Short Literature Review on E-Government Startup**

Before implementing or even planning for e-government, the first thing a government has to think is whether it is ready to go for e-governance; Can the country build the basic infrastructure (technological, financial, and legal) that is necessary for doing business over the Internet? Do the population has the aptitude (income, life-style, education, cultural inclination) and demand for e-governance? Whether the nation’s economy is agile, competitive and energetic to produce goods that cannot be done without making use of the Internet? Questions like these verify a country’s readiness for e-government, called “e-readiness” (Bui et al, 2002; McConnell, 2001; World Information, 2000). Bui et al (2002) defines e-readiness as the aptitude of an economy to use the Internet to migrate traditional businesses into the new digital economy, when the economy is able to create new businesses that could not be done otherwise.

There are various measures that provide comprehensive and comparative perspectives on e-readiness (e.g.: Bui et al (2002) presents a framework for measuring e-readiness). Several studies have been done on e-readiness of different countries (e.g.: Taylor Nelson Sofres, 2002). However, for some countries like Sri Lanka, either e-readiness is not measured, or its results are not available. In this case, we can generally estimate e-readiness of a country qualitatively, by evaluating some of the factors that affect e-readiness of that country; many works provide comprehensive studies of factors that effect e-readiness in different countries. For example, the World Competitiveness Yearbook grade countries according to their economic performance and efficiency of the government; Economist Intelligence Unit asses countries’ infrastructure and environment.

If a country has scored well on e-readiness measure and has decided to launch e-government, then it must decide sophistication level and speed of transformation. Sophistication level means whether the country is just interested in entry-level publish only stage, intermediate-level interactive stage, or advanced transaction stage (Robb, 2003). By speed of transformation we mean, the time frame given to achieve the required level of sophistication.

Zhou (2001) suggests complete modeling government business prior to beginning realization of e-government. Zhou suggests defining all government businesses, both internal and external, and to think about how to use ICT to better do government business. According to Zhou, as government businesses are different between central and local governments, and between departments and agencies, modeling government business should be the first step toward e-government realization.

Once the level of sophistication is planned and modeling of government business is complete, then the policy makers must devise the development stages for realizing it. Korea's journey to e-government is planned in three stages (Korea, 2003), and European union suggests five stages (eEurope, 2003). Wong (2000) proposes a six-stage development process, where the identified stages are information publishing, two-way transaction, multipurpose portals, portal personalization, clustering of common services, and full integration.

Developed or under developed, countries are facing tremendous pressure to move toward e-government. For example, Zhou (2001) states that e-government is a *must* for *every* government, and the only question is sooner, later and via what approaches. However, there is a danger especially for developing countries like Sri Lanka, to implement e-government investing large sums of money, which may not bring the desired results. Therefore it is wise for the policy makers of the developing countries to think about the costs of failure of e-government initiates beforehand. Heeks (2000) illustrates specific threats to e-government initiatives for developing countries: barriers to entry in e-commerce are higher for enterprises in developing countries than in developed, developing countries' communications infrastructure and national policy frameworks are often inadequate and progress is slow, e-commerce will not necessarily improve export opportunities but may increase imports, and developing countries may end up paying large multinational corporations for providing ICT infrastructure heavily.

## **2.2 The Approach for Analysis**

For analyzing implementation of e-Sri Lanka, we are going to use an approach based on the "Theory of Connection (ToC)". ToC is a Scandinavian invention with strong mathematical logic background (Bjørke, 1995; Franksen, 1979). ToC has been successfully used for modeling, analysis and implementation of many complex systems in diverse fields like mechatronics (Hussien, 1999), consumer electronics (Møller, 1995), production planning (Haavardtun, 1995), material flow (Wang, 1995), and in collaborative supply chain development (Davidrajuh, 2000). In this paper, we apply ToC for modeling and analysis of e-government.

### **2.2.1 Theory of connection (ToC)**

Detailed treatment on ToC is given in Bjørke (1995). The approach by ToC is summarized in figure-2. As shown in figure-2, a system consists of three fundamental components: *elements*, *connections*, and *sources*. The elements carry all the physical properties of the system; thus, elements are the fundamental building blocks of a physical system. Some of the elements in e-government are human resources (government officials, computer professionals), computer and network resources, and buildings for housing computer departments. The property of a computer professional (human resource element) is her capacity to perform her task, whereas the property of a building is its capacity to hold items and humans.

When there is no connection between the elements, the set of isolated elements (also called *primitive elements*) is called *the primitive system*. Connections reflect how the elements in a primitive system influence each other, thus connections represents the structure of a system. The set of connected elements is called *the connected system*.

Finally, sources are the environment's influence on a system; it is the source that ignites a system into action.

### 2.2.2 Formulation methodology

The objective of our approach based on ToC is to offer a strategy by which behavior of complex systems could be determined from the known behavior of its individual elements. The mathematical formulation approach by ToC can be summarized as follows (Hussein, 1999):

#### *Phase-1: identifying the primitive system*

- Break up the system into its basic parts (the primitive elements); this group of isolated elements is called "the primitive system".
- Set up the governing equation of each element independent of other elements, by that, we isolate the variables in the individual elements.
- Concurrently, by the process of measurement, we will create an abstract model of the whole system defining the topological structure of the whole system.

#### *Phase-2: making the connected system*

By means of the topological structure, we connect together the variables in the individual elements. That is to set up the governing equations of the whole system, or "the connected system".

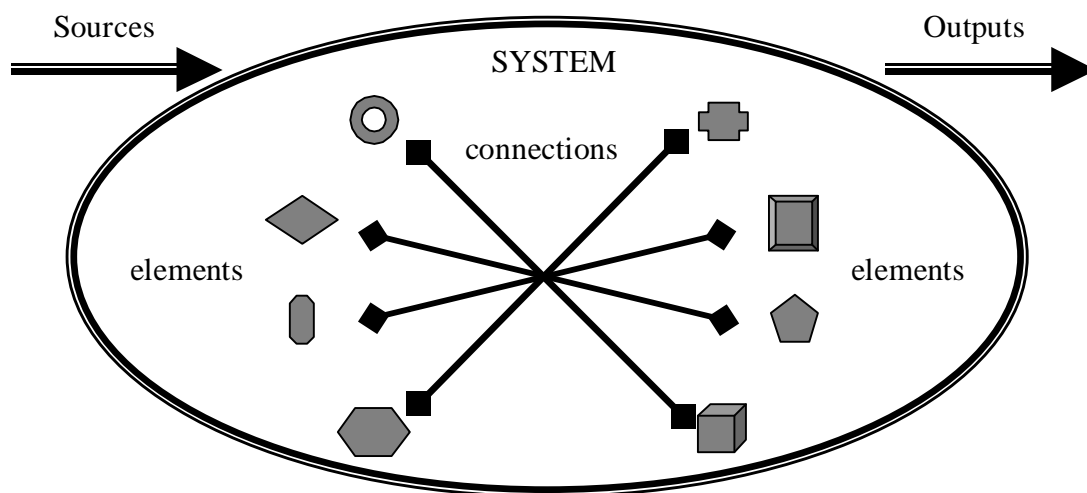


Figure-2: Components of a system

#### *Phase-3: applying the sources, and solving the connected system*

By applying the sources we can determine the behavior of the system governed by the equations of the connected system.

In section 4, we will follow the three phases in our approach to analyze the proposed strategies for implementing e-Sri Lanka. In phase-1, we can already recognize some of the primitive elements: government officials and employees, experts and technologists, computer hardware and software resources, entrepreneurs, and general public. From the literature study, we can conclude that *e-readiness* is the source for adopting e-governance.

**2.2.3 Iterative nature of model building with ToC**

Though the formulation methodology (section 2.2.2) seems like a bottom-up approach (starting with primitive elements and ending in the whole system), the approach we use for modeling and analysis is basically incremental (iterative) approach with both top – down and bottom –up views. More explanation is given in section 4.

**3. The Proposed Strategy for Implementing the Vision**

In this section, we present the implementation strategy for e-Sri Lanka. The implementation strategy presented here is a heavily edited version of the proposals given in the official document GoSL (2003). The implementation is planned through a five-program strategy (see figure-3). The five programs are to run concurrently. Figure-3 outlines that the five-program strategy will realize e-Sri Lanka by 2007.

**3.1 Program - A: Building implementation capacity**

Program - A is solely about forming control and coordinating committees, to advise the Cabinet of ministers. A top-level consultative committee will be formed, made up of secretaries of key ministries, industry leaders, etc., to advise the cabinet. In addition, an agency will be established to look into the intricacies of capacity building.

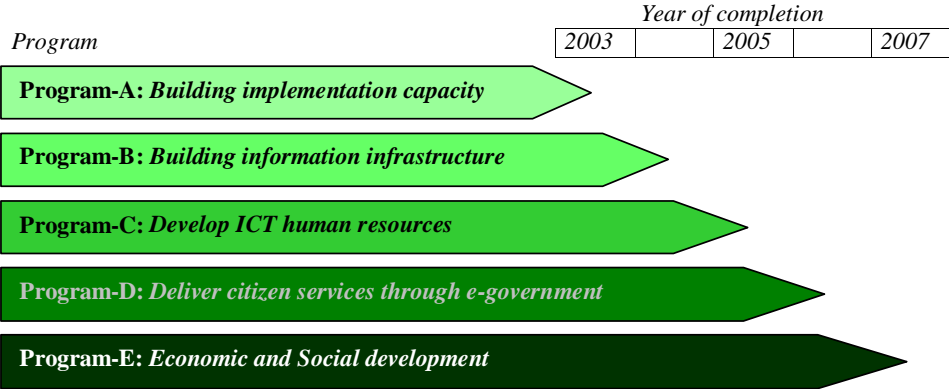


Figure-3: Five-program implementation strategy to achieve the vision of e-Sri Lanka (based on [GoSL, 2003])

**3.2 Program - B: Building information infrastructure**

Program - B is about building national information infrastructure and enabling environment. Program - B can be divided into three subprograms B1 – B3.

- Subprogram - B1 is about building *hard* infrastructure to provide affordable telecommunications services for various users.
- Subprogram - B2 is about building *soft* infrastructure to support the Sri Lankan software companies who often encounter significant difficulties. Some of the actions planned under

B2 are stimulation of domestic demand for software applications and establishment of ICT parks, and ICT development zones.

- Subprogram - B3 is about building capacity for adaptation, learning, monitoring, and evaluation. To build this learning capacity, the government will encourage local initiatives and will also recruit multinational companies to invest and partner with the local counterparts.

### 3.3 Program - C: Development of human resources

To develop ICT human resources, the following subprograms are planned for different sections of human resources: C1 for software industry, C2 for educational establishments, and C3 for general public.

- Subprogram - C1 is to increase the supply of ICT professionals, a prudent policy will be devised on issuing of visas for foreign ICT professionals with required skill sets and by actively recruiting and providing incentives for leading ICT multinationals and training institutions to invest in Sri Lanka.
- Subprogram - C2 is for educational establishments, ICT education and training programs will be provided in the use of ICT tools in primary and secondary schools for students as well as for teachers. Undergraduate intake for ICT based University courses will be increased and training to university staff will be also increased.
- Subprogram - C3 is for general public, ICT awareness programs will be relayed through the electronic media. Tertiary education on ICT, and e-learning will be increased.

<i>Seller</i>	<i>Buyer</i>		
	Government	Businesses	Citizens
Government	G2G	G2B	G2C
Businesses	B2G	B2B	B2C
Citizens	C2G	C2B	C2C
	<i>E-Government</i>	<i>E-Commerce</i>	<i>E-Community</i>

Figure-4: Classification of E-Commerce by the relationships among participants

### 3.4 Program - D: Delivering citizen services through e-government

Figure-4 shows that e-government services can be classified into five categories: G2G, G2B, and G2C, where government is the seller, and B2G, and C2G, where government is the buyer. Program - D is further subdivided into three subprograms, D1 for G2G, D2 for G2B and D3 for G2C.

- Subprogram - D1 is about establishing a forum on e-government to facilitate dialogue and consensus, establishing a government wide-area-network supporting email linking every government institution and employee, development of fundamental data registries/databases of citizen data, and establishing a Sri Lanka Portal to serve as a global front-end for administration and service delivery channel.
- Subprogram - D2 is about establishing G2B interface that will facilitate interaction between businesses and the government.



- Subprogram - D3 is about establishing G2C service delivery infrastructure. Also, a government call center will be established to provide voice based interactive support to citizens.

### 3.5 Program - E: Use of ICT as a key lever for economic & social development

Program - E is also divided into three subprograms E1 – E3.

- Subprogram - E1 is about societal applications and content development. Under this subprogram, among other things, a national fund will be established to support innovative applications of ICT for social and rural development.
- Subprogram - E2 deals with strengthening connectivity and establishment of telecommunication centers (“telecenters”) and other forms of public access to information

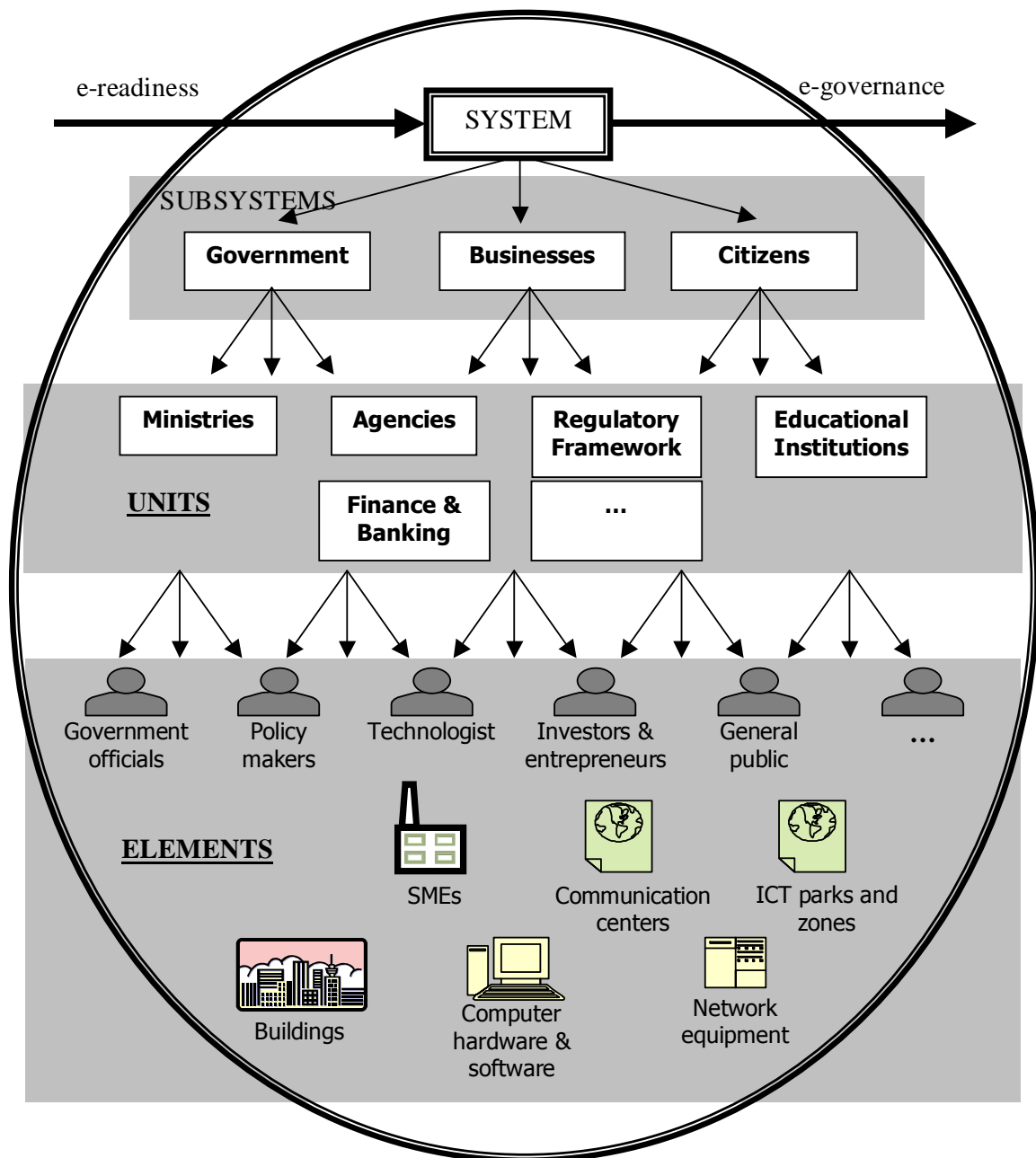


Figure-5: System model of e-governance

and communication services.

- Subprogram - E3 is about strengthening mass media. Under this subprogram, Sri Lanka's mass media and multi media policy will be revised so that they adhere to internationally established principles.

## 4. Analyzing the strategies for implementing e-Sri Lanka

In section 3, we went through the details on how the vision of e-Sri Lanka is going to be implemented by a five-program strategy. In this section, we analyze the implementation strategy so that we can identify the strengths and weaknesses of this strategy.

### 4.1 The Model

We follow the three phases in our approach to analyze the proposed strategies for implementing e-Sri Lanka. In phase-1, we recognize a *minimal set of* primitive elements in any e-governance environment: government officials, policy makers, experts and technologists, government employees, computer hardware and software resources, network equipment, entrepreneurs, investors, buildings, and general public. Some of these primitive elements can be grouped into the following units: ministries and departments, agencies, regulatory framework, financial institutions and banking, communication centers (Internet service providers, telecenters), small to medium-sized enterprises (SMEs), and educational establishments. Finally, these units can be combined to form the three major subsystems of e-government, namely Government, Businesses, and Citizens; see figure-5. In figure-5, we indicate *e-readiness* as the source for adopting e-governance for dealing with the government.

The system model given in figure-5 is the basis of our analysis. There are three factors that influence the output (e-governance) of the system: 1) the primitive elements and their properties, 2) the connections between the elements (“processes or services”), and 3) the sources. Lets go through each of these three factors in detail:

### 4.2 Analyzing the primitive elements and their properties

To see how the individual programs affect the properties of the primitive elements, we check each program and subprogram of the five-program strategy against the components of the system; the results are summarized in table-1.

Table-1 indicates that the proposed implementation strategy is very influential on human resource development, especially on ICT education. This has two effects, a positive one – the population becomes more IT-literate, and a negative one – surplus computer professionals but lack of inventors and entrepreneurs. A country’s capability for innovations and internal improvements cannot be flourished by IT education alone; production technology, supply-and demand chain management, economics, and psychology are all too important in the digital economy era. The lesson we learn from the “dot-com crash” is that technology is just “an enabler” and it is the business model that makes an enterprise to succeed or fail.

Table-1 also indicates that the implementation strategy ignores SMEs. Ignoring SMEs (not helping them) will certainly cause undesirable outcome, as SMEs are the most important portion of the economy of any country, yet they tend to have fewer funds for exploring complexities of laws, and regulations [Davidrajuh, 2001].

### 4.3 Analyzing the connections (“processes and services”)

To do analysis based on connections, we need precise description about the processes involved and the services intended for e-government. The official document on e-Sri Lanka does not state the services the government wants to offer over the Internet. Therefore, the analysis of e-Sri Lanka based on connection is not done here. However, we show how government business processes can be modeled and analyzed with the help of the ToC, using two views, bottom – up view and top – down view.

Program/ subprogram	HRD				BIF			Units					S
	GO	T	GP	IE	HID	SID	ICTP	SMEs	CCs	BF	EDU	RF	ER
<b>A</b>	<b>X</b>	<b>X</b>		<b>X</b>									
<b>B</b>	<b>X</b>				<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	
B-1					x							x	
B-2	x				x	x	x		x	x		x	
B-3											x		
<b>C</b>		<b>X</b>	<b>X</b>								<b>X</b>		
C-1		x											
C-2											x		
C-3			x										
<b>D</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>				<b>X</b>		<b>X</b>	
D-1	x	x			x	x				x			
D-2	x	x		x	x	x				x		x	
<b>E</b>			<b>X</b>		<b>X</b>	<b>X</b>			<b>X</b>				
E-1			x		x	x							
E-2					x	x			x				
E-3			x						x				
<b>All programs</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	

**Table-1: Effect of programs and subprograms on primitive elements and units**

Abbreviations:

HRD - human resource management

GO - government officials; T – technologists; GP – general public; IE – investors and entrepreneurs

BIF – building information infrastructure

HID – hard infrastructure development; SID – soft infrastructure development; ICTP – ICT parks and zones

SMEs – small to medium-sized enterprises; CCs – Internet service providers and telecenters;

BF – banking and financial institutions; EDU – educational institutions; RF – regulatory framework;

S – Source; ER – E-readiness

#### 4.4.1 Bottom – up view:

The bottom – up view starts with the current set of primitive elements. The primitive elements are grouped into units (sub-subsystems) and given side-by-side interface to the respective units. This means, the groups of primitive elements confined into different units are separated to pave way for incremental and independent development of the units. The functional separation of the units also allows different deployment models and hardware-software

platforms to implement the independent units. In addition, an incomplete unit will not block the entire system.

**4.4.2 Top – down view:**

The top – down view starts with the services that are intended to be provided through government portals. Then the services or service providers are devolved into (functional) units (subsystems). This breakdown helps managing complexity and supports continuous improvements by iterations. The units will be independent and interactivity between these will be clearly identified, see figure-6. In he business model shown in figure-6, the flows that flow from higher level entities (an entity can be subsystem, unit, subunit, or element) to lower level entities (top to bottom) are contracts. The flows that flow between same level entities and between lower level entities to upper level entities are services.

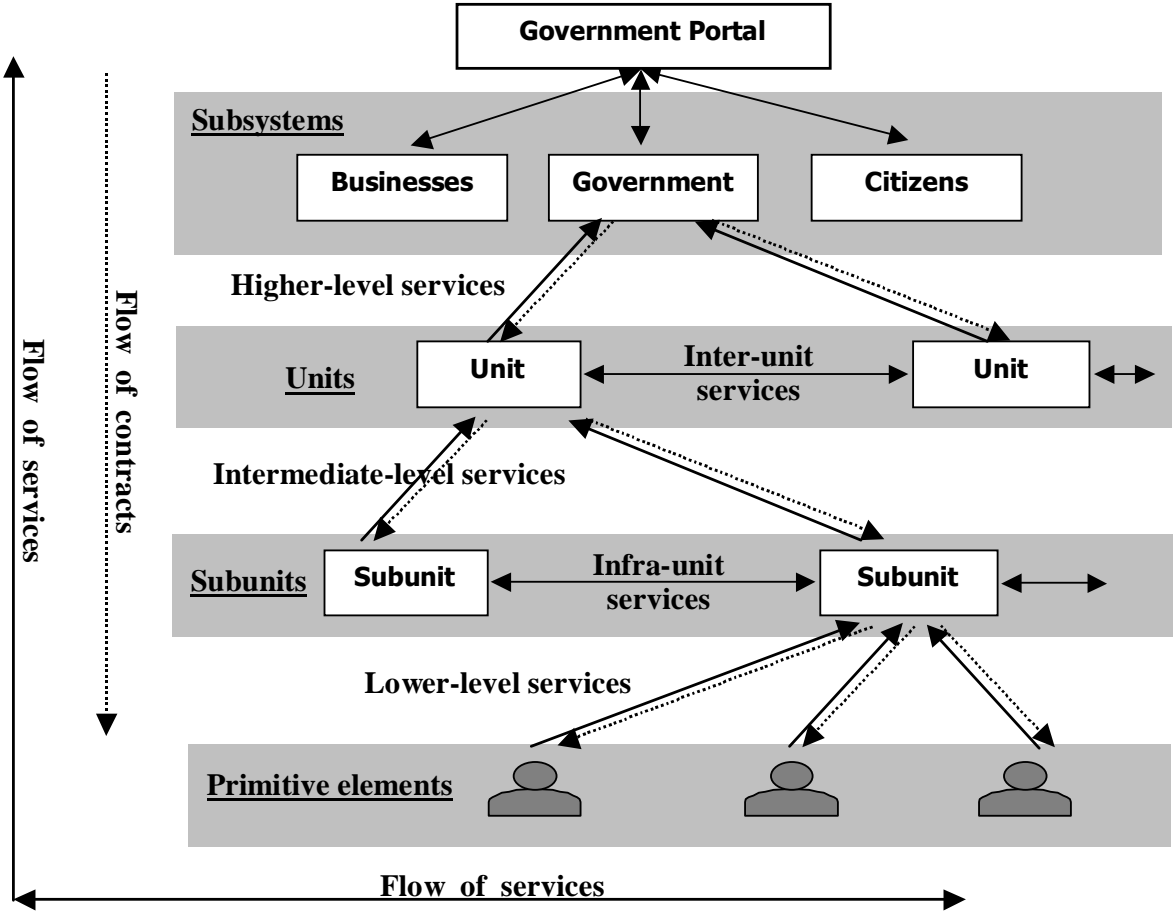


Figure-6: System model by top-down view

**4.4.3 Iterative solution**

It must be remembered that our approach is incremental meaning the final model is developed after many iterations, as shown in figure-7.

If the performance of the e-governance does not satisfy the performance requirements then many corrective actions could be taken, like identifying and inducing new entities (an entity

can be a subsystem, unit, subunit, or element) into the model, combining two or many existing entities into a single entity, splitting an entity into two or more, etc. These changes may introduce newer elements or remove existing elements.

**4.3 Analyzing the source**

In figure-5, we indicated that e-readiness is the source of the system. E-readiness is something that makes a consumer ‘ready’ to buy products online; e-readiness thrusts a citizen adopt e-government practices when dealing with government. Thus, more investment on the source (e-readiness) will improve the output (e-governance).

The results of our analysis (table-1) show that the implementation strategy ignores promoting e-readiness. Whether or not Sri Lanka launches e-Sri Lanka, improving e-readiness must be emphasized for growth of e-commerce in that country.

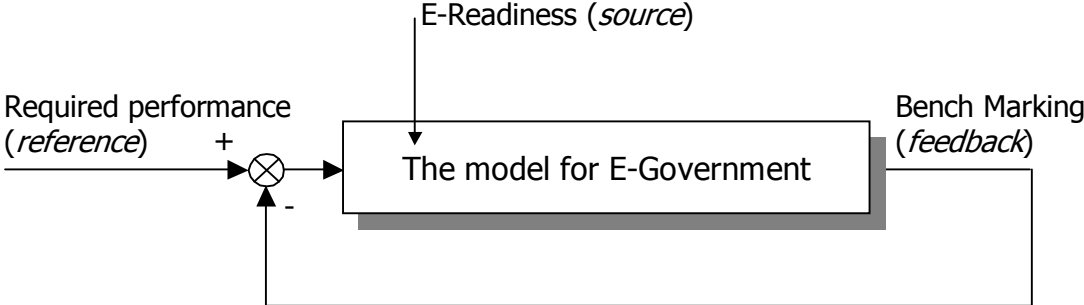


Figure-7: Iterative stepwise refinement of the model

**5. Concluding Remarks**

With an approach based on the theory of connection, we analyzed the implementation strategy of e-Sri Lanka. Our approach for analysis is simple yet highly effective. The results of the analysis indicate that the policy makers have given low consideration to SMEs, they have not given priority to improve e-readiness, and they not started process modeling. Based on our analysis, we propose the following for improvement of the implementation strategy:

*Create a separate program for SMEs:* In addition to the five programs, we suggest a separate program exclusively for SMEs must be planned. This is because, it is the SMEs and not large corporations that employ most workers in the global economy; thus survival of SMEs is vital for providing jobs to skilled workforce. In addition, SMEs are increasingly conducting business transaction across borders (Bui et al, 2002), and hence they bring much-needed foreign exchange into a developing country.

*Incorporate steps to improve e-readiness in every implementation program.* How de we improve e-readiness? To improve e-readiness of a country, we go back to the basics:

1. We develop the basic infrastructure (technological, financial, legal, and regulatory framework).

2. We develop agility of the economy (the ability to produce innovative products faster, cheaper, and of high quality).
3. We develop the consumer base (buying power, credit card usage, living costs, and standard of living).

*Start government's business process modeling at once.* Modeling government business processes is the first step in e-government development. Government must define all its processes, and then find out how technology can be used to perform the processes better, by whom, when and how (Liu and Hwang, 2003; Zhou, 2001).

*Plan development in stages, not by programs:* In all the e-government initiatives (exclusive e-Sri Lanka) we have studied so far, implementations are planned in a series of consecutive stages. The obvious advantage of implementing in stages is that completion of an intermediate stage always means overall improvement in e-governance and that the extent of e-governance has gone a step further. Whereas, completion of a program that runs in parallel with other programs does not guarantee overall improvement of e-governance, it only ensures that certain aspects of e-governance may have improved.

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