

An Analysis of Business Process Reengineering in the Public Service Delivery System of the Government of Sri Lanka

スリランカ政府の公共サービス提供システムにおけるビジネスプロセス
リエンジニアリングの分析

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Chapter No. 1

Introduction

1.1 Sri Lanka

Sri Lanka is an island country located in the Indian Ocean and separated from India by the Palk Strait. The country is located between latitudes 5°55' and 9°51' N and longitudes 79°41' and 81°53' E. Relatively small sized country, it has a maximum length of 268 miles (432 km) and a maximum width of 139 miles (224 km). Over millennia, Sri Lanka has accumulated and assimilated cultural stimuli from other Asian civilizations due to its peculiar location. Being at the crossroads of seafaring lanes negotiating the Indian Ocean, this cross-cultural inoculation was an inevitable consequence. An example of this can be the case of a number of names the country was given over centuries by visiting nations. The country was called Taprobane (by Greeks), Serendib (by Arabs), and Ceylon (by Europeans) before it was named Sri Lanka in 1972.¹



Figure 1.1 Sri Lanka – An island country²

¹ Elsie Kathleen Cook, *Ceylon: Its Geography, Its Resources, and Its People*, 2nd ed., rev. by K. Kularatnam (1951)

² Source: The National Atlas of Sri Lanka (1988)

1.1.1 Sri Lanka – An Historical Account

Sri Lanka has an uninterrupted record of anthropological settlement for over 2000 years. The roots of Sri Lankan populace and civilization can be discovered back to the 6th century BCE and its societal evolution and makeup has always been impacted by the neighboring subcontinent. Sinhalese and Tamils are two major ethnic groups whereas Buddhism and Hinduism are two major religions, though Islam is also the religion of roughly 10% of the population. However, Sinhalese make up the largest ethnic group which is close to 70% of the island's population. For a detailed account of genetic origins of the majority group, i.e. Sinhalese, the study by Kirk (1976) is very much relevant and interesting read. According to Kirk,

“ancient chronicles relate the origin of the Sinhalese people of Sri Lanka to the arrival of Prince Vijaya from an area either in north-east or north-west India, and his subsequent affiliation with people from south India. Students of Indian history argue that the Vijayan legend should be interpreted to favor either one or the other of the northern origins, or a mixture of peoples from both areas. Genetic distance analysis however, despite the limitations imposed by the data, shows that modern Sinhalese populations are closer to the Tamils and Keralites of south India and the upper caste groups of Bengal than they are to populations in Gujarat or the Panjab.”

Other than genetic origins, the cultural traits flowed over from India, though the same inevitably undertook autonomous evolution and transformation in Sri Lanka giving the island nation its own distinct cultural outlook. Religious and language transformation are two very clear examples of the ways in which Sri Lanka divorced from the subcontinent and evolved in its own manner. While Buddhism has a very small religious presence in the subcontinent and Sinhalese (although of Indo-Aryan linguistic strata) is a language present and spoken only on the Sri Lankan island. At present Sri Lanka has its own cultural and religious identity with Buddhism and Sinhalese language being the dominant forces; however, the same is augmented by the stimuli of Hinduism and Islam.



Figure 1.2 Sigiri Apsara (Sigiriya Fresco)³

1.1.2 Historical Crossroads

Sri Lanka's has always occupied an important geographical location at the crossroads of important maritime trade routes between Europe, the Middle East, and Asia. The cultural development and present make up of society and culture is an inevitable outcome of this very position of the island throughout the millennia it took to shape them. Sri Lanka was a frequent maritime destination known to Arabs, Chinese, Malay, and Persians seafarers until 15th Century. With the advent of colonization trends Portages, Dutch and British started taking more than a fleeting interest in the island. As a result, Sri Lanka became an active colonization target for all these competing European nations from 16th Century onwards.

1.1.2.1 Portuguese Conquest Period⁴

In 1505, due to bad weather and stormy conditions at sea a Portuguese fleet ended up being at the shores of the Island. Lorenzo de Almeida, the commander was received cordially at the court of the king of Kotte. Realizing the commercial and strategic

³ Sigiriya Fresco – A UNESCO World Heritage in Sigiriya

⁴ Tikiri Abeyasinghe, *Portuguese Rule in Ceylon, 1594–1612* (1966)

significance of the island, the Portuguese soon returned and negotiated for trading concessions and formal relation with the king of Kotte. The king agreed to the concessions and even granted the Portuguese permission to build a fort at Colombo. Later the Kotte kingdom was split into the three kingdoms of Kotte, Sitawake and Rayigama due to infighting among the ruling family. Bhuvanaika Bahu VII, king of Kotte relied more and more on Portuguese to get a firmer grip on power against his rivals from the ruling family and the competing kingdoms. However, the infighting made all the kings weaker and allowed Portuguese to expand their hold on the lands of the ruling family even further. Portuguese control of the majority of the island was complete by 1619 with the annexation of the kingdom of Jaffna, except in the highlands where Kandyan Kingdom continued to linger on⁵.

Portuguese kept most of the civil and administrative structure of the Kotte kingdom intact. Other than retaining the Kotte territorial division of the island into four provinces (dissavanis) each regulated by a dissave. Similarly, other territorial subdivisions were also kept intact. The Sinhalese system of service tenure was maintained, and it was used extensively to secure the essential produce of the land, such as cinnamon and elephants. Also remained in place the caste system. The land revenue system was also kept in place, only that Portuguese officials replaced the Sinhalese officials as the recipients of the revenue. Portuguese colonizing officials maintained detailed land records. These records served the purpose of provisioning minute and detailed account of landholding, crops, taxes, and ownership. Loyal Sinhalese nobles were incorporated into the Portuguese ruling structure, although not at the highest levels of the hierarchy which was kept only for the Portuguese.⁶

Portuguese introduced and favored Portuguese language Catholicism in the country allowing various Catholic denominations and missionaries to carry on their missions. Conversion of Prince Dharmapala (with a lineage from Kotte kings) resulted in the conversion of many noble Sinhalese. Portuguese and loyalists like Dharmapala

⁵ Lorna S. Dewaraja, *A Study of the Political, Administrative, and Social Structure of the Kandyan Kingdom of Ceylon, 1707–1760* (1972)

⁶ Chandra R. Desilva, *The Portuguese in Ceylon, 1617–1638* (1972)

favoured Christianity over local Buddhism and local religion was largely persecuted. On the economic side Portuguese monopolized cinnamon, pepper, betel nuts and elephants. The Portuguese monopoly and civil structure favored only the colonizers or the nobles loyal to them at the expense of a large majority of the populace. The Kandyan kingdom, however, lumbered on during all this time with diminished power and mostly helpless. King Seranath of Kandy continued skirmishes with the Portuguese in the early decades of the 17th century without gaining much.

1.1.2.2 Dutch Period⁷

While Seranath tried to lure Dutch into alliance with Kandy into attacking and overtaking Portuguese, it was King Rajasinha II who finally brokered an effective deal with Dutch to fight with him against the Portuguese in 1638. The partite deals and on and off fights continued for the control of the island for almost 20 years. The Dutch takeover of the coastal Sri Lanka was complete by 1658. Dutch replaced the Portuguese and the Kandyan king was again contained within Kandyan highlands without much effectual addition to his power and control.

Dutch brought significant legal and economic reforms to Sri Lanka, while keeping most of the Portuguese civil administrative structure in place. The Dutch divided the country into three provinces Colombo, Galle and Jaffna with Colombo being the seat of power where the governor resided. On legal side, they established three courts in the three provinces with an appeals court at Colombo. The legal proceedings under the Dutch rule were based on Roman-Dutch law. Smaller circuit courts were established in districts and the legal system was well organized and functional. The system still is at the root of legal system of the country.

Dutch were most effective in reorganizing the economy during their rule over the island. While maintaining their monopoly over major rainfed crops, they built a major

⁷ Sinnappah Arasaratnam, *Dutch Power in Ceylon, 1658–1687* (1958, reprinted 1988)

network of irrigation system with three major canal systems in the western, southern, and eastern parts of the island bringing the concept of canal irrigation-based cultivation in the country. Other than traditional crops, coffee and tobacco were cultivated in a major way. International trade from the island was promoted and flourished greatly during the Dutch rule. While all this took place, strict Dutch monopoly of the major trade resulted in less enviable consequences for the local population. It will however not be wrong to comment that economic base of the island expanded and it was formally integrated into global trade and economy on a greater scale for the first time during this period. Also, Dutch, as against their Portuguese predecessors, discouraged Catholic missionaries. On the other hand, Dutch tried to promote Protestantism in the country without much effect.

1.1.2.3 British Colonization Period

Dutch had their own problem at home during the French Revolution (1792–1801) when France took over Netherlands. The Treaty of Amiens with France opened up the avenues for Britain to assert its colonization of the island which got finality in 1802, when it was finally declared a British colony.

British introduced a number of important reforms in their colony which they referred to as Ceylon. Notable reforms introduced by British included abolishment of slavery, Anglicization of judiciary, and civil service structure reforms. British also laid brickwork for the political and economic structure of the colony providing a unitary administrative and judicial system for the whole island. Political and administrative infrastructure was developed more or less basis of British bicameral legislature. Christian missions were allowed to continue their missionary work and English became the language of government and the medium of instruction in schools.

The island continued to benefit from advanced knowledge in agriculture and industry from the colonial power. The economic base further widened and diversified under the British rule. Tea also became an important commodity under the British rule and

wide spread tea plantations were established on the highland slopes around Kandy. Tea eventually became an important commercial commodity for the island in addition to coconut, beetle nut, cinnamon, pearls and gems etc. These new industries also became reason for importing labor from neighboring Indian states; although at times caused communal conflicts.



Figure 1.3 Tea Plantation⁸

1.1.2.4 Independence

In 1948, after nearly 150 years of British rule, Sri Lanka became an independent country, and it was admitted to the United Nations seven years later. In a new constitution proclaimed in 1972, Ceylon became the Republic of Sri Lanka, while maintaining its link with the British Commonwealth. The constitution changed the bicameral legislature to a unicameral body and replaced the governor-general (who had been an extension of the British crown) with a president as head of state. Effective executive power, however, remained with the prime minister and cabinet, and all existing restraints on the lawmaking powers of the new unicameral legislature were removed. Colombo, remains the executive and judicial capital of Sri Lanka; Sri Jayewardenepura Kotte, a Colombo suburb, is the legislative capital. For administrative purposes, the country has been divided into nine provinces and

⁸ Source: Serendipity Travel Blog – Sri Lanka

subdivided into 25 districts. Sri Lanka is densely populated. Buddhism was given “the foremost place,” and Sinhalese again was recognized as the official language. As the home of several ethnic groups, each with its own cultural heritage, Sri Lanka also has a highly varied cultural landscape; however, Sinhalese population gained a firm grip on the political and economic resources in the ensuing scenario in the country. However, political unrest escalated in the 1980s as groups representing the Tamil minority moved toward organized insurgency. The insurgency transformed into a full-fledged prolonged civil war in the country for almost three decades.

1.1.2.5 Past to Present - A Quick Roundup

As was mentioned earlier, the first Sinhalese arrived in Sri Lanka late in the 6th century B.C., probably from northern India. Buddhism was introduced circa 250 B.C., and the first kingdoms developed at the cities of Anuradhapura (from circa 200 B.C. to circa A.D. 1000) and Polonnaruwa (from about 1070 to 1200). In the 14th century, a south Indian dynasty established a Tamil kingdom in northern Sri Lanka. The Portuguese controlled the coastal areas of the island in the 16th century followed by the Dutch in the 17th century. The island was ceded to the British in 1796, became a British colony in 1802, and was formally united under British rule by 1815. As Ceylon, it became independent in 1948; its name was changed to Sri Lanka in 1972. Prevailing tensions between the Sinhalese majority and Tamil separatists turned into war in July 1983. Fighting continued for over a quarter century, however, finally, the government defeated the insurgency in May 2009.

Sri Lanka began to recover from its 3 decades of civil war during Rajapaksa’s second term. The economy showed sustained growth and reduced poverty levels, though some were concerned about ballooning debt and overreliance on foreign investment, especially from China. It was during these turbulent later years of war, i.e. after 2000, when the country realized the need a comprehensive reorganization and overhaul of the government services. During the post-conflict years under President Mahinda

Rajapaksa, the government-initiated infrastructure development projects, many of which were financed by overseas governments. In 2015, a new coalition government headed by President Maithripala Sirisena of the Sri Lanka Freedom Party and Prime Minister Ranil Wickremesinghe of the United National Party came to power with promises to wide ranging reforms. However, implementation of these reforms has been uneven. In October 2018, President Sirisena attempted to oust Prime Minister Wickremesinghe dissolved parliament, with former President Rajapaksa as the prime minister. This sparked a constitutional crisis that was finally averted when the Supreme Court ruled Sirisena's parliamentary dissolution as unconstitutional. Eventually, Rajapaksa had to resign, and Wickremesinghe was came back into power as prime minister again. However, after parliamentary elections in the fall of 2019, Gotabaya Rajapaksa (brother of Mahinda Rajapaksa) won the presidential election who eventually appointed his brother, Mahinda, prime minister. Thus, we see a greater initiative and derive towards business process reengineering (BPR) in the country became noticeable. This research and the thesis is about the same BPR process and its impact upon the government functions and the public service delivery thereof.

1.2 Geography of Sri Lanka

A roughly triangular mountainous area known as the Central Highlands occupies the south-central region of Sri Lanka and is the heart of the country. This highland mass is surrounded by a diverse plain, the general elevation of which ranges from sea level to about 1,000 feet (300 meters). This plain accounts for about five-sixths of the country's total area.

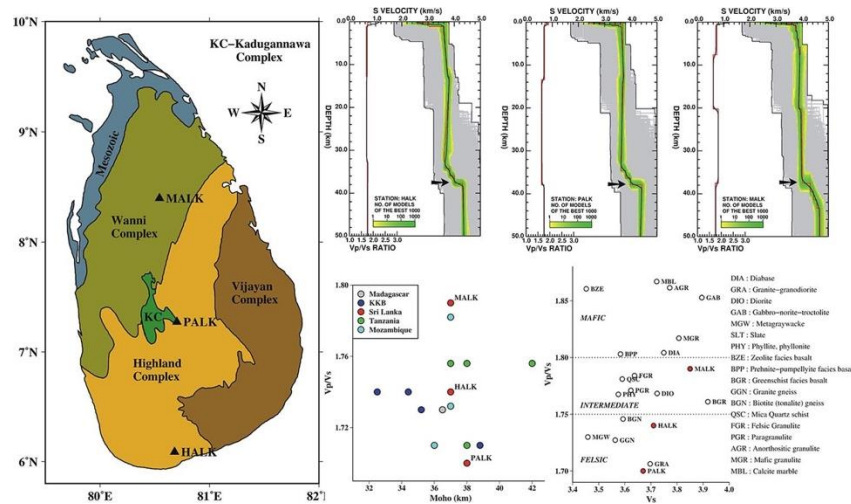


Figure 1.4 Nature of Sri Lankan Crust⁹

The Central Highlands have a highly dissected terrain consisting of a unique arrangement of plateaus, ridges, escarpments, intermontane basins, and valleys. Sri Lanka's highest mountains—Pidurutalagala at 8,281 feet (2,524 meters), Kirigalpotta at 7,858 feet, and Adam's Peak (Sri Pada) at 7,559 feet—are found in this area. The highlands, except on their western and southwestern flanks, are sharply defined by a series of escarpments, the most spectacular being the so-called World's End, a near-vertical precipice of about 4,000 feet.

The plain that surrounds the Central Highlands does not have an entirely flat and featureless terrain. To the north and northeast of the highlands, the plain is traversed by low ridges that decrease in altitude as they approach the coast. The western and southwestern parts of the plain feature alternating ridges and valleys running parallel to the coast and increasing in elevation toward the interior to merge imperceptibly with the highland mass. Elsewhere the flatness of the plain is sporadically interrupted by rocky buttes and mounds, some of which reach elevations of more than 1,000 feet. The plain is fringed by a coast consisting mostly of sandy beaches, spits, and lagoons. Over a few stretches of the coast there are rocky promontories and cliffs, deep-water bays, and offshore islets.

⁹ Source: Pousali Mukherjee, Kajalijyoti Borah, Dipok K. Bora, Nature of crust beneath Sri Lanka using tele seismic receiver function, Journal of Asian Earth Sciences, Volume 187, 2020,



Figure 1.5 Sri Lankan Topography¹⁰

Geologically, the island of Sri Lanka is considered a southerly extension of peninsular India (the Deccan), with which it shares a continental shelf and some of its basic lithologic and geomorphic characteristics. Hard, crystalline rock formations, such as granite, gneisses, konderite, and quartzite, make up about nine-tenths of the island's surface and subsurface.

1.3 Sri Lanka – Current Economic and Political Profile¹¹

Sri Lanka is facing a challenging macroeconomic landscape. The post-conflict high growth momentum has decelerated. A volatile global environment and structurally weak competitiveness continue to weaken growth and external sector performance. High interest costs mask limited fiscal improvement. While outlook remains stable conditional on political stability and reform implementation, the balance of risks is downward tilted. The country is vulnerable to global financial market conditions due

¹⁰ Source: Pousali Mukherjee, Kajaljoyoti Borah, Dipok K. Bora, Nature of crust beneath Sri Lanka using tele seismic receiver function, Journal of Asian Earth Sciences, Volume 187, 2020,

¹¹ "World Bank. 2019. Sri Lanka Development Update, February 2019 : Demographic Change in Sri Lanka. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/31261> License: CC BY 3.0 IGO."

to large refinancing requirements. Although some important reforms were carried out, the process has slowed down due to a challenging political. Sri Lanka is a lower middle-income country with a GDP per capita of USD 4,073 (2017) and a total population of 21.4 million people. Following 30 years of civil war that ended in 2009, Sri Lanka's economy grew at an average 5.8 percent during the period of 2010-2017, reflecting a peace dividend and a determined policy thrust towards reconstruction and growth; although there were some signs of a slowdown in the last few years. The economy is transitioning from a predominantly rural-based economy towards a more urbanized economy oriented around manufacturing and services.

The country has made significant progress in its socio-economic and human development indicators. Social indicators rank among the highest in South Asia and compare favorably with those in middle-income countries. Economic growth has translated into shared prosperity with the national poverty headcount ratio declining from 15.3 percent in 2006/07 to 4.1 percent in 2016. Extreme poverty is rare and concentrated in some geographical pockets; however, a relatively large share of the population subsists on slightly more than the poverty line. The country was ranked 76th in the Human Development Index in 2018.¹²

The economy's weak competitiveness is an issue to address. Restrictive trade policies over the past decade have created a strong anti-export bias, which has been reflected in a dramatic decline in trade. While growth in Sri Lanka has been strong over the past few years, it has been inward-oriented and based on the growth of non-tradable sectors. Sri Lanka also attracts a much lower volume of FDI than peer economies and the shortcomings of the investment climate and factor markets pose obstacles for investments. Moreover, high state participation in the economy has implications on competitiveness in several sectors and labor market dynamics.

Low revenues and high debt as a share of GDP are key macroeconomic concerns. The major causes of low revenues as a share of GDP are: the low number of tax payers

¹² For detailed statistics on Sri Lanka's profile, please refer to Appendix No. 1 at the end of the thesis.

(less than 7 percent of the labor force and formal establishments pay income tax); reductions in statutory rates without commensurate efforts to expand the tax base; and inefficiencies in administration and numerous exemptions. Low revenues combined with largely non-discretionary expenditure in salary bill, transfers, and interest payments have constrained critical development spending and squeezed expenditure on health, education and social protection, which is low compared to peers. The debt levels are high, and the overall debt portfolio also points to some important risks.

1.4 Public Service and BPR in Sri Lanka

As we can see from the earlier sections, it is obvious that the Sri Lankan public service apparatus has a long colonial heritage, and all of that has not been in line with the requirements of a 21st century public service expectations. However, the increasing societal pressure for the delivery of more modern public services has forced it to undergo a major overhaul of its business process. In this treatise, I assess the impact of the recent efforts at business process reengineering (BPR) in public service. I estimate overall as well as relative efficiency of public service delivery across various ministries and departments of the Sri Lankan government. A broad-based Likert scale field survey on a five-point scale was carried out and performance data was collected. I applied a non-parametric data envelopment analysis (DEA) to estimate an overall and relative efficiency of the public service delivery across 29 ministries and the departments of the government of Sri Lanka. The results show that save for a few, most ministries and departments have a potential for improving the performance. The performance enhancement is desirable both from an input as well as output perspectives. Moreover, the results indicate significant scale inefficiencies associated with the performance of ministries and departments that are engaged in public service delivery (PSD) in the country. I have also indicated towards critical success factors for a wider deployment of the study's findings in the conclusion. Sri Lankan public services have a lingering colonial legacy, and there have been several efforts since the

country's independence to break away from the restraints of the past to align them with modern times and expectations. The drive for modernization of public services passed through several phases of experimentation without much success in the past. However, a significant attempt at the modernization of public-services was made in the first decade of this millennium, and we now notice substantial changes in public service delivery (PSD) in the country. In this thesis, I assess the impact of an inside-outside-inside (IOI) based open system innovation-related business process reengineering (BPR) regime adapted for reforms in the organization and the delivery of public services in the country. I carried out an input and output analysis of the BPR regime, adopted by various departments and ministries of the government of Sri Lanka to improve the PSD infrastructure.

1.5 The Thesis Summary

1.5.1 The Background

Sri Lanka's colonial heritage has a significant bearing upon the design as well and functioning of its public service apparatus. Despite being a British colony like many other countries in the region, Sri Lanka's society and government structure is a special case unlike many of its neighboring countries. It will be of little use to see the country's historical and contemporary developments as a complimentary case of its neighboring nations. Meyers (1996) stated that there is more to be found by recognizing specificity of Sri Lanka than by regarding it as microcosm of India. Service sector is considered an engine of growth for a country; and in a country like Sri Lanka the efficiency of public sector becomes immensely important, as it is the largest employer as well as deliverer of public services in the country. Park et al. (2013) have conducted an exhaustive study on the role of services sector in the growth of East Asian economies and have asserted a strong relationship between the two. It is with this background that I have made an effort to assess the impact of BPR in PSD in the country. While, I have attempted to put the case of BPR and PSD in a broader perspective, however this is a case with evidence and analysis related to original field data collected from

public sector in Sri Lanka. While the data is unique, the model used and the findings are applicable to many other countries seeking improvement of PSD through BPR expecting improved efficiency of the public sector administration.

Sri Lanka Administrative Services (SLAS - established 1972) is the successor to Ceylon Administrative Services (CAS – established 1963). CAS was, in turn, successor to a much older Ceylon Civil Services (CCS – established 1833). While the purpose of CCS was to help British colonial power to govern over its colony, SLAS has significantly different demands and expectations from its Sri Lankan clients. While, SLAS is one major public service provider in Sri Lanka, its functions are supplemented, and sometimes even duplicated, by layers of other offices, across several ministries and departments. It certainly has been a great challenge for SLAS, along with other departments and ministries, to deliver service in modern times with a design and functionality inherited from CCS. As a result of mounting expectations and demands of more modern, independent and highly educated populace, SLAS and many other departments and ministries of Sri Lanka underwent a major BPR regime during the last decade. BPR regime, in this context, meant (i) *structural* reforms, (ii) *regulatory* overhaul, and (iii) better performance *control* mechanisms. These three measures were put in place as mainstay of the BPR regime in order to ensure an efficient delivery of public services. While BPR was put into place, no effort has since been made to assess the propriety as well the outcome of the regime. In this thesis I analyze the post-BPR-implementation state of affairs and measure the efficiency of the service across 29 ministries and departments of Sri Lankan government through which most public services are delivered to the populace.

Hammer and Champy (1993) has defined BPR as “fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance”. Also, according to Ezigbo (2011), “BPR involves rethinking of the current theories of business. Remarkable improvements are made by breaking away from following the old methods and adopting the newer ones”. Further BPR regime implementation has several aspects of open innovation as

a continuous outside-in innovation element is ingrained in it; such is also the purpose of this study to allow the inside-outside-inside (IOI) feedback to the regime implementers. Gassmann and Enkel (2004) define open innovation as a bidirectional information process that leads to the process improvement, thus making open innovation a necessary corollary to BPR. It must be noted that BPR is a continuous process instead of one time even, thus it is imperative that a continuous IOI feedback process be carried on and thus allow innovation be incorporated into the process.

This way of defining BPR takes account of two key areas important to our case i.e. fundamental rethinking and radical redesign. Two critical areas that stand out as prime targets for a BPR regime are: *first*, fundamental rethinking of the philosophy; *second*, a complete redesign of the structure of the business process in order to provide public service in an efficient manner. It may be noted that BPR did not start in one go in Sri Lanka; rather it took off incrementally over many years. Only by 2010, it took a recognizable shape in the form of strategic, policy, and action initiatives. These measures in turn resulted in creation as well elimination of several departments and ministries across Sri Lanka. Re-engineering Government Program (Re-Gov) started with a blueprint issued in 2004 and sketched a detailed BPR process of public service with the program named 'Program D' with 24 (D1-D24) initiatives in various areas of governance targeted in the Sri Lanka. These measures were revealed in eGovernment Strategy document prepared by Sri Lanka's Information and Communication Technology Agency (ICTA) in 2013. Now as almost ten years have passed since various BPR measure were implemented across the public service delivery apparatus, it seems pertinent to evaluate the outcome of the regime by comparing various inputs into this regime in the form of *rules*, *structure redesign*, and *performance controls*. In the next section, I lay down the details of the data used and the methodology applied to estimate the outcome of the BPR. I conducted a two-pronged analysis of the situation as explained below. But, before I explain the analytical approaches one by one, I shall explain the nature of data collected and used for the purpose of this study.

1.5.2 The Data

A broad-based ground survey on a five-point Likert scale was carried out, and performance data was collected. Data was collected through a questionnaire-based field survey conducted across 29 departments and ministries of the Sri Lankan government. Appendix No. 2 lists the D&Ms from where the survey data was collected. I collected a total of 290 responses—each questionnaire¹³ composed of 40 questions regarding the inputs and the outputs of the regime's implementation. The survey was conducted during the February and March of 2020. In total 290 respondents returned the completed questionnaire. The questionnaire was designed on 5-point *Likert* type scale with 5 meaning strongly agreed, 4 agreed, 3 neutral, 2 disagreed and 1 for strongly disagreed. Input questions were categorized into three areas of the regime i.e. (i) *Structure*, (ii) *Rules*, and (iii) *Control* and compared with the set of questions related to outcomes. The questions were deliberately planned per se to verify the inputs the outcomes of the BPR regime for PSD. Appendix No. 3 gives the contents of the questionnaire that was used in the survey.

Inputs and outcomes related responses of 10 employees from each of 29 D&Ms were tabulated. The data thus collected was recorded into separate excel sheet and tabulated for further treatment and analysis. The originality and novelty of the data singles out this study from other studies that were conducted in the past.

1.5.3 Stage I - Analysis

Using the data, a non-parametric data envelopment analysis (DEA) has been employed to measure the performance of ministries and the departments denoted as decision making units (DMUs). A DMU's efficiency is depicted by the ratio of the sum of its weighted outputs to the sum of its weighted inputs. DEA is applicable to the case of both public and private sector entities. DEA has widespread use across a whole

¹³ The questionnaire used in the survey can be found at the end of this thesis

- English Version (Appendix No. 3)
- Sinhala Version (Appendix No. 4)

host of areas of public or private service provision industries. The data was analyzed using data envelopment analysis program DEAP Version 2.1 developed by Coelli (1996b). DEA enables us to construct a non-parametric frontier over the input and output data and calculate the efficiency scores. I assess input-oriented constant return to the scale (CRS) and variable return to the scale (VRS) models to calculate technical efficiency and scale efficiency for 29 DMUs in the data. Using DEA, one can calculate each DMU's efficiency score, calculated in relation to an efficiency frontier. DMUs positioned on the efficiency frontier have an efficiency score of 1. DMUs operating below the frontier have an efficiency score lesser than 1. DMUs can also be used for benchmarking, as DMUs that fall on efficient frontier can serve as benchmark for the DMUs that fall below the frontier and hence peers at frontier can serve as guideposts for the slackers. A non-parametric DEA can be conducted both from an input orientation as well as from an output orientation in order to ascertain efficiency scores. However, for this very situation that I am dealing with, an input orientation will be most appropriate, as DMUs have control over only the inputs; public service DMUs are expected to provide a minimum level of service which is usually given and cannot be arbitrarily controlled. Hence, input orientation has been taken while conducting the DEA. A detailed explanation of the analysis and the analytical procedures have been given in the chapter no. 3 of the thesis.

1.5.3.1 Primary research questions – Stage I

The stage I analysis was conducted in order to evaluate the overall as well as unitary efficacy of the implementation of the BPR regime in the public services of the country. So, I can identify the basic research question that need an answer from the outcomes of the analysis. Those questions can be listed as;

- Has implementation of the BPR regime resulted in increasing the efficiency of the system as a whole?
- How disparate are the outcomes of the BPR regime across various DMUs of the government of Sri Lanka?

1.5.3.2 Outcomes - Stage I

The data analysis shows that 4 DMUs out of a total of 29 DMUs are efficient with reference to the scale. The disparity of the scale efficiencies can be attributed to the latent inefficiencies or lack of full implementation of the BPR regime across the DMU. Out of 29 departments and ministries, 12 are having IRS, meaning there is still a room to improve performance in order to achieve full-scale efficiency. 5 DMUs are faced with DRS meaning there is a capacity to increase the scale of service delivery in order to achieve scale efficiency. Other 12 DMUs are in a state of CRS, including 4 DMUs (DMU14, DMU22, DMU27 and DMU29) who have achieved CRSTE, VRSTE as well as scale efficiency, adjusting the scale towards optimum scale we can enhance the level of efficiency. I can therefore safely conclude that out of 29 DMUs, 25 DMUs can increase public service delivery efficiency by adjusting the scale of their operations. Additionally, I have also prepared results on peer, groups, targets and slacks too. Finally, I have produced individual DMU results also in order to enrich understanding of the entity-wise performance results of the BPR implementation process. The detailed analysis and outcomes have been presented in the chapter no. 3.

1.5.4 Stage II - Analysis

In the second stage of the analysis, I analyze the correlations among the inputs, outputs, and overall perception of success or failure of the BPR regime across multiple ministries and departments of the Sri Lankan government. Applying an ordered multivariate logistic regression model, I have attempted to estimate correlations amongst inputs, results, and overall perception of success or failure of the BPR regime across ministries and the departments (29 in total). I have tabulated summary statistics and regression results to assess the relative significance of various regime inputs and their impact on the corresponding outcomes.

The analysis also allows us to test the efficacy of IOI based systematic innovation ingrained in the regime. I can summarize the primary research questions raised in this paper as follows:

1.5.4.1 Primary research questions – Stage II

- What is the relationship amongst the various BPR measures (structure, rules and control) and the outcomes (effectiveness) of the BPR regime in total?
- How are the outcomes perceived by employees, i.e. level of agreement/disagreement level of effectiveness of the BPR?
- How correlated are the BPR measure per se to understand the inner structure of the BPR measures?

1.5.4.2 Outcomes – Stage II

The outcomes suggest that while all inputs and outputs are significantly correlated, some inputs have a more significant effect on the results expected from the BPR regime. I have used original data acquired through a survey carried out directly through the PSD organizations in the country, and this study is the first of its kind in this regard. I expect this study will be of high utility to the personnel engaged in the planning and implementation of PSD. Through systematic innovation and BPR, not only in Sri Lanka but also for many other professionals and researchers who are engaged in designing and execution of similar service improvements and reengineering strategies in different countries around the world. Detailed analysis and outcomes have been presented in the chapter no. 4 of the thesis.

Chapter No. 2

Literature Review

2.1 Business Process Reengineering (BPR)

From a conceptual as well architectural perspective, at the least two critical areas stand out as prime targets for a BPR regime in the perspective of public service sector. First is a fundamental rethinking of the definition of public service, and the second is a complete redesign of the structure of the business processes to provide efficient public service. Hammer and Champy (1993) defined BPR as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance". Ezigbo (2011) argued that "business process reengineering involves a rethinking of the current theories of business. Remarkable improvements were made by breaking away from the old methods and adopting the newer ones". Ranasinghe (2010) agrees that the definition covers both factors, a fact that is important for our study, i.e. fundamental rethinking and radical redesign. BPR regime, in this context, means (i) structural reforms, (ii) regulatory overhaul, and (iii) better performance control mechanisms. These three measures are mainstay of the BPR regime in order to ensure an efficient administrative and service structure in any situation. Ezigbo's (2011) findings suggest that managerial innovations result in alterations in existing working patterns, systems, procedures, styles resulting in efficiency and effectiveness in the delivery of public service. In short, open innovation serves as one of the core axioms of BPR and related reforms in Sri Lanka, hence, for the sake of focus and explanative ease, I shall mostly focus on IOI based BPR regime when I discuss BPR in Sri Lankan perspective. Apart from the BPR architecture, we also need to assess the literary background of such reformative actions from an economics perspective. There is scant literature that deals with the economic utility and outcomes of such BPR regimes from the standpoint of the country. However, there is ample evidence as to the desirability of public sector process reform from a

theoretical as well and practical point of view in general. Park et al. (2013) did a detailed study on several developing economies in Asia and found strong evidence of the relationship between PSD reform and economic growth.

2.1.1 BPR in Perspective

Dealing with large organizations in public sector requires more than physical and technical infrastructure; it requires entailing organizational and operational changes in a carefully planned and acceptable way, so that the pain and organizational upheaval is kept to a minimum (Beauregard and Lesley, 2004). This would further require that a complete and comprehensive change management regime be put in place, before any large organization is put to the test of undergoing new and unknown or untested operational changes. Change management will be needed to ensure that the organizational entity is able to cope with the ensuing change or business process reengineering without unnecessarily shocking the stakeholders involved. Change management will be needed throughout the planning as well execution phases of the project in order to permit a smooth and painless transition. This thesis presents the findings gained from engagement in the BPR and change management process of a public service sector in a developing country and brings out important lessons for similar other countries attempting to incorporate change or innovative business practices. It also points towards the likely behavioral challenges across organizational hierarchy that would need appropriate treatment to ensure a successful and smooth transition. The change needed in such a situation effectively means a complete business process reengineering (BPR) for the services sector under consideration. It involves many changes as well innovations in the practical business of the organization.

In a situation where, known environment is changing into largely unknown environment, the general principles or theories governing above aspects alone cannot create a successful transformation. A careful study of the given transformation is a prior followed by a heavily customized solution approach to the case (Sexton 2010).

Change or transition is seldom smooth and painless for organizations that attempt at shaking old business procedures and make moves in a new direction. Mastering the machinations & complexities of the systems, and need for customizing the technologies and methodologies to the contextual environment in which it is to be used, requires detailed situational analysis in addition to environmental and operational analysis (Clarke and Clegg, 1998). Macredie and Sandom (1999) agree that, “an improvisational perspective may be useful for hierarchical organizations which introduce new processes as the local improvisations which can occur may be leveraged for advantage.” As public services sector in Sri Lanka is a hierarchical system, it seems that customization would be imperative. It should also be noted that in an earlier study, it was found that service and skill-oriented sectors in developing countries were found to be more receptive to transition than labour intensive sectors (Oyelaran-Oyeyinka et al., 2004). In this perspective, one can be hopeful that implementing change at public services sector is not a hopeless case to start with.

Public service requirements will bear an important influence upon the scope and design of transition plans; resultantly there would be dissimilarities in the transition paradigm between developing and developed countries. It is due to the reason that in developing countries the awareness and desire for the change may be significantly lacking. As this study deals with the transformation, of public service in a developing country, caused by introduction of information technology infrastructure; hence we need to understand the dynamics of that transition in this perspective. Dadashzadeh (2002) referred to possible pitfalls and triumphs involved when implementing such change regimes into the structure of a developing country. His insights are interesting to understand the mechanisms and strategies to allow a smooth adaptation of change in developing countries. Also, one should not only focus on design and management strategies, as there would be many other important factors like people, culture, customs and organizational environment. These factors need to be taken into consideration in addition to infrastructure related issues. Jorgensen et al (2008) found that achieving project success does not depend primarily on infrastructure rather the

success depends largely on people. Lastly, the change cannot be successful without a complete acceptance by employees at all levels of any organization. LeClair & Rao (2002) stressed that “managing change is the responsibility of everyone in the corporation - from senior managers on down” it.

2.1.2 BPR Pre-requisites

BPR requirements go beyond infrastructure, training & work assignments, enhancements, updates, incremental fixes and patches to PSD systems. BPR in this context needs to encompass a set of processes that needed to be executed in order to manage the resultant organizational upheaval. In this case, many stakeholders interact such as the public, government offices, governmental reform handlers, executive level staff, middle managers, lower line functionaries, developers, IT operations staff, and auditors. Stable, reliable and efficient organizational environment requires that implementation of changes be predictable and repeatable. The change should follow a controlled pattern that is not amorphous, is observable and enforceable. In this case I found that the nature of the public service requires a high degree of system readiness while regulatory requirements such as business process manuals (including regulations and parameters set by parliament and other government bodies) drive the need for controls to ensure the confidentiality and integrity of information.

Establishment of a stable and managed PSD process requires that changes be implemented in a predictable and repeatable manner. Also, it is important to make sure that the preventative controls (segregation of duties) and detective controls (supervisory) are put in place in combination.

BPR and ensuing change management for such a large sector (that encompasses almost all the governmental departments of a country the size of Sri Lanka) would require a phased-out strategy; as normal operations cannot normally be terminated even for a short time due to the scale as well nature of the business. However, running full scale change management regime without a prior test run can put the entire operations at jeopardy and cause unease and discomfort to a large number of clients

that the organization caters for. In this particular case, a pilot run was carried out before a full-scale implementation of the e-pensions regime and accompanying change management regime.

On the design and development side of a BPR regime, an early involvement in the project and liaison with the organization under transition can help understand and build a capacity to cultivate a strong change management partner team from functionaries and executives at the organization for which change management regime is being put in place. In Sri Lanka's case, we can identify a number of promising individuals in almost every department and ministry with a willingness to actively participate in the BPR process and be effective change agents. Later out of these change agents, one can identify the individual with a potential to emerge as change leaders. It is important, as during the implementation following phases of the BPR such individuals can play an important role in carrying out BPR tasks at strategic as well as functional levels. Such a team development in the transitioning organization ensures that groundwork for BPR regime can be initiated without greater turmoil and the organizational environment is ready for acclimatizing for the change. This groundwork will also assure that the resources needed for the change are available, while simultaneously creating general awareness and universal involvement at all personnel levels. Finally, we shall be able to apportion line and staff to requisite training modules, and also be able to comply with task of reporting on regime accomplishment and adaptability prerequisites.

2.1.3 Concerns Regarding BPR Execution

Unfamiliarity and perceived concerns with new and unknown are always a major roadblock in the implementation of any important and major change in any organization. These fears become more relevant and important for large public sectors, as the operators are used to a system and routine that has developed over decades (in case of Sri Lanka over centuries, in fact). It is thus very important to recognize and understand BPR related challenges or divergence points that can

obstruct implementation of a change associated with a BPR regime. Some of such important concerns can be;

- Disagreement among old and young staff in accommodating the change.
- Divergence among urban and rural working cultures after the change.
- Conflict in types of incentives to motivate workers to accept the change.
- Disagreement between the old and new routines culture.
- Overall skepticism on the suitability of the ensuing BPR.
- Indifference to change assuming new system will somehow evolve.
- Perception of loss of power/benefits after the change.
- Fear of being left by certain ambitious employees.
- Fear of further aggravating the status quo by inability to address the core requirements for smooth/stable system operation.

Now, below here I would like to elaborate in detail on some of these concerns that can impede the way of a smooth and successful transition expected from a BPR regime. **First**, during the deployment phase of a major BPR regime, it is unavoidable to have a considerable gap between the initially deployed system and system required at the state of stable operation. Considerable amount of amendments and additions in terms of personnel, infrastructure and operations will take place with time. However, it is important to understand the core requirements for smooth operation in advance and more importantly to foresee the potential critical problems before the initial deployment. **Second**, personnel who are habituated to and highly value the current system would display skepticism about the need for any such change in business procedures. Also, those who are already satisfied with the service provided by the current system, in the context of infrastructural and cultural setup (as is the case in Sri Lanka) would not be quite keen on change. Some people will be honestly in doubt about the functionality of the new systems and procedures. **Third**, employees with lesser levels of education and training may also express resistance or skepticism about the change in processes and the routines. Their inability to undergo proper training or education to cope with the changes may cause considerable hindrances in the

implementation of the BPR. However, for older employees with lesser terms of the service, there will not be enough incentive or present value in any business procedure change; as they already accustomed to the old way may not want to pick up the new method. Further employees in rural offices will show more resistance, as their current workload might not be so complicated and they may see little benefit in computerization. **Fourth**, conventional job security provided to most government servants is also a reason, though through this comment we are in no way suggesting that such a job security should be taken away, However, it is very difficult to accept a major change in work routines when there are no temporal threats to the people who are habituated to them. Furthermore, eventually organizations develop a culture, style and aura of their own; and many people take pride and comfort in the culture and not much willing to do away with that. People habituated to existing reporting and responsibility mechanisms may not be very enthusiastic about any change. **Fifth**, senior level employees who have been enjoying a high self-esteem through direct interaction with the existing stakeholders will fear loss of power and esteem in case the BPR results in the stakeholder mix or the interaction patterns. This is truer in case of staff at rural offices, where personal connections are developed over a long period of time and are considered very valuable in management and delivery of public services. Change in work routines and procedures diminishes possibilities of benefitting from such relationships when business processes are changed.

2.2 Public Services Sector in Sri Lanka

Here in this section is presented a quick look at the overall political system i.e. the structure of the government of the country, followed by a description of the most important public service delivery branch of the government of Sri Lanka.

2.2.1 The Government

Sri Lanka is a Democratic Republic and a unitary state headed by a semi-presidential system, with a mixture of a presidential system and a parliamentary system. Most provisions of the constitution can be amended by a two-thirds majority in parliament. The amendment of certain basic features such as the clauses on language, religion, and reference to Sri Lanka as a unitary state require both a two-thirds majority and approval in a nationwide referendum. The Sri Lankan government has three branches:

- **The Executive Branch:** The President of Sri Lanka is the head of state, the commander in chief of the armed forces; head of government, and is popularly elected for a five-year term. The President heads the cabinet and appoints ministers from elected members of parliament. The President is immune from legal proceedings while in office with respect to any acts done or omitted to be done by him or her in either an official or private capacity. Following passage of the 19th amendment to the constitution in 2015, the President has two terms, which previously stood at no term limit. With 20th amendment the limit to the presidential terms has been removed once again.
- **The Legislative Branch:** The Parliament of Sri Lanka is a unicameral 225-member legislature with 196 members elected in multi-seat constituencies and 29 elected by proportional representation. Members are elected by universal suffrage for a five-year term. The president may summon, suspend, or end a legislative session and dissolve parliament any time after four and a half years. The parliament reserves the power to make all laws. The president's deputy, the Prime Minister, leads the ruling party in parliament and shares many executive responsibilities, mainly in domestic affairs.
- **The Judicial Branch:** Sri Lanka's judiciary consists of a supreme court – the highest and final superior court of record, a court of appeal, high courts and a number of subordinate courts. The highly complex legal system reflects

diverse cultural influences. Criminal law is based almost entirely on British law. Basic civil law derives from Roman and Dutch law. Laws pertaining to marriage, divorce, and inheritance are communal. Due to ancient customary practices and/or religion, the Sinhala customary law (Kandyan law), the Thesavalamai, and Sharia law are followed in special cases. The President appoints judges to the Supreme Court, the Court of Appeal, and the High Courts. A judicial service commission, composed of the Chief Justice and two Supreme Court judges, appoints, transfers, and dismisses lower court judges.

	Main Powers	Election Process	Term
Executive Branch (President)	Head of state, head of government, commander in chief of the armed forces, Answerable to Parliament for the exercise of duties under the constitution and laws.	President is elected through a contingent vote system.	5 years
Legislative Branch	Power to make all laws.	Parliament members are elected by open list proportional representation in multi-member constituencies.	5 years
Judicial Branch	Court has ultimate appellate jurisdiction in constitutional matters, and take precedence over all lower courts.	Appointed by president.	Until the age of 65

Table 2.1 Government of Sri Lanka - Branches, Election Process and Terms

The governance or the administrative structure has president of the country at apex which heads the government through a cabinet of various ministers who in turn are responsible for taking care of many departments under their purview. The president represents the administrative branch of the governance headed by a prime minister at the head of the cabinet, however, under the present scheme of things, president has more administrative powers. As such the administrative and governance structure is

more like a presidential system, whereas the legislative functions are the responsibility of the parliament.

On a larger scale the public governance structure in Sri Lanka can be represented by Figure 2.1

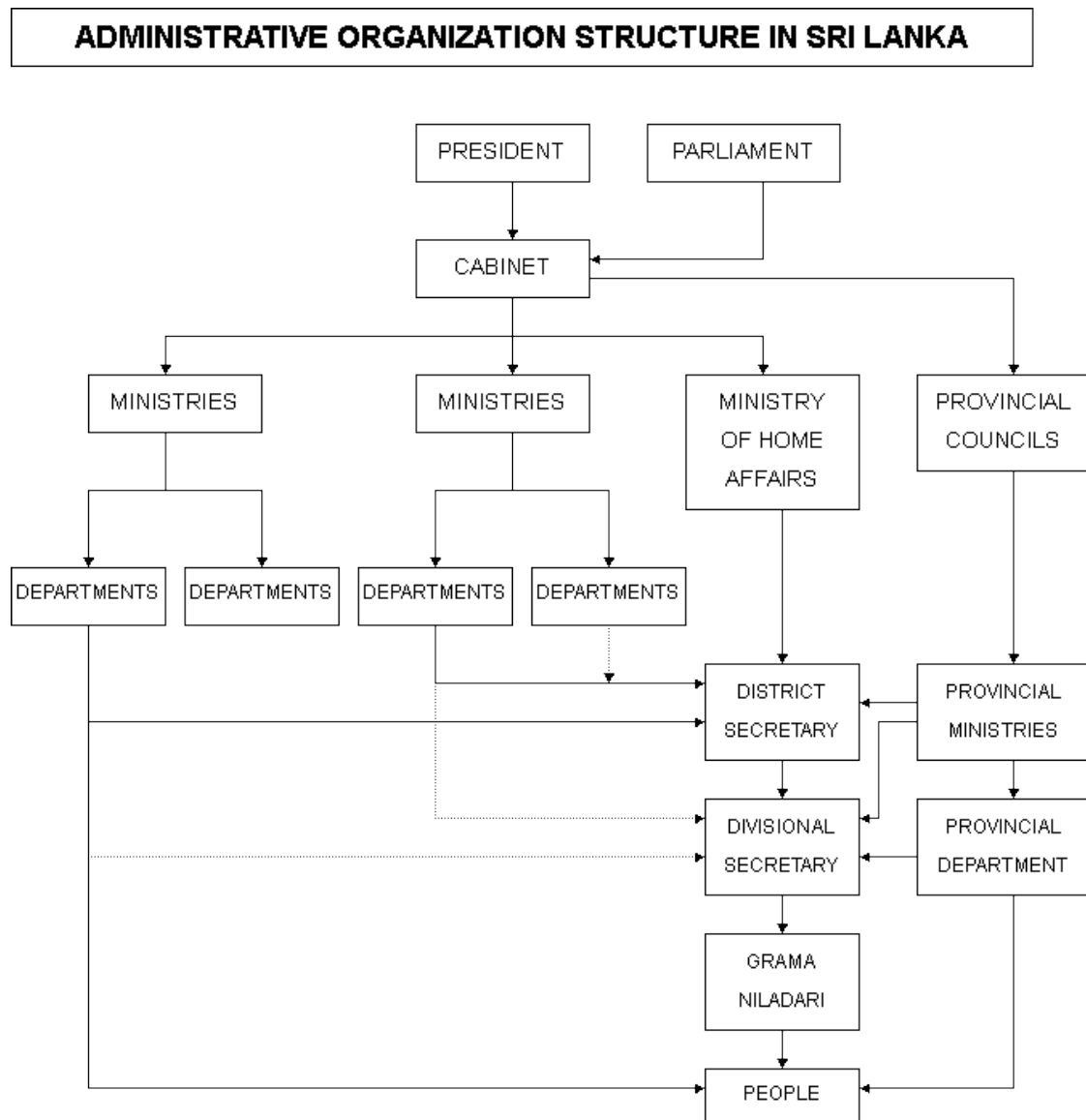


Figure 2.1 Administrative Organization Structure in Sri Lanka

Most of the public services in Sri Lanka are organized under the Ministry of Public Services (MPS). I shall focus mainly on the functions and structure of MPS, as it is a key ministry responsible for service delivery for the benefit of all government

institutions, its servants and the general public servants in Sri Lanka. MPS was earlier a department under the ministry of finance before year 1931, before becoming a separate ministry. Since August 2020, MPS has been reorganized as the Ministry of Public Services, Provincial Councils and Local Government and is at present is responsible for services in the field of public administration.

MPS works forward under the minister in charge of the and is also termed as the 'Mahagedara of all public servants' (main center) is responsible for providing the organizational vision and for formulating policies and necessary directions for provision of public services. Secretary of the ministry works directly under the minister and has the responsibility to provide leadership in aid to the minister.

One of the main responsibilities of the Ministry is the formulation of administrative provisions and regulations in order to assure service delivery to general public with uniformity, fairness and efficiency. MPS is thus responsible for preparation of establishments codes, rules, procedures and makes them known to public by issuance of circulars and observations/recommendations. MPS has the responsibility for formulation and interpretation of policies at national level on the affairs connected to public services and also provides necessary guidelines. MPS builds and manages the functions of whole public service infrastructure in the country. Finally, management of public service human resources and the administration of countrywide services infrastructure such as to align all that with national development goals is also one of the main roles expected from the ministry. MPS defines its mission as

*"Ensuring an excellent public service through proper administration, management and reformation of human resource"*¹

The scope of the activities of MPS include ensuring an excellent service delivery to the general public minimizing the differences observed at provincial and divisional levels

¹ The state ministry of the Ministry of Public Services, Provincial Councils and Local Government
https://pubad.gov.lk/web/index.php?option=com_content&view=article&id=2&Itemid=109&lang=en

with a view to provide an optimum service to recipients avoiding duplication of tasks with the help of new strategies in information and communication technology and making a full-scale capacity development in all public services.

The stated objectives² of MPS can be listed as follows;

- Changing attitudes and expectations of the employees in public service in order to make positive responses to the requirements of general public.
- Preparation of a framework for institutional development of public sector with the capacity for the achievement of targets and development targets and priorities.
- Formulation and implementation of new management structure in order to enhance productivity and quality of public service.
- Enhancement, development and implementation of guidelines in order to simplify the systems and reformulation of processes to work with the changing environment.
- Formulation of productive public policies on recruitments, remuneration and other service conditions in the human resource management of public service.
- Establishment and sharing of code of ethics. (result oriented attitudes, accountability, proper use of resources, impartiality, transparency, etc.)
- Provision of facilities for training programs and identification of training requirement for conducting training programs.
- Formulation and implementation of pension programs with a view to provide remedial measures for issues relating to pension.
- Promoting the implementation of information and communication technology to enhance the productivity and quality of the service delivery.
- Enhancement of the skills of the staff in public service.

² The state ministry of the Ministry of Public Services, Provincial Councils and Local Government
https://pubad.gov.lk/web/index.php?option=com_content&view=article&id=2&Itemid=109&lang=en

The ministry is governed as well as responsible for ensuring a countrywide implementation of a host of laws related to public services at national, provincial as well as local levels of the government.³ It may be noted that the ministry has to deal with a large number of public service law across the spectrum and some laws are dated as back as from late nineteenth century.

2.3 BPR in Sri Lanka

As we noted in the introduction to this thesis, Sri Lankan public services have origins in a philosophy that stood diametrically opposed to the modern concepts of public service. The public service management needed to undergo a thorough process of reform and restructuring. As there were not many internal examples to follow in order to reinvent the service to perform in tune with modern age requirements; the only approach left to avail was an IOI concept for management innovation, reform and restructure.

Several studies have touched upon the topic of public service reforms in Sri Lanka, but no efforts have yet been made to assess the impact of the third and the most recent wave of reforms in the form of BPR regime put into effect. This makes the study one of its nature and the originality of data and the broader scope it carries is yet uncovered by any other study. Some studies though have attempted to assess the impact of the first wave or the second wave. Park and Noland (2013) have conducted an extensive study on several developing economies in Asia and have found strong linkage between PSD reform and economics growth; though in their study is not a specifically related to the case of Sri Lanka. McCourt (2001) did a cursory study of the three waves and his findings were mostly related to employment reforms. In the context of PSD in Sri Lanka, Deshani and Weerasinghe (2015) noted the problem of lack of innovation in Sri Lankan public service. His finding indicated lack of a conceptual model with a core strategic leadership and nonchalance towards a culture

³ For a complete list of laws related to public services, as implemented by MPS, please refer to Appendix No. 5 at the end of the thesis.

of achievement. As compared to the 3rd wave, the 1st and the 2nd waves have been mostly economy related reforms. Deshani and Veerashinghe et al. (2015) studied the effectiveness of public service delivery in Galle district of Sri Lanka only and that too from the perspective of public entrepreneurship.

Resultantly, after repeated halfhearted efforts at reforms through 60s and 70s of the 20th century, a completely new approach towards governance was introduced in 2010 under the concept of ReGovernance 2020 (ReGov). The approach adopted in this outline document called for out of the box solutions and called for opening up almost all areas of public service for innovative approach towards business process. Hence, a BPR regime with IOI based open-innovation as its core was launched to overhaul and reform the public service mechanisms of Sri Lanka. This led to an open-innovation policy of redesigning the whole business model of the PSD in the country.

Introduction of concept of open innovation within BPR regime was a relatively new concept at the time. While explaining the concept of open innovation Ozcelik (2010) stated, “open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model. It was in this very context, that ReGov laid down a reform process that was out of box and allowed a great mesh of internally generated as well as externally imported ideas to reform the public service systems in Sri Lanka. Here, we see a shadow of Hesson et al.’s (2007) findings that stated that managerial innovations result in alterations in existing working patterns, systems, procedures, styles resulting in efficiency and effectiveness in the delivery of public service. In short, open innovation serves as one of the core axioms of this reform wave; however, for the sake of focus and explanative ease, the paper mostly focuses on IOI based BPR regime in the Sri Lankan public service.

Wijesinghe (1997) stated that Sri Lankan public administration structure has undergone at least three distinct public reform waves. The first wave as explained in the report of Administrative Reforms Committee (ARC) laid down detailed/linked proposals with a major focus on civil service size. However, the first wave was only partially implemented as most reform measures were hampered by political

instability. As noted earlier, Wijesinghe (1997) asserts that the second wave came with a focus upon structural reform of the management units, but the target areas were not clear and resulted in greater mess and an enlarged public sector with little performance improvement. The third and the most recent wave, the focus of this study, has undertaken a major strategic shift in the philosophy and the structure of the public service administration.

BPR regime, in this context, meant (i) structural reforms, (ii) regulatory overhaul, and (iii) better performance control mechanisms. These three measures were put in place as mainstay of the BPR regime in order to ensure an efficient PSD. While BPR regime was put into place, no effort has since been made to assess the propriety as well the outcome of the regime. In this thesis I analyze the post-BPR-implementation state of affairs and measure the efficiency of the service across 29 ministries and departments through which most public services are delivered to the populace in Sri Lanka. In the next sections, I explain the data sources, the methodology applied to analyze the situation and finally discuss the outcomes of our research and analysis.

As was stated earlier, the colonial heritage of the public service apparatus in Sri Lanka has historically been a significant impediment in the way of developing a more modern service. The country needed an overhaul of its administrative architecture, and also how the system served the public. As a prolonged civil war with LTTE came to an end in 2009, the peacetime provided the country with an opportunity to push forward with a radical redesign of the administration and align the system with the modern times and achieve better economic growth. Gyan (2001) noted that "Sri Lanka's economic "performance has been below its potential, and the unresolved civil conflict poses one of the greatest obstacles to its long terms growth prospects". Premachandra (2016) states that end of the ethnic conflict in Sri Lanka carried the great expectation of sustained economic gains in its wake; however, there are fears that if a radical redesign and rethinking is not put into place to address the issues. It is evident that when we are concerned with analyzing the BPR regime, we need to consider both

the architecture as well as its utility. It is therefore crucial that we review the empirical literature that explains both the design of a BPR regime as well the utility that it entails. Ramasamy (2020) found that Sri Lankan public administration structure underwent three distinct reform waves. The first wave, as explained in the report of the Administrative Reforms Committee (ARC), laid down detailed/linked proposals with a significant focus on civil service size. As Wijesinghe (1997) asserts that the second wave's direction was structural reform of the management units. Still, the target areas were not clear and thus resulted in a greater mess, and an enlarged public sector with little performance improvement. The third wave has been the most significant one, as the country adopted a new approach towards governance in 2010 under the concept of ReGovernance 2020 (ReGov). The approach called for out of the box solutions and called for opening up almost all areas PSD areas for business process reform and innovation. Resultantly, an IOI open-innovation based BPR was to reform the PSD mechanisms of the country. The concept of open innovation within the BPR regime was a relatively new concept at the time. Fernando (2006) states that "open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model". ReGov laid down an out-of-box reform process the public service systems in Sri Lanka to bring efficiency and effectiveness in PSD. Ranasinghe's (2010) found that managerial innovations result in alterations in existing working patterns, systems, procedures, and styles, resulting in efficiency and effectiveness in the delivery of public services. While open innovation serves as one of the core axioms of this reform, I shall specially focus on IOI based BPR regime in the Sri Lankan public services.

From a conceptual as well architectural perspective, at the least two critical areas stand out as prime targets for a BPR regime. First is a fundamental rethinking of the definition of public service, and the second is a complete redesign of the structure of the business processes to provide efficient public service. Hammer and Champy (1993) defined BPR as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of

performance". Ezigbo (2011) argued that "business process reengineering involves a rethinking of the current theories of business. Remarkable improvements were made by breaking away from the old methods and adopting the newer ones". Ranasinghe (2010) agrees that the definition covers both factors, a fact that is important for our study, i.e. fundamental rethinking and radical redesign. Jayawardena (1997) states that In Sri Lanka, PSD reforms did not happen overnight; instead, the current BPR regime is an outcome of many interrelated initiatives undertaken over many years. Kittinger et al. (1996) explained the significance of incorporating information architecture (IA) within the BPR architecture and proposed that BPR and IA are complementary to each other. The concept of open innovation, i.e. IOI based systematic innovation that was fused with the BPR regime installed, has been found useful in improving performance. Ahmad et al. (2018) found a positive connection between open innovation and performance. However, their findings are based on corporate data and do not directly explain public service performance and its association with the IOI systematic innovation. Bianchi et al. (2010) also didn't cover public service arena when they stated that "open innovation that focused on large firms found it a useful tool to enhance performance". Fernando (2006) also noted that "open innovation combines internal and external ideas into architectures and systems whose requirements are defined by a business model". Hochleitner et al. (2017) also state that "Open innovation is a model ... allowing for a two-way flow of knowledge from inside the firm out (outbound) and from outside in (inbound). It was in this same context that ReGov laid down an out-of-box reform process and with an IOI based BPR architecture of PSD system in Sri Lanka.

Apart from the BPR architecture, we also need to assess the literary background of such reformative actions from an economics perspective. There is scant literature that deals with the economic utility and outcomes of such BPR regimes from the standpoint of the country. However, there is ample evidence as to the desirability of public sector process reform from a theoretical as well and practical point of view in general. Park et al. (2013) did a detailed study on several developing economies in

Asia and found strong evidence of the relationship between PSD reform and economic growth. Their research does not cover Sri Lanka as a case study. Thong et al.'s (2000) study also found essential linkages between BPR and public sector performance. Nukurinziza et al. (2019) found that to have a successful reform process; the organization must be responsive to BPR.

So, the literature review reinforces the contention that understanding the dynamics and the results of BPR is very important to ensure that results conform to the stated objectives. This study will fill the empirical gaps, and also provide feedback to the implementers of the BPR regime in the country.

Chapter End References

1. Hammer, M.; Champy, J. Reengineering the corporation: A manifesto for business revolution. *Bus. Horiz.* **1993**, *36*, 90–91.
2. Ezigbo, C.A. *Advanced Management Theory and Applications*; Immaculate Publication Ltd.: Enugu, Nigeria, 2011; pp. 83–90.
3. Ranasinghe, S., Breaking the mindsets: Issues of learning and innovation in Sri Lankan organizations. *Sri Lankan Journal of Management*, **2010**, Vol. 7, 3-4.
4. Park, D., & Noland, M. (Eds.). Developing the service sector as an engine of growth for Asia, Mandaluyong City, Philippines: Asian Development Bank, 2013; 47-48.
5. Beauregard, T. Alexandra and Henry, Lesley C. (2009) Making the link between work-life balance practices and organizational performance. *Human resource management review*, 19. pp. 9-22. ISSN 1053-4822
6. Sexton, Clive "Change Management - Coping With Change.", 4 Apr. 2008 EzineArticles.com. 25 Feb. 2010
7. Clarke, Thomas & Clegg, Stewart, 1998, Changing Paradigms: the transformation of management knowledge for the 21st century, Harper Collins Business.
8. Macredie R D. and Sandom C., 1999, IT-Enabled Change: Evaluating an Improvisational Perspective, *European Journal of Information Systems*, 8(4), 247-259
9. Oyelaran-Oyeyinka, Banji & Lal, Kaushalesh, 2004. "Sectoral Pattern of E-business Adoption in Developing Countries," Discussion Papers 07, United Nations University, Institute for New Technologies.
10. Dadashzadeh, M. (2002). Information Technology Management in Developing Countries.
11. Jorgensen, H., Owen L. and Neus, A., 2008, Making Change Work Study, IBM Global Services

12. LaClair, J. and Rao, R., 2002, Helping Employees Embrace Change, McKinsey Quarterly No. 4
13. McCourt, W., Finding a way forward on public employment reform: A Sri Lankan case study. *Asia Pacific Journal of Human Resources*, 2001; 39(1), 1–22
14. Deshani, A.L.; Weerasinghe, R.N. Public Entrepreneurship and Delivering Public Services Effectively: A Study in Public Organizations in Galle District. In *Proceedings of the 12th International Conference on Business Management*, Nugegoda, Sri Lanka, 7 December 2015.
15. Ghatari, A.; Shamsi, Z.; Vedadi, A. Business Process Reengineering in Public Sector: Ranking the Implementation Barriers. *Int. J. Process Manag. Benchmarking* 2014, 4, 1–18.
16. Ozcelik, Y. Do business process reengineering projects payoff? Evidence from the United States. *Int. J. Project Manag.* 2010, 28, 7–13.
17. Hesson, M.; Ameen, H.; Samaka, M. Business process reengineering in UAE public sector: A town planning case study. *Bus. Process Manag. J.* 2007, 13, 348–378.
18. Thong, J.Y.; Yap, C.S.; Seah, K.L. Business Process Reengineering in the Public Sector: The Case of the Housing Development Board in Singapore. *J. Manag. Inf. Syst.* 2000, 17, 245–270.
19. Gyan, P. Economic cost of Sri Lanka's ethnic conflict, *Journal of Contemporary Asia*, 31:3, 2001, 375–384, DOI: 10.1080/00472330180000221
20. Premachandra, A. Sri Lanka's post-civil war development challenge: learning from the past, *Contemporary South Asia*, 24:1, 2016, 19–35, DOI: 10.1080/09584935.2015.1132188
21. Ramasamy, R. Governance and administration in Sri Lanka: trends, tensions, and prospects", *Public Administration and Policy: An Asia-Pacific Journal*, Vol. 23 No. 2, 2020; 187–198. <https://doi.org/10.1108/PAP-03-2020-0020>
22. Wijesinghe, D. Administrative reforms: International perspectives and the case of Sri Lanka. Colombo: 1997; Government of Sri Lanka.
23. Jayawardena, L., Sri Lanka: Reforming public administration. Paper presented at ADB seminar. Colombo: National Development Council. May 1997
24. Kettinger, W., Teng, J. & Guha, S. Information architectural design in business process reengineering. *J Inf Technol* 11, 27–37, 1996, <https://doi.org/10.1080/026839696345405>
25. Ahmed, S.; Halim, H.A.; Ahmad, N.H. Open and Closed Innovation and Enhanced Performance of SME Hospitals—A Conceptual Model. *Business Perspectives and Research*, 6(1), 2018; 1–12. doi:10.1177/2278533717722661
26. Hochleitner, F.P.; Arbussa, A.; Coenders, G. Inbound open innovation in SMEs: Indicators, non-financial outcomes and entry-timing. *Technology Analysis & Strategic Management*, 29(2), 2017; 204–218.
27. Bianchi, M.; Campodall'Orto, S.; Frattini, F.; Vercesi, P. Enabling open innovation in small- and medium-sized enterprises: How to find alternative applications for your technologies. *R&D Management*, 40(4), 2010; 414–431.

28. Fernando, R. L. S. Managerial innovation in delivery service in public sector organizations in Sri Lanka, *Governance and Development*, 2006, Shrabon Printing Press Dhaka, 221- 237.
29. Nkurunziza, G.; Munene, J.; Ntayi, J; Kaberuka, W. Business process reengineering in developing economies: Lessons from microfinance institutions in Uganda, *Innovation & Management Review*, 16 (2), 2019; pp. 118-142. <https://doi.org/10.1108/INMR-03-2018-0010>

Chapter No. 3

Analysis of the Implementation of BPR in Sri Lanka's Public Services

3.1 Background of BPR in Sri Lankan Public Services

Sri Lanka's colonial heritage has a significant bearing upon the design as well and functioning of its public service apparatus. Despite being a British colony like many other countries in the region, Sri Lanka's society and government structure is a special case unlike many of its neighboring countries. It will be of little use to see the country's historical and contemporary developments as a complimentary case of its neighboring nations. Meyer (1996) stated that there is more to be found by recognizing specificity of Sri Lanka than by regarding it as microcosm of India. Service sector is considered an engine of growth for a country; and in a country like Sri Lanka the efficiency of public sector becomes immensely important, as it is the largest employer as well as deliverer of public services in the country. Park (2013) has conducted an exhaustive study on the role of services sector in the growth of East Asian economies and have asserted a strong relationship between the two. It is with this background that the I have made an effort to assess the impact of BPR in PSD in the country. While, I have attempted to put the case of BPR and PSD in a broader perspective, however this is a case with evidence and analysis related to original field data collected from public sector in Sri Lanka. While the data is unique, the model used and the findings are applicable to many other countries seeking improvement of PSD through BPR expecting improved efficiency of the public sector administration.

Sri Lanka Administrative Services (SLAS - established 1972) is the successor to Ceylon Administrative Services (CAS – established 1963). CAS was, in turn, successor to a much older Ceylon Civil Services (CCS – established 1833). While the purpose of CCS was to help British colonial power to govern over its colony, SLAS has significantly different demands and expectations from its Sri Lankan clients. While, SLAS is one

major public service provider in Sri Lanka, its functions are supplemented, and sometimes even duplicated, by layers of other offices, across several ministries and departments. It certainly has been a great challenge for SLAS, along with other departments and ministries, to deliver service in modern times with a design and functionality inherited from CCS. As a result of mounting expectations and demands of more modern, independent and highly educated populace, SLAS and many other departments and ministries of Sri Lanka underwent a major BPR regime during the last decade. BPR regime, in this context, meant (i) *structural* reforms, (ii) *regulatory* overhaul, and (iii) better performance *control* mechanisms. These three measures were put in place as mainstay of the BPR regime in order to ensure an efficient delivery of public services. While BPR was put into place, no effort has since been made to assess the propriety as well the outcome of the regime. In this thesis I analyze the post-BPR-implementation state of affairs and measure the efficiency of the service across 29 ministries and departments of Sri Lankan government through which most public services are delivered to the populace.

Hammer and Champy (1993) has defined BPR as “fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance”. Also, according to Ezigbo (2011), “BPR involves rethinking of the current theories of business. Remarkable improvements are made by breaking away from following the old methods and adopting the newer ones”. Further BPR regime implementation has several aspects of open innovation as a continuous outside-in innovation element is ingrained in it; such is also the purpose of this study to allow the inside-outside-inside (IOI) feedback to the regime implementers. Gassmann and Ellen (2004) define open innovation as a bidirectional information process that leads to the process improvement, thus making open innovation a necessary corollary to BPR. It must be noted that BPR is a continuous process instead of one time even, thus it is imperative that a continuous IOI feedback process be carried on and thus allow innovation be incorporated into the process.

3.2 Key Issues in BPR

This way of defining BPR takes account of two key areas important to our case i.e. fundamental rethinking and radical redesign. As I mentioned earlier that colonial heritage of the public service apparatus in Sri Lanka has historically been a major impediment in the way of developing a more modern service. Two critical areas that stand out as prime targets for a BPR regime are: first, fundamental rethinking of the philosophy; second, a complete redesign of the structure of the business process in order to provide public service in an efficient manner. It may be noted that BPR did not start in one go in Sri Lanka; rather it took off incrementally over many years. Only by 2010, it took a recognizable shape in the form of strategic, policy, and action initiatives. These measures in turn resulted in creation as well elimination of several departments and ministries across Sri Lanka. Re-engineering Government Program (Re-Gov) started with a blueprint issued in 2004 and sketched a detailed BPR process of public service with the program named 'Program D' with 24 (D1-D24) initiatives in various areas of governance targeted in the Sri Lanka. These measures were revealed in eGovernment Strategy document prepared by Sri Lanka's Information and Communication Technology Agency (ICTA) in 2013. Now as almost ten years have passed since various BPR measure were implemented across the public service delivery apparatus, it seems pertinent to evaluate the outcome of the regime by comparing various inputs into this regime in the form of *rules, structure redesign, and performance controls*. In the next section, I lay down the details of the data used and the methodology applied to estimate the outcome of the BPR.

3.3 Data and Methodology

3.3.1. The Data

The data was collected through a questionnaire-based field survey conducted across 29 departments and ministries of the Sri Lankan government. The survey was conducted during the February and March of 2020. In total 290 respondents returned the completed questionnaire. The questionnaire was designed on 5-point *Likert* type

scale with 5 meaning strongly agreed, 4 agreed, 3 neutral, 2 disagreed and 1 for strongly disagreed. Input questions were categorized into three areas of the regime i.e. (i) *Structure*, (ii) *Rules*, and (iii) *Control* and compared with the set of questions related to outcomes (Table 3.1). The questions were deliberately planned per se to verify the inputs the outcomes of the BPR regime for PSD.

Table 3.1 Survey Questionnaire

Questions	Response				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<i>Input Questions (1, 2, 3....20)</i>					
Structure	5	4	3	2	1
Rules	5	4	3	2	1
Control	5	4	3	2	1
<i>Outcome Questions (1, 2, 3....20)</i>	5	4	3	2	1
Total Questions 40	Total responses 290				

Table 3.2 lists the D&Ms from where the survey data was collected. Inputs and outcomes related responses of 10 employees from each of 29 D&Ms were tabulated. The data thus collected was recorded into separate excel sheet and tabulated for further treatment and analysis. The originality and novelty of the data singles out this study from other studies that were conducted in the past.

Table 3.2 Departments and Ministries Surveyed

Department/Ministry	No. of Questionnaires Collected (n=290)
Department of Pensions	10
Department of Registrar General	10
Ministry of Public Administration	10
Ministry of Local Government	10
Department of Revenue License	10
Department of Railways	10
Department of Wildlife Conservation	10
Department of Examinations	10
Ministry of Higher Education	10
Ministry of Urban Development	10
Department of Irrigation	10
Department of Excise	10
Department Immigration Emigration	10
Department Import & Export	10
Department of Co. Registration	10
Department Inland Revenue	10
Department of Persons Registration	10
Department of Land Settlement	10
Ministry of Labor	10
Department Census & Statistics	10
Ministry of Mahaweli & Agriculture	10
Department of Coast Conservation	10
Foreign Ministry	10
Department of Elections	10

Department of Survey	10
Department of Postal	10
Department of Forest Conservation	10
Department of Motor Traffic	10
Department of Customs	10

In the next stage, the data from the completed questionnaire collected from each department was averaged, and the average response to each was used for processing and analysis through DEA software. The questions were designed as such to confirm the input into BPR and the output of the BPR regime set into motion through the functional structure of the public service delivery system. Hence, the raw data could be categorized into inputs and output to assess the outcome of the BPR implementation and the efficiency of the service delivery. Further, the questionnaire design allows to categorize the inputs into three major categories i.e. *structure*, *rules*, and *controls* related to the service provision system across 29 departments and ministries (Table 3.2). While some departments come under relevant ministerial jurisdiction, many departments function as independent entities; hence they have been considered as separate DMUs. The table also shows original input/output data averages from the questionnaire distributed and collected (Table 3.3).

Table 3.3 Input and Output Data

Organization	Decision Making Unit	Input/Output Data			
		Output	Input 1 Structure	Input 2 Rules	Input 3 Control
Department of Pensions	DMU1	3.68	4.00	3.49	3.74
Department of Registrar General	DMU2	3.62	3.55	3.46	3.87
Ministry of Public Administration	DMU3	3.78	3.70	3.79	3.81
Ministry of Local Government	DMU4	3.72	3.70	3.68	3.77
Department of Revenue License	DMU5	3.61	3.60	3.51	3.73
Department of Railways	DMU6	3.77	3.70	3.79	3.79
Department of Wildlife Conservation	DMU7	4.04	3.98	4.08	4.01
Department of Examinations	DMU8	3.52	3.55	3.43	3.60
Ministry of Higher Education	DMU9	3.91	3.90	3.78	4.09
Ministry of Urban Development	DMU10	3.76	3.63	3.58	4.07
Department of Irrigation	DMU11	3.40	3.38	3.32	3.51
Department of Excise	DMU12	3.66	3.68	3.48	3.87
Department Immigration Emigration	DMU13	3.76	3.83	3.77	3.71
Department Import & Export	DMU14	3.59	3.73	3.56	3.56
Department of Co. Registration	DMU15	3.42	3.55	3.33	3.44
Department Inland Revenue	DMU16	3.70	3.80	3.52	3.86
Department of Persons Registration	DMU17	3.75	3.88	3.52	3.97
Department of Land Settlement	DMU18	3.85	4.00	3.64	4.01
Ministry of Labor	DMU19	3.83	3.60	3.53	4.33
Department Census & Statistics	DMU20	3.97	4.10	3.73	4.19
Ministry of Mahaweli & Agriculture	DMU21	4.35	4.25	4.31	4.46
Department of Coast Conservation	DMU22	3.99	4.18	3.80	4.11
Foreign Ministry	DMU23	3.91	4.15	3.81	3.90
Department of Elections	DMU24	3.70	3.68	3.62	3.80
Department of Survey	DMU25	3.69	3.88	3.36	4.01
Department of Postal	DMU26	3.79	3.85	3.51	4.11
Department of Forest Conservation	DMU27	3.31	3.00	3.13	3.71
Department of Motor Traffic	DMU28	3.91	4.08	3.91	3.82
Department of Customs	DMU29	3.19	3.60	2.96	3.24

3.3.2. The Methodology

As mentioned in the chapter no. 1 of this thesis, a non-parametric data envelopment analysis (DEA) has been employed to measure the performance of ministries and the departments denoted as decision making units (DMUs). As per Thanassoulis et al. (2008), a DMU's efficiency is depicted by the ratio of the sum of its weighted outputs to the sum of its weighted inputs. DEA is applicable to the case of both public and private sector entities. DEA has widespread use across a whole host of areas of public or private service provision industries.

The data was analyzed using data envelopment analysis program DEAP Version 2.1 developed by Coelli (1996). DEAP enables us to construct a non-parametric frontier over the input and output data and calculate the efficiency scores. I assess input-oriented constant return to the scale (CRS) and variable return to the scale (VRS) models to calculate technical efficiency and scale efficiency for 29 DMUs in the data. Using DEA, one can calculate each DMU's efficiency score, calculated in relation to an efficiency frontier. DMUs positioned on the efficiency frontier have an efficiency score of 1. DMUs operating below the frontier have an efficiency score lesser than 1. DMUs can also be used for benchmarking, as DMUs that fall on efficient frontier can serve as benchmark for the DMUs that fall below the frontier and hence peers at frontier can serve as guideposts for the slackers. A non-parametric DEA can be conducted both from an input orientation as well as from an output orientation in order to ascertain efficiency scores. However, for this very situation an input orientation will be most appropriate, as DMUs have control over only the inputs; public service DMUs are expected to provide a minimum level of service which is usually given and cannot be arbitrarily controlled. Hence, input orientation has been taken while conducting the DEA.

The technical efficiency (TE) is explained as ability of the firm (or DMU in this case) to obtain maximum output from a given set of inputs, as proposed by Farrell (1957). Input-oriented TE describes the likelihood of reducing inputs to achieve the same

level of output, while output-oriented TE describes the likelihood of increasing the outputs with the same level of input. Constant returns to scale technical efficiency scores (CRSTE) is a measure of inefficiency caused by input and output configuration. Variable returns to scale technical efficiency scores (VRSTE) is a measure of inefficiency caused by managerial underperformance. The approach for frontier estimation, originally suggested by Boles (1966), was later improved with mathematical programming methods by Afriat (1972) and Charnes et al. (1978). Later input oriented constant return to the scale and variable return to the scale forms of the model were proposed by Charnes, Cooper and Rhodes (hereinafter referred as CCR) (Charnes et al. 1978). Also, see Banker et al. (1984) and Fare and Grosskopf (2005) for further elaboration on the same idea.

CCR model defines efficiency of a decision-making unit (DMU) as the maximum of a ratio of weighted outputs to weighted inputs, subject to the condition that the similar ratios for every DMU can be less than or equal to unity. CCR model can be presented with mathematical programming methods, as later suggested by both Farell (1957) and Charnes et al. (1978). In order to attain a variable return to scale technical efficiency (VRSTE) measure, I have initiated from a CRS CCR model in linear programming form and then introduced convexity constraint to adapt it for VRS; i.e. to maximize output (y) divided by input (x) subjected to weights vectors u' for outputs and v' for inputs. Hence,

$$\max_{u,v} \left(\frac{u'y_i}{v'x_i} \right), \quad (1)$$

subject to

$$\left(\frac{u'y_j}{v'x_j} \right) \leq 1, j = 1, 2, \dots, N$$

$$u, v \geq 0$$

in order to avoid infinite solutions problem, we constrain this by

$$v'x_i = 1$$

Hence, we get

$$\max_{u,v} (\mu' y_i), \quad (2)$$

subject to

$$\begin{aligned} v' x_i &= 1, \\ \mu' y_j - v' x_j &\leq 0, j = 1, 2, \dots, N, \\ \mu, v &\geq 0, \end{aligned}$$

Here, μ and v , represent transformation into multiplier form of linear programming. At this point CCR model proposes to introduce duality in liner programming to derive the following envelopment form;

$$\min_{\theta, \lambda} \theta \quad (3)$$

subject to

$$\begin{aligned} -y_i + Y\lambda &\geq 0, \\ \theta x_i - X\lambda &\geq 0, \\ \lambda &\geq 0, \end{aligned}$$

Finally, here the convexity constraint $N1'\lambda = 1$ is introduced to (3) to transform it to VRS as [9];

$$\min_{\theta, \lambda} \theta, \quad (4)$$

subject to

$$\begin{aligned} -y_i + Y\lambda &\geq 0, \\ \theta x_i - X\lambda &\geq 1 \\ N1'\lambda &= 1 \text{ (for VRS)} \\ \lambda &\geq 1, \end{aligned}$$

Now this VRS model can work under the constraints as stipulated in the equations above and provide a reliable measure of efficiency. Using DEAP 2.1 version we are able to calculate not only efficiency per se, but peers, peer targets and slacks for amongst our entities. Here, θ is a scalar and λ is a $N \times 1$ vector of constants, y_i is column vector of outputs, Y is output matrix defined as $m \times n$, x_i is column vector of inputs, X is input matrix defined as $k \times n$, N is the number of DMUs, k is number of inputs, m is number of outputs. Efficiency score is equal to or less than 1. The efficiency scores

equal to 1 means the DMU is on efficiency frontier line. The efficiency scores less than 1 mean that the DMU is inside of the efficiency frontier. Scale efficiency will be calculated as ratio of CRSTE to VRSTE.

3.4 Results

Table 3.4 shows input-oriented efficiency summary for the 29 decision-making units (DMUs). The first column contains the DMUs under study. Column 1 shows the constant returns to scale technical efficiency scores (CRSTE), which is also denoted as total efficiency score. Column 2 shows pure technical efficiency measure named variable returns to scale technical efficiency (VRSTE); whereas column 3 indicates a scale efficiency measure (scale). Finally, the column 4 shows increasing (IRS), decreasing (DRS), or constant (-) returns to scale for each DMU. In the next subsections important results gathered from DEA conducted under the variable and constant returns to scale assumption with an input orientation have been explained. In this chapter, I first present overall analysis results. Later I shall present departmental results one by one for a deeper understanding of the situation in each and every department studied through this project.

The results have been categorized into the following three sections;

- Efficiency analysis
- Peer analysis
- Input/output targets analysis

3.4.1 Overall Analysis Results

As mentioned earlier, the overall results have been categorized into the following three sections;

- Efficiency analysis
- Peer analysis
- Input/output targets analysis

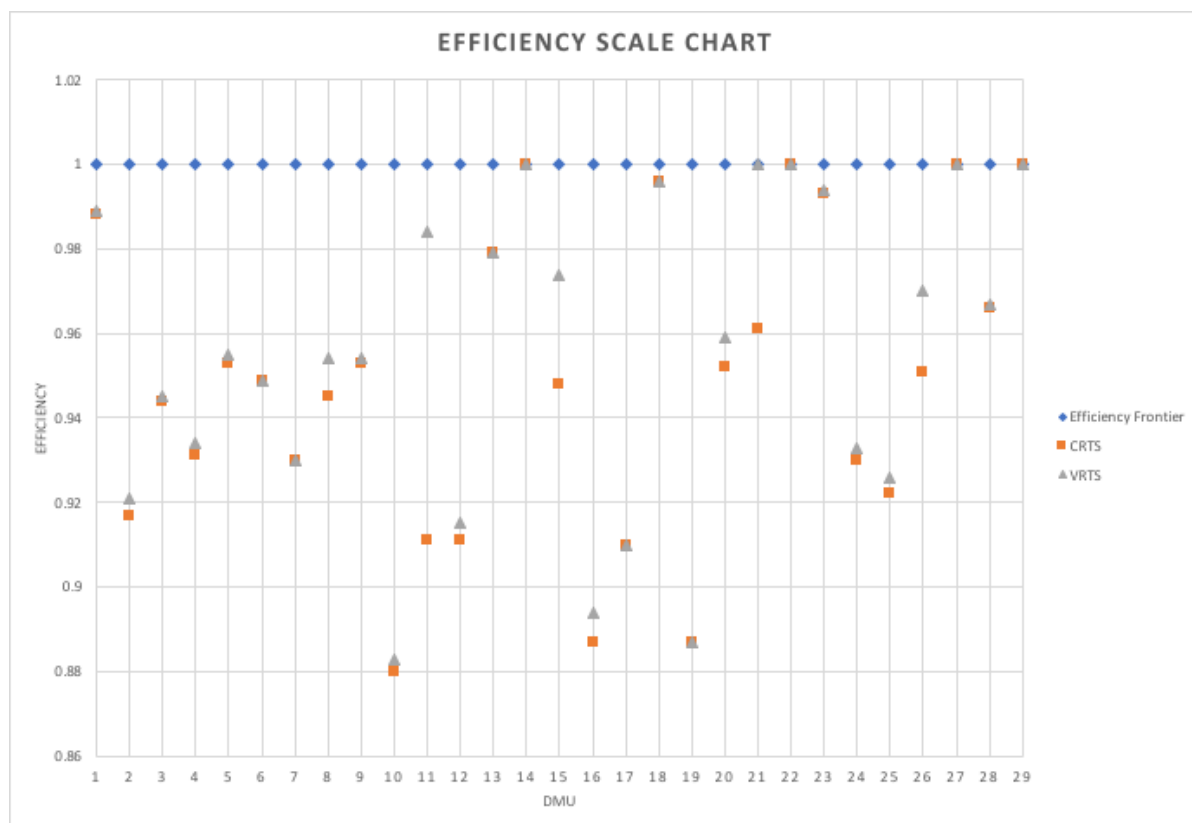


Figure 3.1 Efficiencies Scale Chart

3.4.2 Efficiency Analysis

On the whole efficiency results show that a 96% mean score for VRSTE, meaning DMUs on a whole have a possibility to reduce their inputs by 4% and still maintain the same level of operations. With a 95% mean score for CRSTE, DMUs on a whole have a possibility to reduce their inputs by 5% and still maintain same level of operational efficiency. With a 99% for scale efficiency, all DMUs can enhance efficiency by 1% by adjusting their operational scale. DMUs with IRS indicated in the last column are facing increasing returns to scale situation indicating that efficiency can still be improved by operating at optimum operational level.

DMUs with DRS indicated in the last column are in the state of decreasing returns to scale situation indicating that efficiency can be improved by reverting to a decreased but optimum operating level. DMUs with a dash are facing constant returns to scale, meaning they are operating at an optimal scale. The comparative efficiencies on both types of scale and their respective locales can be observed from the Figure 3.1.

Table 3.4 Efficiency Results.

Decision Making Unit No.	Efficiency Results Summary			
	Constant Returns to Scale (Col. 1)	Variable Returns to Scale (Col. 2)	Scale (Col. 3)	Returns to Scale (Col. 4)
DMU1	0.988	0.989	0.999	IRS
DMU2	0.917	0.921	0.996	IRS
DMU3	0.944	0.945	1	-
DMU4	0.931	0.934	0.996	IRS
DMU5	0.953	0.955	0.998	IRS
DMU6	0.949	0.949	1	-
DMU7	0.93	0.93	1	-
DMU8	0.945	0.954	0.991	IRS
DMU9	0.953	0.954	1	-
DMU10	0.88	0.883	0.997	IRS
DMU11	0.911	0.984	0.925	IRS
DMU12	0.911	0.915	0.996	IRS
DMU13	0.979	0.979	1	-
DMU14	1	1	1	-
DMU15	0.948	0.974	0.973	IRS
DMU16	0.887	0.894	0.992	IRS
DMU17	0.91	0.91	1	-
DMU18	0.996	0.996	1	-
DMU19	0.887	0.887	1	-
DMU20	0.952	0.959	0.993	DRS
DMU21	0.961	1	0.961	DRS

DMU22	1	1	1	-
DMU23	0.993	0.994	0.999	DRS
DMU24	0.93	0.933	0.997	IRS
DMU25	0.922	0.926	0.995	IRS
DMU26	0.951	0.97	0.98	DRS
DMU27	1	1	1	-
DMU28	0.966	0.967	0.999	DRS
DMU29	1	1	1	-
Means	0.95	0.96	0.99	

Table 3.5 Peers and Targets Analysis.

Decision Making Unit No.	Peers, Peer Weights and Targets Analysis									
	Summary of Peers (DMU No.)			Summary of Peers' Weights			Output Target s	Input Targets		
								BPR 1	BPR 2	BPR 3
DMU1	14	22	29	0.167	0.466	0.367	3.95	3.892	3.452	3.699
DMU2	14	27	29	0.151	0.585	0.264	3.74	3.269	3.15	3.563
DMU3	14	29	27	0.657	0.026	0.317	3.82	3.495	3.408	3.599
DMU4	14	29	27	0.405	0.270	0.326	3.73	3.457	3.258	3.523
DMU5	29	14	27	0.165	0.465	0.370	3.77	3.438	3.302	3.563
DMU6	29	14	27	0.024	0.681	0.295	3.82	3.511	3.419	3.597
DMU7	14	22	27	0.551	0.253	0.196	3.97	3.701	3.536	3.728
DMU8	29	14	27	0.571	0.059	0.371	3.62	3.385	3.058	3.433
DMU9	14	22	27	0.135	0.526	0.339	4.13	3.719	3.54	3.9
DMU10	14	27	29	0.101	0.681	0.217	3.76	3.204	3.137	3.593
DMU11	29	27		0.544	0.456		3.632	3.326	3.038	3.454
DMU12	22	14	27 29	0.019	0.216	0.455 0.310	3.73	3.366	3.183	3.54

DMU13	14 22 27	0.834 0.120 0.046	3.89	3.751	3.569	3.633
DMU14	14	1.00	3.82	3.73	3.56	3.56
DMU15	29 27	0.764 0.236	3.545	3.458	3	3.351
DMU16	29 14 27	0.516 0.118 0.366	3.64	3.396	3.093	3.45
DMU17	22 27 29	0.208 0.411 0.381	3.81	3.474	3.205	3.614
DMU18	22 27 29	0.747 0.220 0.033	4.24	3.901	3.625	3.993
DMU19	27	1.00	3.85	3	3.13	3.71
DMU20	27 22	0.333 0.667	4.21	3.787	3.577	3.977
DMU21	21	1.00	4.54	4.25	4.31	4.46
DMU22	22	1.00	4.39	4.18	3.8	4.11
DMU23	22 14	0.579 0.421	4.15	3.991	3.699	3.878
DMU24	14 29 27	0.413 0.219 0.368	3.75	3.433	3.27	3.545
DMU25	29 27	0.100 0.900	3.81	3.06	3.113	3.663
DMU26	27 22	0.593 0.407	4.07	3.481	3.403	3.873
DMU27	27	1.00	3.85	3	3.13	3.71
DMU28	22 14	0.24 0.754	3.96	3.841	3.619	3.695
DMU29	29	1.00	3.45	3.6	2.96	3.24

3.4.3 Peers Analysis

Table 3.5 summarizes the peer position analysis and have also laid down input and output target projections. The peer analysis shows that DMU14, DMU21, DMU22, DMU27 and DMU29 are peers to other DMUs in different iterations. These 5 DMUs also have a 'VRSTE' of 1.0 each meaning they have no other peer and thus have a 100% VRS efficiency score. Furthermore, of these 5 DMUs only DMU21 has not achieved 100% scale efficiency and is faced with a DRS; whereas all other 4 DMUs of this group

have CRS meaning they have no inefficiencies of scale. The VRS assumption is precisely represented in the envelopment form of the VRS model with a limitation of 1 i.e. $\sum \lambda = 1$ (meaning sum of peer weights cannot exceed 1 or be less than 1). In short, DMU14, DMU22, DMU27 and DMU29 can serve as benchmark.

3.4.4 Targets Analysis

Targets analysis (Table 3.5) allows us a comparison between the actual performance levels achieved and the projected targets that should be achieved by various DMUs. Table 3.5 lays down the target's inputs and output for all 29 DMUs. We should observe that DMUs with consistent higher scores across various efficiency measures only should be pursuing the target scores very closely. As an input-oriented approach has been taken, our focus should be on the input targets and see how much each DMU is distant from or close to the indicated target for all 3 inputs. Also, one can establish cross DMU performance assessment from this data. It is obvious that most DMUs are away from the targets generated by DEA.

3.4.5 Individual DMU Analysis Results

Now here I present DMU analysis one by one. The DMU results have also been categorized into the following three sections;

- Efficiency analysis
- Peer analysis
- Input/output targets analysis

Results for DMU: 1

Technical efficiency = 0.989

Scale efficiency = 0.999 (irs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
		value	movement	movement	value
output	1	3.950	0.000	0.000	3.950
input	1	4.000	-0.044	-0.064	3.892
input	2	3.490	-0.038	0.000	3.452
input	3	3.740	-0.041	0.000	3.699

LISTING OF PEERS:

peer	lambda weight
14	0.167
22	0.466
29	0.367

Results for DMU: 2

Technical efficiency = 0.921

Scale efficiency = 0.996 (irs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
		value	movement	movement	value
output	1	3.740	0.000	0.000	3.740
input	1	3.550	-0.281	0.000	3.269
input	2	3.460	-0.274	-0.036	3.150
input	3	3.870	-0.307	0.000	3.563

LISTING OF PEERS:

peer	lambda weight
14	0.151
27	0.585
29	0.264

Results for DMU: 3

Technical efficiency = 0.945

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable		original	radial	slack	projected
	value		movement	movement	value	
output	1		3.820	0.000	0.000	3.820
input	1		3.700	-0.205	0.000	3.495
input	2		3.790	-0.210	-0.172	3.408
input	3		3.810	-0.211	0.000	3.599

LISTING OF PEERS:

peer	lambda	weight
14	0.657	
29	0.026	
27	0.317	

Results for DMU: 4

Technical efficiency = 0.934

Scale efficiency = 0.996 (irs)

PROJECTION SUMMARY:

	variable		original	radial	slack	projected
	value		movement	movement	value	
output	1		3.730	0.000	0.000	3.730
input	1		3.700	-0.243	0.000	3.457
input	2		3.680	-0.242	-0.180	3.258
input	3		3.770	-0.247	0.000	3.523

LISTING OF PEERS:

peer	lambda	weight
14	0.405	
29	0.270	
27	0.326	

Results for DMU: 5

Technical efficiency = 0.955

Scale efficiency = 0.998 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.770	0.000	0.000	3.770
input	1	3.600	-0.162	0.000	3.438
input	2	3.510	-0.157	-0.051	3.302
input	3	3.730	-0.167	0.000	3.563

LISTING OF PEERS:

peer	lambda weight
29	0.165
14	0.465
27	0.370

Results for DMU: 6

Technical efficiency = 0.949

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.820	0.000	0.000	3.820
input	1	3.700	-0.189	0.000	3.511
input	2	3.790	-0.193	-0.178	3.419
input	3	3.790	-0.193	0.000	3.597

LISTING OF PEERS:

peer	lambda weight
29	0.024
14	0.681
27	0.295

Results for DMU: 7

Technical efficiency = 0.930

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.970	0.000	0.000	3.970
input	1	3.980	-0.279	0.000	3.701
input	2	4.080	-0.286	-0.257	3.536
input	3	4.010	-0.282	0.000	3.728

LISTING OF PEERS:

peer	lambda weight
14	0.551
22	0.253
27	0.196

Results for DMU: 8

Technical efficiency = 0.954

Scale efficiency = 0.991 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.620	0.000	0.000	3.620
input	1	3.550	-0.165	0.000	3.385
input	2	3.430	-0.159	-0.213	3.058
input	3	3.600	-0.167	0.000	3.433

LISTING OF PEERS:

peer	lambda weight
29	0.571
14	0.059
27	0.371

Results for DMU: 9

Technical efficiency = 0.954

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.130	0.000	0.000	4.130
input	1	3.900	-0.181	0.000	3.719
input	2	3.780	-0.175	-0.064	3.540
input	3	4.090	-0.190	0.000	3.900

LISTING OF PEERS:

peer	lambda weight
14	0.135
22	0.526
27	0.339

Results for DMU: 10

Technical efficiency = 0.883

Scale efficiency = 0.997 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.760	0.000	0.000	3.760
input	1	3.630	-0.426	0.000	3.204
input	2	3.580	-0.420	-0.024	3.137
input	3	4.070	-0.477	0.000	3.593

LISTING OF PEERS:

peer	lambda weight
14	0.101
27	0.681
29	0.217

Results for DMU: 11

Technical efficiency = 0.984

Scale efficiency = 0.925 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.390	0.000	0.242	3.632
input	1	3.380	-0.054	0.000	3.326
input	2	3.320	-0.053	-0.230	3.038
input	3	3.510	-0.056	0.000	3.454

LISTING OF PEERS:

peer	lambda weight
29	0.544
27	0.456

Results for DMU: 12

Technical efficiency = 0.915

Scale efficiency = 0.996 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.730	0.000	0.000	3.730
input	1	3.680	-0.314	0.000	3.366
input	2	3.480	-0.297	0.000	3.183
input	3	3.870	-0.330	0.000	3.540

LISTING OF PEERS:

peer	lambda weight
22	0.019
14	0.216
27	0.455
29	0.310

Results for DMU: 13

Technical efficiency = 0.979

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.890	0.000	0.000	3.890
input	1	3.830	-0.079	0.000	3.751
input	2	3.770	-0.078	-0.123	3.569
input	3	3.710	-0.077	0.000	3.633

LISTING OF PEERS:

peer	lambda	weight
14	0.834	
22	0.120	
27	0.046	

Results for DMU: 14

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.820	0.000	0.000	3.820
input	1	3.730	0.000	0.000	3.730
input	2	3.560	0.000	0.000	3.560
input	3	3.560	0.000	0.000	3.560

LISTING OF PEERS:

peer	lambda	weight
14	1.000	

Results for firm: 14

Results for DMU: 15

Technical efficiency = 0.974

Scale efficiency = 0.973 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.490	0.000	0.055	3.545
input	1	3.550	-0.092	0.000	3.458
input	2	3.330	-0.086	-0.244	3.000
input	3	3.440	-0.089	0.000	3.351

LISTING OF PEERS:

peer	lambda weight
29	0.764
27	0.236

Results for DMU: 16

Technical efficiency = 0.894

Scale efficiency = 0.992 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.640	0.000	0.000	3.640
input	1	3.800	-0.404	0.000	3.396
input	2	3.520	-0.374	-0.053	3.093
input	3	3.860	-0.410	0.000	3.450

LISTING OF PEERS:

peer	lambda weight
29	0.516
14	0.118
27	0.366

Results for DMU: 17

Technical efficiency = 0.910

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
value		movement	movement	value	
output	1	3.810	0.000	0.000	3.810
input	1	3.880	-0.348	-0.059	3.474
input	2	3.520	-0.315	0.000	3.205
input	3	3.970	-0.356	0.000	3.614

LISTING OF PEERS:

peer	lambda weight
22	0.208
27	0.411
29	0.381

Results for DMU: 18

Technical efficiency = 0.996

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
value		movement	movement	value	
output	1	4.240	0.000	0.000	4.240
input	1	4.000	-0.017	-0.082	3.901
input	2	3.640	-0.015	0.000	3.625
input	3	4.010	-0.017	0.000	3.993

LISTING OF PEERS:

peer	lambda weight
22	0.747
27	0.220
29	0.033

Results for DMU: 19

Technical efficiency = 0.887

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.850	0.000	0.000	3.850
input	1	3.600	-0.408	-0.192	3.000
input	2	3.530	-0.400	0.000	3.130
input	3	4.330	-0.491	-0.129	3.710

LISTING OF PEERS:

peer	lambda	weight
27	1.000	

Results for DMU: 20

Technical efficiency = 0.959

Scale efficiency = 0.993 (drs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.210	0.000	0.000	4.210
input	1	4.100	-0.169	-0.145	3.787
input	2	3.730	-0.153	0.000	3.577
input	3	4.190	-0.172	-0.041	3.977

LISTING OF PEERS:

peer	lambda	weight
27	0.333	
22	0.667	

Results for DMU: 21

Technical efficiency = 1.000

Scale efficiency = 0.961 (drs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.540	0.000	0.000	4.540
input	1	4.250	0.000	0.000	4.250
input	2	4.310	0.000	0.000	4.310
input	3	4.460	0.000	0.000	4.460

LISTING OF PEERS:

peer	lambda	weight
21	1.000	

Results for DMU: 22

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.390	0.000	0.000	4.390
input	1	4.180	0.000	0.000	4.180
input	2	3.800	0.000	0.000	3.800
input	3	4.110	0.000	0.000	4.110

LISTING OF PEERS:

peer	lambda	weight
22	1.000	

Results for DMU: 23

Technical efficiency = 0.994

Scale efficiency = 0.999 (drs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.150	0.000	0.000	4.150
input	1	4.150	-0.023	-0.137	3.991
input	2	3.810	-0.021	-0.090	3.699
input	3	3.900	-0.022	0.000	3.878

LISTING OF PEERS:

peer	lambda weight
22	0.579
14	0.421

Results for DMU: 24

Technical efficiency = 0.933

Scale efficiency = 0.997 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.750	0.000	0.000	3.750
input	1	3.680	-0.247	0.000	3.433
input	2	3.620	-0.243	-0.107	3.270
input	3	3.800	-0.255	0.000	3.545

LISTING OF PEERS:

peer	lambda weight
14	0.413
29	0.219
27	0.368

Results for DMU: 25

Technical efficiency = 0.926

Scale efficiency = 0.995 (irs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	3.810	0.000	0.000	3.810
input	1	3.880	-0.285	-0.535	3.060
input	2	3.360	-0.247	0.000	3.113
input	3	4.010	-0.295	-0.052	3.663

LISTING OF PEERS:

peer	lambda weight
29	0.100
27	0.900

Results for DMU: 26

Technical efficiency = 0.970

Scale efficiency = 0.980 (drs)

PROJECTION SUMMARY:

	variable	original	radial	slack	projected
	value	movement	movement	value	
output	1	4.070	0.000	0.000	4.070
input	1	3.850	-0.117	-0.252	3.481
input	2	3.510	-0.107	0.000	3.403
input	3	4.110	-0.125	-0.112	3.873

LISTING OF PEERS:

peer	lambda weight
27	0.593
22	0.407

Results for DMU: 27

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
value		movement	movement	value	
output	1	3.850	0.000	0.000	3.850
input	1	3.000	0.000	0.000	3.000
input	2	3.130	0.000	0.000	3.130
input	3	3.710	0.000	0.000	3.710

LISTING OF PEERS:

peer	lambda	weight
27	1.000	

Results for DMU: 28

Technical efficiency = 0.967

Scale efficiency = 0.999 (drs)

PROJECTION SUMMARY:

variable		original	radial	slack	projected
value		movement	movement	value	
output	1	3.960	0.000	0.000	3.960
input	1	4.080	-0.133	-0.106	3.841
input	2	3.910	-0.128	-0.163	3.619
input	3	3.820	-0.125	0.000	3.695

LISTING OF PEERS:

peer	lambda	weight
22	0.246	
14	0.754	

Results for DMU: 29

Technical efficiency = 1.000

Scale efficiency = 1.000 (crs)

PROJECTION SUMMARY:

		variable	original	radial	slack	projected
		value	movement	movement	value	
output	1	3.450		0.000	0.000	3.450
input	1	3.600		0.000	0.000	3.600
input	2	2.960		0.000	0.000	2.960
input	3	3.240		0.000	0.000	3.240

LISTING OF PEERS:

peer	lambda	weight
29	1.000	

Chapter End References

1. Afriat, S. Efficiency Estimation of Production Functions. *Int. Econ. Rev.* **1972**, *13*, 568–598.
2. Banker, R.D.; Charnes, A.; Cooper, W.W. Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Manag. Sci.* **1984**, *30*, 1078–1092. Available online: <http://www.jstor.org/stable/2631725> (accessed on 1 October 2020).
3. Boles, J.N. Efficiency squared-efficient computation of efficiency indexes. Proceedings of the Annual Meeting. Western Farm Economics Association: Long Beach, California, CA, USA, 15–17 August 1966; pp. 137–142.
4. Charnes, A.; William W. C.; Edwardo, R. Measuring the efficiency of decision-making units. *Eur. J. Oper. Res.* **1978**, *2*, 429–444. Available online: <https://farapaper.com/wp-content/uploads/2019/06/Fardapaper-Measuring-the-efficiency-of-decision-making-units.pdf> (accessed on 14 October 2020).
5. Chesbrough, H.W. Business model innovation: Opportunities and barriers. *Long Range Plan.* **2010**, *43*, 354–363.
6. Coelli, T.J. *A Guide to DEAP Version 2.1: A Data Envelopment Analysis (Computer) Program*; CEPA Working Papers No.8/96; University of New England: New South Wales, Australia, 1996.
7. Deshani, A.L.; Weerasinghe, R.N. Public Entrepreneurship and Delivering Public Services Effectively: A Study in Public Organizations in Galle District. In Proceedings of the 12th International Conference on Business Management, Nugegoda, Sri Lanka, 7 December 2015.
8. Elapatha, V.W.; Jehan, S.N. An Analysis of the Implementation of Business Process Re-engineering in Public Services. *J. Open Innov. Technol. Mark. Complex.* **2020**, *6*, 114. <https://doi.org/10.3390/joitmc6040114>.
9. Ezigbo, C.A. *Advanced Management Theory and Applications*; Immaculate Publication Ltd.: Enugu, Nigeria, 2011; pp. 83–90.
10. Fare, R.; Grosskopf, S. Nonparametric tests of regularity, Farrell efficiency, and goodness-of-fit. *J. Economy.* **2005**, *6*, 415–425.
11. Farrell, M. The Measurement of Productive Efficiency. *J. R. Stat. Soc. Ser. A (Gen.)* **1957**, *120*, 253–290.
12. Fernando, R.L.S. *Managerial Innovation in Service Delivery in Public Sector Organizations in Sri Lanka, Governance and Development*; Shrabon Printing Press: Dhaka, Bangladesh, 2006; pp. 221–237.
13. Gassmann, O.; Ellen, E. Towards a Theory of Open Innovation: Three Core Process Archetypes. In Proceedings of the R&D Management Conference (RADMA) 2004, Lisbon, Portugal, 7–9 July 2004; pp. 6–7.

14. Ghatari, A.; Shamsi, Z.; Vedadi, A. Business Process Reengineering in Public Sector: Ranking the Implementation Barriers. *Int. J. Process Manag. Benchmarking* **2014**, *4*, 1–18.
15. Hammer, M.; Champy, J. Reengineering the corporation: A manifesto for business revolution. *Bus. Horiz.* **1993**, *36*, 90–91.
16. Hesson, M.; Ameen, H.; Samaka, M. Business process reengineering in UAE public sector: A town planning case study. *Bus. Process Manag. J.* **2007**, *13*, 348–378.
17. Hsieh, C. What Explains the Industrial Revolution in East Asia? Evidence from the Factor Markets. *Am. Econ. Rev.* **2002**, *92*, 502–526.
18. Information and Communication Technology Agency of Sri Lanka. Detailed Study of the Lanka eGovernment Strategy Project, ICTA/AFC/IC/IC03/58. Available online: <https://www.gov.lk/elaws/wordpress/wp-content/uploads/2015/08/GOSL-Integrated-eGovernment-Strategy-Final-Submitted-17-Aug-2014-vcio-1.pdf> (accessed on 6 October 2020)
19. Jehan, S.N.; Nishantha, G.G.D.; Jehan, S.Q. E-governance initiative in Sri Lankan public service delivery. In Proceedings of the 12th International Conference on Advanced Communication Technology (ICACT), Gangwon-Do, Korea. 7–10 February 2010; pp. 1625–1629.
20. Jehan, S.N.; Nishantha, G.G.D.; Uchida, Y. BPR in large public organizations: A case of managing change in a developing country. *J. Jpn. Assoc. Manag. Syst.* **2010**, *27*, 25–31.
21. Jian-Bo, Y.; Brandon, Y.H.; Wong, D.; Theodor, J.S. Integrating DEA-oriented performance assessment and target setting using interactive MOLP methods. *Eur. J. Oper. Res.* **2009**, *195*, 205–222.
22. McCourt, W. Finding a way forward on public employment reform: A Sri Lankan case study. *Asia Pac. J. Hum. Resour.* **2001**, *39*, 1–22.
23. Meyer, E. The Specificity of Sri Lanka: Towards a Comparative History of Sri Lanka and India. *Econ. Political Wkly.* **1996**, *31*, 395–398. Available online: www.jstor.org/stable/4403796 (accessed on 5 October 2020).
24. Najmeh, M.; Farhad, H.L.; Azmi, B.J. Target setting in data envelopment analysis using MOLP. *Appl. Math. Modeling* **2011**, *35*, 328–338.
25. Ozcelik, Y. Do business process reengineering projects payoff? Evidence from the United States. *Int. J. Project Manag.* **2010**, *28*, 7–13.
26. Park, D., & Noland, M., Developing the service sector as an engine of growth for Asia, 2013) Mandaluyong City, Philippines: Asian Development Bank.
27. Rödder, W.; Kleine, A.; Dellnitz, A. Scaling production and improving efficiency in DEA: An interactive approach. *J. Ind. Eng. Int.* **2018**, *14*, 501–510.
28. Sultonov, M. Health expenditure efficiency in the Commonwealth of Independent States: A data envelopment analysis approach. *Transit. Stud. Rev.* **2011**, *18*, 384–340.
29. Thanassoulis, E.; Portela, M.C.S.; Despić, O. Data Envelopment Analysis: The Mathematical Programming Approach to Efficiency Analysis. In *The Measurement*

- of Productive Efficiency and Productivity Change*; Oxford University Press: Walton Street, Oxford, 2008.
30. Thong, J.Y.; Yap, C.S.; Seah, K.L. Business Process Reengineering in the Public Sector: The Case of the Housing Development Board in Singapore. *J. Manag. Inf. Syst.* **2000**, *17*, 245–270.
 31. Wijesinghe, D. *Administrative Reforms: International Perspectives and the Case of Sri Lanka*; Government of Sri Lanka: Colombo, Sri Lanka, 1997
 32. Yang, A.; Zhang, Z.; Zhang, Y.; Chen, D. Gap minimization for peer-evaluation in DEA cross-efficiency. *J. Appl. Math.* **2014**, 1–7.

Chapter No. 4

Factors Analysis of Systematic Innovation

Based BPR in Sri Lanka

4.1 Systematic Innovation and BPR in Sri Lanka

Sri Lankan public services have a lingering colonial legacy, and there have been several efforts since the country's independence to break away from the shackles of the past to align them with modern times and expectations. The drive for modernization of public services has been through several attempts in the past without much success. However, a significant effort was undertaken in the first decade of this millennium, resulting in noticeable changes in public service delivery (PSD) in the country. Delivering public services in Sri Lanka has been the domain of many organizations established before and after the independence of the country from British colonial rule. In 1972, Sri Lanka Administrative Services (SLAS) was formed, which was a replacement to an earlier entity, Ceylon Administrative Services (CAS). CAS was established in 1963 in place of a much older service organization, Ceylon Civil Services (CCS) which was established by the colonial powers during the second half of the 19th century to service its colonial rule objectives. PSD is not the domain of any single organization in the country. According to Elapatha and Jehan (2020) and Jehan and Nishantha (2010) SLAS is a key public service provider in Sri Lanka. PSD functions are executed by multiple layers of offices and administrators across several ministries and departments.

An acceptable and modern concept of PSD has been a great challenge for the governments over time, and plans and efforts have been made many times to bring change and improvement in this domain. A long and vicious civil war resulted in the lack of continuity and half-hearted nature of many such reform efforts undertaken in the 20th century. End of the Sri Lankan civil war in 2009 created an opportunity for real and far-reaching reforms in PSD. As a result of this peacetime opportunity and

growing calls for reforms, aided by several international players and donors, the country undertook several major governance reform initiatives in the first decade of the 21st century. One major initiative taken was the BPR of public services in Sri Lanka. Most departments and ministries of Sri Lanka underwent major but phased business process-reengineering (BPR) regime aided by IOI based systematic innovation. While the BPR regime covered many areas of public service efficiency, three areas of the BPR regime, i.e. (i) *structural* reforms, (ii) *regulatory* overhaul, and (iii) better performance *control* mechanisms are as the cornerstones of this regime. Ten years have passed since the regime was first planned and executed. By 2010, the BPR regime took a noticeable profile in the form of policies and actions with a strategic outlook. These measures, in turn, resulted in creation as well as the elimination of several departments and ministries across Sri Lanka. Reengineering Government Program (Re-Gov) started with a blueprint issued in 2004 and sketched a detailed BPR process of public service with the program named 'Program D' with 24 (D1-D24) initiatives in various areas of governance targeted in Sri Lanka. These measures were revealed in the eGovernment Strategy document prepared by Sri Lanka's Information and Communication Technology Agency (ICTA) in 2013 (ICTA 2014). Now, after ten years of the implementation of the BPR regime, it seems desirable to evaluate the outcome of the reform effort. No studies have been conducted to assess the input-output relationship to assess the suitability of this reform regime in the country, and none has used the analytical approach used here. I analyze the correlations among the inputs, outputs, and overall perception of success or failure of the BPR regime across multiple ministries and departments of the Sri Lankan government. The analysis also allows us to test the efficacy of IOI based systematic innovation ingrained in the regime. Primary research questions raised in the second stage of analysis can be summarized as follows:

Primary Research Questions

- What is the relationship amongst the various BPR measures (structure, rules and control) and the outcomes (effectiveness) of the BPR regime in total?
- How are the outcomes perceived by employees, i.e. level of agreement/disagreement level of effectiveness of the BPR?
- How correlated are the BPR measure per se to understand the inner structure of the BPR measures?

However, before I embark upon the task of working on these research questions, explaining the analytical model and discuss the results; it seems pertinent that I briefly discuss the concept of BPR. So, I shall define the concept of BPR in general as well as in the country's context, and take a quick stock of the literature related to our study.

4.2 Materials and Methods

4.2.1 The Data

Data was collected through a questionnaire-based field survey conducted across 29 departments and ministries of the Sri Lankan government. I distributed 600 questionnaires, and 290 respondents responded, meaning a response rate of 48.33%. The respondents were selected from D&Ms of the government of Sri Lanka directly affected by the introduction of the BPR. The respondent ranged from directors, managers to junior officers who understood the BPR regime and volunteered to respond to our questionnaire. The survey contained questions related to three categories of the BPR regime measures (after this also referred to as independent variables) mentioned already in the introduction, i.e. structure, rules control. Also, the survey contained questions related to the outcomes (effectiveness) of the BPR regime. The outcome is a dependent variable in our analysis. While the first four are observed variables gathered via the survey, the last variable (agree/disagree) is a dependent binary variable transformed using the fourth original dependent variable of the

outcome. The survey was conducted during February and March of 2020. In total, 290 respondents returned the completed questionnaire.

Table 4.1 Survey Questionnaire

Questions	Response				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<i>Input Questions (1, 2, 3....20) Structure</i>	5	4	3	2	1
Rules	5	4	3	2	1
Control	5	4	3	2	1
<i>Outcome Questions (1, 2, 3....20)</i>	5	4	3	2	1
Total Questions 40	Total responses 290				

The questionnaire was designed on 5-point *Likert* type scale with 5 for strongly agreed, 4 agreed, 3 neutral, 2 disagreed and 1 for strongly disagreed. Input questions were categorized into three areas of the BPR regime, i.e. (i) *Structure*, (ii) *Rules*, and (iii) *Control* and compared them with a set of questions related to their outcomes Table 4.1). The question-items were deliberately planned per se to verify the inputs and the outputs of the BPR regime for PSD. The outcome was converted into a binary form of outcomes: 1 for general agreement and 0 for general disagreement. As a result, I have 3 independent input variables (structure, rules, and control) and 1 dependent output variable (outcome). Additionally, I have one more variant dependent variable of the outcome, i.e. binary notion of the outcome (overall agreement/overall disagreement). First, the data from the questionnaire from each input category and outcome was averaged. Secondly, the average response to each was used for processing and

analysis using Stata analytical software. The questionnaire format is explained above in Table 4.1.

4.2.2 The Methodology

There are 3 independent variables (structure, rules, and control), and one dependent variable is the outcome. I added another transformed binary dependent variable for which control is an independent variable. I established a threshold of 4 to convert outcome into a binary dependent variable (Agree/Disagree) of 1 (general agreement) and 0 (overall disagreement). As the response data is an ordered data on a 5-point Likert scale with 5 for strongly agreed, 4 agreed, 3 neutral, 2 disagreed, and 1 for strongly disagreed; for response ≥ 4 , I assigned value to of 1 to this additional variable and for all responses < 4 , was set as 0. In this way, I adopted a conservative approach towards our analysis in converting qualitative judgements into quantitative.

Further, I calculated the paired correlations of the variables. As it is a survey data with ordinal characteristics, and also calculated Spearman and Kendall correlations to allow for the ordinal nature of the data. Kendall's τ and Spearman's ρ have been computed as a special case of generally paired correlations. .

Additionally, I produced multivariate ordered logistic regression results to deepen our understanding of the nature of the relationships that exist among various variables used in the analysis. As the response categories in this data are limited to 5, using a nonparametric ordered logistic regression model seems most appropriate for the analytical purpose. The model can be described as;

$$\text{logit}[P(Y \leq j)] = \left[\frac{P(Y \leq j)}{P(Y > j)} \right] = \alpha_j - \beta X, j \in [1, J - 1]$$

where $j \in [1, J-1]$ are the levels of the ordinal outcome variable Y , the proportional odds model assumes there is a common set of slope parameters β for the predictors. The ordinal outcomes are distinguished by the $J-1$ intercepts α_j . The benchmark level

is J. For ordinal regression, I make certain assumptions about the underlying data, i.e. the response variable is ordinal, and that the explanatory variables are continuous or categorical (though too are ordinal). Still, I treat them either as continuous or categorical. I also assume that there is no multicollinearity and the odds are proportional where each independent variable has an identical effect at each cumulative split of the ordinal dependent variable (Fu 1998), (Williams 2006) and (Gen 2018).

For the statistical analysis based on the methodology stated here, I used SATA 16.0 version to generate results that have been described in detail in the next section.

4.3 Results

4.3.1 Summary Statistics & Survey Results

I prepared descriptive statistics of the response data (n=290). The summary statistics are presented in Table 4.2. The Table contains summary statistics from the data gathered through the questionnaire. In total, the data represents 290 responses (n=290). Mean values for all variables, including the transformed binary variable indicate where the center of the responses is located. It can be seen that for most of our observed variables, the mean values are above 3 but below 4. i.e. mean response towards the BPR measures of structure, rules, and control lies between Neutral to

Table 4.2 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	skewness	kurtosis
Structure	290	3.799138	0.5947791	2.00	5	0.0019	0.8938
Rules	290	3.618897	0.4649688	2.00	5	0.7775	0.0904
Control	290	3.864207	0.5393584	2.00	5	0.0003	0.0021
Outcome	290	3.879621	0.4971332	2.24	5	0.0106	0.3805
Agree/Disagree	290	0.4310345	0.496077	0.00	1	0.0512	

Agree. This shows not a very strong agreement towards the BPR measures, though there is not a total disagreement as well. The mean for the outcome is the highest, 3.879621, reflecting a comparatively better level of agreement amongst the surveyed population regarding the effectiveness of the BPR regime. This trend is also reflected as we can observe the minimum and maximum range of response with a minimum of 2.24 as compared to a minimum response for all other observed variables. Observation shows a more significant skewness in case of rules meaning that most of the respondents agree to the rules of BPR. The results also indicate a higher kurtosis in the case of structure, reflecting greater neutrality amongst the respondents regarding the effectiveness of the structural changes brought in by the BPR. This is indicative of the confusion or lack of understanding or even lack of training necessitated by the structural reforms.

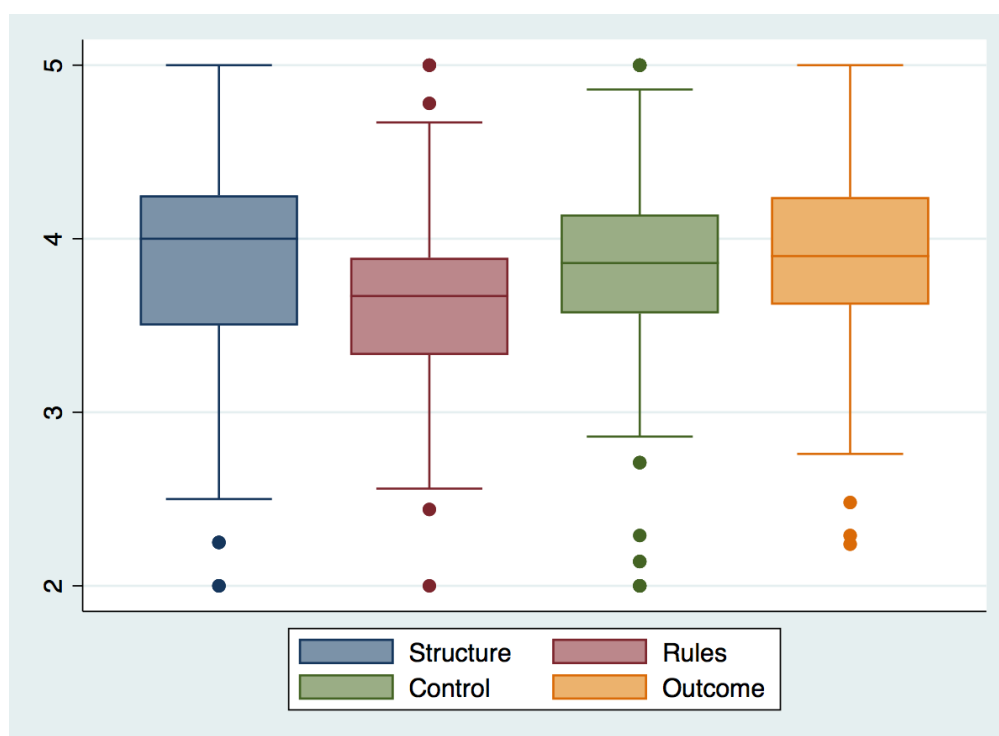


Figure 4.1 Summary Data Plot

Figure 4.1 plots the summary of the location of responses on the Likert scale of 1 to 5, whereas Figure 4.2 gives individual variable response distribution on a comparable

scale. We can observe a larger concentration of responses between neutral (3) to agree (4). This trend may be indicative of lack of enthusiasm towards the changes brought in by the BPR, although it also shows lack of an active animosity towards the changes. I insist upon the importance of inclusiveness and proper training to raise both awareness as well and eagerness towards the acceptance and implementation of the BPR.

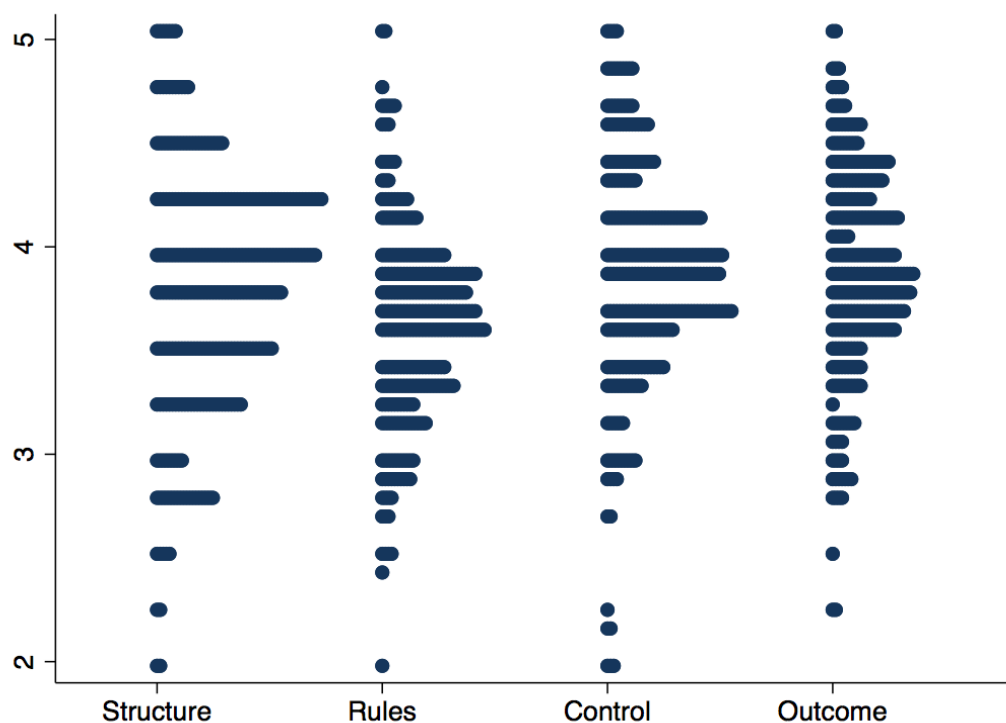


Figure 4.2 Variables Response Plot

4.3.2 Correlations

Table 4.3 gives details of the paired correlation among all four observed variables (n=290) and one transformed variable of the data. We can observe that control has the strongest correlation with outcomes followed by structure and rules. On the other hand, outcomes have the strongest correlation with the transformed variable, followed by structure, control, and rules, respectively. The strong correlation of

outcome with a transformed variable is understandable as the latter is a transformation of the former.

Table 4.3 Correlations (paired) (Obs. = 290)

Variable	Structure	Rules	Control	Outcome	Agree/Disagree
Structure	1.0000				
Rules	0.6458	1.0000			
Control	0.5985	0.6131	1.0000		
Outcome	0.7306	0.6985	0.7563	1.0000	
Agree/Disagree	0.5231	0.4748	0.4963	0.7500	1.0000

It is evident from the results that control measures are most strongly correlated with outcomes, which means performance variances must be observed closely to increase the effectiveness of the BPR regime. The structure is also positively associated with outcomes, though still a lack of understanding regarding the structural changes (summary statistics) was found. However, considering the binary variable (agree/disagree), most measures are moderately correlated.

As the data is a Likert scale data gathered from a 5-point questionnaire-based survey, so I have further calculated Spearman correlations. Spearman correlations is a nonparametric measure of rank correlation and are used to explain the strength of the relationship between two variables using a monotonic function, i.e. when the relationship between the variables is not linear (Jane 1983). As it is evident from the earlier explanation of the data, it will be more insightful to calculate Spearman correlations than just simple paired correlations. Table 4.4 gives details of Spearman

correlations among the variables. It is with this result we can look deeper and find that structure (or structural reforms) has the strongest correlation with all independent as well as the dependent variable of the outcome, i.e. structural reforms are most closely related with the outcome. From amongst the independent variables, the structure is also more correlated with the transformed variable (agree/disagree). Finally, the transformed variable's correlation has been heightened by using Spearman correlation. The general trend of correlations from both paired (Table 4.3) and Spearman (Table 4.4) is similar; it is so because Spearman correlation is a particular case of general correlations. I shall now further strengthen our understanding of the outcomes by calculating Kendall correlations (Daniel 1990).

Table 4.4 Spearman Correlations (Obs. = 290)

Variable	Structure	Rules	Control	Outcome	Agree/Disagree
Structure	1.0000				
Rules	0.5969	1.0000			
Control	0.5793	0.5207	1.0000		
Outcome	0.7058	0.6428	0.7000	1.0000	
Agree/Disagree	0.5475	0.4722	0.5153	0.8266	1.0000

Because I have a transformed variable (agree/disagree) with a binary (0, 1) rank as against the ordinal ranking (1, 3, ...5) of all other independent and dependent variables, it will be appropriate to further refine the results by calculating Kendall's tau correlation coefficients (Table 4.5). This will allow for considering the disparity of ranking amongst the data variables (observed and transformed). Here again, one can

find that the structure has the strongest correlation with all independent as well as the dependent variable of the outcome, i.e. structural reforms are most closely related to the outcome. From amongst the independent variables, the structure is also more correlated with the transformed variable (agree/disagree).

Table 4.5 Kendall Correlations (Obs. = 290)

Variable	Structure	Rules	Control	Outcome	Agree/Disagree
Structure	0.8763				
Rules	0.4268	0.9291			
Control	0.4062	0.3701	0.9158		
Outcome	0.5195	0.4735	0.5187	0.9714	
Agree/Disagree	0.3112	0.2701	0.2943	0.4717	0.4922

The comparative results of the correlation are not very different from the Spearman's results, although Kendall results have dampened down the intensity of the relationship. Again, the overall correlations trend amongst all variables, i.e. reform measures and the outcomes has not altered in general,

Table 4.6 Ordered Logistic Regression

Number of obs =290

Wald Chi²(3) = 262.35

Log likelihood = -863.67747

Prob > Chi² = 0.0000

Outcome	Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
Structure	1.8583	0.2666	6.9700	0.0000	1.3357	2.3809
Rules	1.9982	0.3377	5.9200	0.0000	1.3364	2.6601
Control	2.5551	0.3073	8.3200	0.0000	1.9528	3.1573
/cut1	13.40531	1.656139			10.15934	16.65129
/cut1	13.40531	1.656139			10.15934	16.65129
/cut2	14.87814	1.417973			12.09896	17.65731
/cut3	15.63847	1.358482			12.97589	18.30104
/cut4	16.16512	1.336847			13.54495	18.78529
/cut5	17.06923	1.314283			14.49328	19.64517
/cut6	18.11891	1.310828			15.54973	20.68808
/cut7	18.25003	1.311447			15.67964	20.82042
/cut8	18.49522	1.314649			15.91856	21.07189
/cut9	18.72486	1.320107			16.1375	21.31223
/cut10	18.93202	1.325664			16.33377	21.53028
/cut11	19.12068	1.330937			16.51209	21.72926
/cut12	19.30477	1.336429			16.68541	21.92412
/cut13	19.83114	1.354473			17.17642	22.48585
/cut14	19.91182	1.357339			17.25149	22.57216
/cut15	20.2132	1.368673			17.53065	22.89575
/cut16	20.60584	1.383726			17.89379	23.31789
/cut17	21.02133	1.401334			18.27476	23.76789
/cut18	21.19159	1.409093			18.42982	23.95336
/cut19	21.24613	1.41151			18.47962	24.01264
/cut20	21.70997	1.43283			18.90167	24.51826
/cut21	22.01864	1.445582			19.18535	24.85193

/cut22	22.53678	1.464571	19.66627	25.40728
/cut23	22.80591	1.474291	19.91635	25.69547
/cut24	23.31572	1.493697	20.38813	26.24332
/cut25	23.72787	1.50927	20.76975	26.68598
/cut26	24.0499	1.520242	21.07028	27.02952
/cut27	24.35072	1.529764	21.35244	27.34901
/cut28	24.7221	1.541698	21.70043	27.74377
/cut29	25.00258	1.551207	21.96226	28.04289
/cut30	25.26747	1.560774	22.20841	28.32653
/cut31	25.43046	1.56675	22.35969	28.50123
/cut32	25.71086	1.577178	22.61965	28.80208
/cut33	26.0731	1.591712	22.95341	29.1928
/cut34	26.33998	1.60333	23.19751	29.48245
/cut35	26.51996	1.61153	23.36142	29.67851
/cut36	26.66856	1.618294	23.49676	29.84036
/cut37	27.19584	1.643026	23.97557	30.41612
/cut38	27.51848	1.658189	24.26849	30.76847
/cut39	28.18122	1.690424	24.86805	31.49439
/cut40	28.67198	1.716068	25.30854	32.03541
/cut41	28.83115	1.724473	25.45125	32.21106
/cut42	29.08434	1.737156	25.67958	32.4891
/cut43	29.73969	1.766063	26.27827	33.20111
/cut44	29.95152	1.773901	26.47474	33.4283
/cut45	30.32985	1.78893	26.82361	33.83608
/cut46	30.48683	1.796527	26.9657	34.00795
/cut47	31.11141	1.835709	27.51349	34.70933
/cut48	31.85123	1.909361	28.10895	35.59351
/cut49	32.50504	1.996658	28.59166	36.41841

4.3.3 Logistic Regression

The results of ordered logistic regression are presented in Table 4.6. The Table contains correlation coefficients, standard errors, z values and the probability of z estimates and confidence intervals at 95% confidence level. The number of observations is again 290 and as $\text{prob.} > \chi^2 = 0.0000$, i.e. < 0.05 , it proves that the model is correct and the results generated thus have some statistical utility. Also, note that all z values are significant at 95% confidence and hence appear to have a significant influence upon the dependent variable, which is the outcome, in this case. Further, all $P > |z|$ values are less than 0.05 (for a 95% confidence) again pointing out towards the independent variables having a strong bearing on the outcome. In Table 4.6, /cut1~/cut49 are ancillary parameters to define change among the categories. The logistic regression results indicate two crucial conclusions, i.e., one, the various measures adopted in the BPR have a considerable bearing upon the outcomes or stated objectives of the regime. Second, the correlations measured in earlier sections do reflect semi-strong relationships which can mean inadequacy of the measures both in the design as well as in implementation.

4.4 Discussion

I had three research questions to be replied with the help of the analysis carried out in this thesis. The three items (as laid out in the introduction section of this thesis) related to effectiveness, perception and correlations of the BPR measures. While the results indicate the architectural leanings of the BPR regime; I also get a good indication of how various BPR measures have contributed towards the overall perception of the effectiveness of the regime. Being the only study of its nature for BPR regime in Sri Lanka, I consider the findings of this study of immense practical and academic value. The results of this study can indicate how the future adjustment in the architecture, as well as various accompanying measures like leadership training, change management training and inclusiveness, can enhance the fruits of such reforms. Bring PSD systems

up to the levels of the modern age is an inevitable requirement in present time. PSD in many countries has been a contentious issue, and governments are always under public pressure to come up with a measure to improve the delivery of services. While many developed countries have improved their PSD systems to a great extent, developing countries have plenty to do before they can achieve a service level acceptable to their public. Sri Lankan situation has particularly been affected by a protracted civil war that ended only in 2009. Since then, a concerted effort has been made to ensure streamlining and efficiency in the delivery of public services in the country (Jian-bo et al., 2009). The PSD infrastructure needed a significant remake; hence a BPR regime was designed and put into place with three major focus areas (structural reforms, rules, and control measures) to improve the efficiency of the system. BPR regime, as adapted in Sri Lanka, has several aspects of open innovation with an IOI mechanism to allow the feedback to the PSD administrators. Gassmann et al. define open innovation as a bidirectional information process that leads to the process improvement, thus making open innovation a necessary corollary to BPR (Gassmann and Ellen, 2004). This was an opportunity to study the effectiveness of such regime measures (structure, rules, and control) in producing the desired results. For this purpose, an original on-the-ground Likert scale survey was carried out (n=290), and questions regarding the inputs and outcomes were asked. To analyze the results, I resorted to a nonparametric ordered logistic approach of statistical analysis. Analyzing survey data beyond descriptive statistics always comes with certain uncertainty as to which analytical approach will offer the best analysis of the data. While some would suggest using a logistic regression model, there are multiple other options which need to be carefully considered because of the nature of the data. The problem becomes more acute as the responses to the question do contain a certain level of subjective evaluation. As the questionnaire asked respondents to answer the questions on a 5-point Likert scale (5 strongly agreed and 1 for strongly disagreed), it was desirable to use a regression approach that could take care of the ordinal nature of the data. Finally, I decided to use ordinal logistic regression to analyze the data.

This approach allowed us a deeper understanding of the interrelationships amongst the independent and dependent variables while attending to most issues with the nature of the data. In this thesis, I also calculated and presented the performance efficiencies of each department and ministry per se. However, those calculations were made from the same survey using data envelopment technique.

4.5 Conclusions

In conclusion, this study has analyzed the effectiveness and the acceptability of the IOI systematic innovation-based BPR regime in Sri Lanka. I analyzed the situation from the perspective of all three primary focus areas, and the results have shown that all three focus inputs of the regime are significantly contributing to the success of the program. I found that while the association of all three focus areas with the outcomes of systematic innovation-based BPR outcomes varies, there is sufficient evidence for continuing pursuing the IOI model of BPR to achieve a high-performance PSD system in the country. However, I suggest that BPR awareness and inclusiveness at all levels must be enhanced via effective and targeted training. This would result in greater effectiveness of the BPR regime. The uniqueness and the originality of the data make the study first of its kind, and it can be of enormous use to both PSD operators as well the researcher who plan to build upon these results and find other perspectives to this analysis. One such inquiry may be the exploration of factor efficiencies per se by applying other techniques of investigation. I plan to expand the scope of research in future by examining factor efficiencies too. I started with the summary statistics, and for most of the observed variables, the mean values are above 3, but still below 4, i.e. mean response towards the BPR measures of structure, rules, and control lies between Neutral to Agree. The mean for outcome reflected a comparatively better level of agreement amongst the surveyed population about the expected performance of the regime. The results related to paired correlations reflect a positive correlation between the independent and the dependent variables. This means that the BPR regime's reform initiatives explain the efficiency of the PSD. Spearman and Kendall's

correlations reemphasize the similar nature of the connection between the reforms and the efficiency of the regime. Finally, I conducted an ordinal logistic regression analysis to understand the heart of the relationship between the variables. I ran the test of the model and found that the model fits with the data and can lead us to some meaningful conclusions. The results show that various measures (structure, rules and control measures) adopted in the BPR have a considerable bearing upon the outcomes or stated objectives of the regime. However, the correlations measured in earlier sections do reflect semi-strong relationships, which can also mean inadequacy of the measures both in the design as well as in implementation.

Chapter End References

1. Ahmed, S.; Halim, H.A.; Ahmad, N.H. Open and Closed Innovation and Enhanced Performance of SME Hospitals—A Conceptual Model. *Business Perspectives and Research*, 6(1), **2018**; 1-12. doi:10.1177/2278533717722661.
2. Bianchi, M.; Campodall Orto, S.; Frattini, F.; Vercesi, P. (). Enabling open innovation in small- and medium-sized enterprises: How to find alternative applications for your technologies. *R&D Management*, 40(4), **2010**; 414–431.
3. Daniel, Wayne W. "Kendall's tau". *Applied Nonparametric Statistics* (2nd ed.). Boston: PWS-Kent. **1990**; pp. 365–377.
4. Deshani, A.L.; Weerasinghe, R.N. Public Entrepreneurship and Delivering Public Services Effectively: A Study in Public Organizations in Galle District. In *Proceedings of the 12th International Conference on Business Management*, Nugegoda, Sri Lanka, 7 December **2015**.
5. Elapatha, V.W.; Jehan, S.N. An Analysis of the Implementation of Business Process Re-engineering in Public Services. *J. Open Innov. Technol. Mark. Complex.* 2020, 6, 114. <https://doi.org/10.3390/joitmc6040114>.
6. Ezigbo, C.A., *Advanced Management Theory and Applications*, Enugu: Immaculate Publication Ltd, **2011**; 83 - 90.

7. Fernando, R.L.S. Managerial Innovation in Service Delivery in Public Sector Organizations in Sri Lanka, Governance and Development; Shrabon Printing Press: Dhaka, Bangladesh, 2006; pp. 221–237.
8. Gen Li, "Application of Finite Mixture of Logistic Regression for Heterogeneous Merging Behavior Analysis", *Journal of Advanced Transportation*, vol. **2018**.
9. Gyan, P. Economic cost of Sri Lanka's ethnic conflict, *Journal of Contemporary Asia*, 31:3, **2001**, 375-384, DOI: 10.1080/00472330180000221.
10. Hammer, M.; Champy, J. Reengineering the corporation: a manifesto for business revolution. *Business Horizons*, **1993**; vol. 36, issue 5, 90-91.
11. Hochleitner, F.P.; Arbussà, A.; Coenders, G. Inbound open innovation in SMEs: Indicators, non-financial outcomes and entry-timing. *Technology Analysis & Strategic Management*, 29(2), **2017**; 204–218.
12. ICTA, Government Organizations Visitors' Survey, Information Communication Technology Agency of Sri Lanka, (**2008b**), Colombo, available at: www.icta.lk/
13. Information and Communication Technology Agency of Sri Lanka, Detailed study of the Lanka eGovernment Strategy Project, ICTA/AFC/IC/IC03/58, <https://www.gov.lk/elaws/wordpress/wp-content/uploads/2015/08/GOSL-Integrated-eGovernment-Strategy-Final-Submitted-17-Aug-2014-vcio-1.pdf>.
14. Jan De Leeuw, Models and methods for the analysis of correlation coefficients, *Journal of Econometrics*, Volume 22, Issues 1–2, **1983**, Pages 113-137.
15. Jayawardena, L., Sri Lanka: Reforming public administration. Paper presented at ADB seminar. Colombo: National Development Council. May **1997**.
16. Jehan, S.N.; Elapatha, V.W. Systematic Innovation Based BPR Regime—A Factors Analysis. *Appl. Syst. Innov.* 2020, 3, 50. <https://doi.org/10.3390/asi3040050>.

17. Jehan, S.N., Nishantha, G.G.D., Jehan, S.Q. (2010). 'E-governance initiative in Sri Lankan public service delivery'. 2, The 12th International Conference on Advanced Communication Technology (ICACT), **2010**; 1625-1629.
18. Kettinger, W., Teng, J. & Guha, S. Information architectural design in business process reengineering. *J Inf Technol* 11, 27–37, **1996**, <https://doi.org/10.1080/026839696345405>.
19. Liu, X. and Koirala, H. Ordinal Regression Analysis: Using Generalized Ordinal Logistic Regression Models to Estimate Educational Data, *Journal of Modern Applied Statistical Methods*, 11 (1) **2012**, available at: <http://digitalcommons.wayne.edu/jmasm/vol11/iss1/21> .
20. Nkurunziza, G.; Munene, J.; Ntayi, J; Kaberuka, W. Business process reengineering in developing economies: Lessons from microfinance institutions in Uganda, *Innovation & Management Review*, 16 (2), **2019**; pp. 118-142. <https://doi.org/10.1108/INMR-03-2018-0010>.
21. Park, D.; Noland, M. Developing the Service Sector as an Engine of Growth for Asia; Asian Development Bank: Mandaluyong City, Philippines, **2013**.
22. Prema-chandra, A. Sri Lanka's post-civil war development challenge: learning from the past, *Contemporary South Asia*, 24:1, **2016**, 19-35, DOI: 10.1080/09584935.2015.1132188.
23. Ramasamy, R. Governance and administration in Sri Lanka: trends, tensions, and prospects", *Public Administration and Policy: An Asia-Pacific Journal*, Vol. 23 No. 2, **2020**; 187-198. <https://doi.org/10.1108/PAP-03-2020-0020>.
24. Ranasinghe, S., Breaking the mindsets: Issues of learning and innovation in Sri Lankan organizations. *Sri Lankan Journal of Management*, **2010**, Vol. 7, 3-4.
25. Thong, J.Y.; Yap, C.S.; Seah, K.L. Business Process Reengineering in the Public Sector: The Case of the Housing Development Board in Singapore. *J. Manag. Inf. Syst.* 2000, 17; 245–270.
26. Wijesinghe, D. Administrative Reforms: International Perspectives and the Case of Sri Lanka; Government of Sri Lanka: Colombo, Sri Lanka, **1997**.

Chapter 5

Conclusions and Suggestions

5.1 Conclusions, Limitations and Suggestions - Stage I Analysis

Wijesinghe (1997) stated that Sri Lankan public administration structure has undergone at least three distinct public reform waves. The first wave as explained in the report of Administrative Reforms Committee (ARC) laid down detailed/linked proposals with a major focus on civil service size. However, the first wave was only partially implemented as most reform measures were hampered by political instability. We have also already noted that Fernando (2006) found that the second wave had a structural reform focus; however, the target areas were not clear and implementation of the reforms resulted in disarray and did not result in any noticeable performance improvement. The third and the most recent wave, the focus of this study, has undertaken a major strategic shift in the philosophy and the structure of the public service administration.

Several studies have touched upon the topic of public service reforms in Sri Lanka, but no efforts have yet been made to assess the impact of the third and the most recent wave of reforms in the form of BPR regime put into effect. Some studies have attempted to assess the impact of the first wave or the second wave. From the discussion in the literature section we already know that Fernando (2006) did a cursory study of the three waves and his findings were mostly related to employment reforms. As compared to the 3rd wave, the 1st and the 2nd waves have been mostly economy related reforms. Deshani and Weerasinghe (2105) studied the effectiveness of public service delivery in Galle district of Sri Lanka only and that too from the perspective of public entrepreneurship.

I carried out this study from the perspective of a totality of public service provision in Sri Lanka in the wake of most recent BPR regime put into place. One cannot take an entrepreneurial perspective, as expected output is given (i.e. public satisfaction per se)

and only change can be implemented from the inputs. i.e. the reformative actions. I identified three reformative actions forming the core of the BPR regime namely, *rules*, *structure*, and the *control* actions. Through changes in these three input areas, I assessed the efficiency of the public service systems in Sri Lanka. As a logical consequence, I applied input-oriented DEA to identify the overall as well as the relative efficiency of the service providers. Accordingly, the questionnaire was structured in a format to allow us determine the efficiency status of the public service delivery. The data analysis presented in the earlier section shows that 4 DMUs out of a total of 29 DMUs are efficient with reference to the scale; whereas DMU21 though not at 100% scale efficiency still falls in the peer groups (Table 3.5). The disparity of the scale efficiencies can be attributed to the latent inefficiencies or lack of full implementation of the BPR regime across the DMU. Out of 29 departments and ministries, 12 are having IRS, meaning there is still a room to improve performance in order to achieve full-scale efficiency. 5 DMUs are faced with DRS meaning there is a capacity to increase the scale of service delivery in order to achieve scale efficiency. Other 12 DMUs are in a state of CRS, including 4 DMUs (DMU14, DMU22, DMU27 and DMU29) who have achieved CRSTE, VRSTE as well as scale efficiency. It has been demonstrated by Liu and Koirala (2012) that adjusting the scale towards optimum scale we can enhance the level of efficiency. One can therefore safely conclude that out of 29 DMUs, 25 DMUs can increase public service delivery efficiency by adjusting the scale of their operations.

Peer analysis has given us an insight into the rankings of the DMUs and one can identify the benchmark DMUs from the lagging DMUs (Table 3.5). Understanding and making use of peer weights is not very straightforward, however the same results can be adjusted to understand and explain cross efficiency by adopting gap-minimization techniques. Gap minimization will help eliminate extreme efficiency cases through an efficiency landscape developed by applying aggressive and benevolent cross efficiency evaluation approach. This approach has been fairly explained by Jan (1983) and can be applied in situations of extreme efficiency.

However, in this case most efficient as well as less efficient DMUs are located fairly close by, and none can be identified as extreme efficiency case.

Finally, the analysis has also produced targets for both input as well as output. Fare and Grosskopf (2005) explained in their model that target setting could be integrated with performance assessment while simultaneously taking decision makers' preferences into account. However, they applied an output-oriented approach into their model. On the other hand, I used an input-oriented model, so I mostly focused on input reduction approach to enhance efficiency of the lagging DMUs. It is also often proposed that an input-oriented target setting approach for DEA, and I am inclined to favor their approach in this matter. The results show that most DMUs are off the input target levels. By applying appropriate peer weights, one can steer the DMUs towards optimal performance level and cross DMU efficiency comparison can be highlighted even further. However, as here I am offering an analysis of the performance as such and not proposing to offer optimal performance strategy, so I shall leave that for a future study. The results thus obtained should form the basis for an IOI feedback to allow a continuous process innovation and reform in the PSD of the country. At the same time, the results and the analytical approach applied in this thesis can be replicated to assess the open innovation based BPR regimes anywhere else too.

5.2 Conclusions, Limitations and Suggestions - Stage II Analysis

At stage two analysis, there were three research questions to be replied with the help of the analysis carried out in chapter no. 4. The three questions related to effectiveness, perception and correlations of the BPR measures. While the results indicate the architectural leanings of the BPR regime; I also get a good indication of how various BPR measures have contributed towards the overall perception of the effectiveness of the regime. Being the only study of its nature for BPR regime in Sri Lanka, I consider the findings of this study of immense practical and academic value. The results of this study can indicate how the future adjustment in the architecture, as

well as various accompanying measures like leadership training, change management training and inclusiveness, can enhance the fruits of such reforms. Bring PSD systems up to the levels of the modern age is an inevitable requirement in present time. PSD in many countries has been a contentious issue, and governments are always under public pressure to come up with a measure to improve the delivery of services. While many developed countries have improved their PSD systems to a great extent, developing countries have plenty to do before they can achieve a service level acceptable to their public. Sri Lankan situation has particularly been affected by a protracted civil war that ended only in 2009. Since then, a concerted effort has been made to ensure streamlining and efficiency in the delivery of public services in the country (Jian-bo et al., 2009). The PSD infrastructure needed a significant remake; hence a BPR regime was designed and put into place with three major focus areas (structural reforms, rules, and control measures) to improve the efficiency of the system. BPR regime, as adapted in Sri Lanka, has several aspects of open innovation with an IOI mechanism to allow the feedback to the PSD administrators. Gassmann et al. define open innovation as a bidirectional information process that leads to the process improvement, thus making open innovation a necessary corollary to BPR (Gassmann and Ellen, 2004). This was an opportunity to study the effectiveness of such regime measures (structure, rules, and control) in producing the desired results. For this purpose, an original on-the-ground Likert scale survey was carried out (n=290), and questions regarding the inputs and outcomes were asked. To analyze the results, I resorted to a nonparametric ordered logistic approach of statistical analysis. Analyzing survey data beyond descriptive statistics always comes with certain uncertainty as to which analytical approach will offer the best analysis of the data. While some would suggest using a logistic regression model, there are multiple other options which need to be carefully considered because of the nature of the data. The problem becomes more acute as the responses to the question do contain a certain level of subjective evaluation. As the questionnaire asked respondents to answer the questions on a 5-point Likert scale (5 strongly agreed and 1 for strongly disagreed),

I needed to use a regression approach that could take care of the ordinal nature of the data. Finally, ordered logistic regression was used to analyze the data. This approach allowed a deeper understanding of the interrelationships amongst the independent and the dependent variables while attending to most issues with the nature of the data.

In the end, this study has analyzed the effectiveness and the acceptability of the IOI systematic innovation-based BPR regime in Sri Lanka. I analyzed the situation from the perspective of all three primary focus areas, and the results have shown that all three focus inputs of the regime are significantly contributing to the success of the program. I found that while the association of all three focus areas with the outcomes of systematic innovation-based BPR outcomes varies, there is sufficient evidence for continuing pursuing the IOI model of BPR to achieve a high-performance PSD system in the country. However, it can be safely suggested that BPR awareness and inclusiveness at all levels must be enhanced via effective and targeted training. This would result in greater effectiveness of the BPR regime. The uniqueness and the originality of the data make the study first of its kind, and it can be of enormous use to both PSD operators as well the researcher who plan to build upon our results and find other perspectives to this analysis. One such inquiry may be the exploration of factor efficiencies per se by applying other techniques of investigation. It is planned to expand the scope of research in future by examining factor efficiencies too. I started with the summary statistics, and for most of our observed variables, the mean values are above 3, but still below 4, i.e. mean response towards the BPR measures of structure, rules, and control lies between Neutral to Agree. The mean for outcome reflected a comparatively better level of agreement amongst our surveyed population about the expected performance of the regime. The results related to paired correlations reflect a positive correlation between the independent and the dependent variables. This means that the BPR regime's reform initiatives explain the efficiency of the PSD. Spearman and Kendall's correlations reemphasize the similar nature of the connection between the reforms and the efficiency of the regime. Finally, I conducted

an ordered logistic regression analysis to understand the heart of the relationship between the variables. I ran the test of the model and found that the model fits with the data and can lead us to some meaningful conclusions. The results show that various measures (structure, rules and control measures) adopted in the BPR have a considerable bearing upon the outcomes or stated objectives of the regime. However, the correlations measured in earlier sections do reflect semi-strong relationships, which can also mean inadequacy of the measures both in the design as well as in implementation.

Thesis References

1. Afriat, S. "Efficiency Estimation of Production Functions." *International Economic Review* 13(3), 1972; 568-598
2. Ahmed, S.; Halim, H.A.; Ahmad, N.H. Open and Closed Innovation and Enhanced Performance of SME Hospitals—A Conceptual Model. *Business Perspectives and Research*, 6(1), 2018; 1-12. doi:10.1177/2278533717722661
3. Anrong Yang, Zigang Zhang, Yishi Zhang, Dunliang Chen, Gap minimization for peer-evaluation in DEA cross-efficiency", *Journal of Applied Mathematics*, vol. 2014.
4. Banker, R. D., A. Charnes, and W. W. Cooper. "Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis." *Management Science* 30, no. 9 (1984): 1078-092. <http://www.jstor.org/stable/2631725>.
5. Beauregard, T. Alexandra and Henry, Lesley C. (2009) Making the link between work-life balance practices and organizational performance. *Human resource management review*, 19. pp. 9-22. ISSN 1053-4822
6. Bianchi, M.; Campodall' Orto, S.; Frattini, F.; Vercesi, P. Enabling open innovation in small- and medium-sized enterprises: How to find alternative applications for your technologies. *R&D Management*, 40(4), 2010; 414–431.
7. Boles, J. N. "Efficiency squared-efficient computation of efficiency indexes," in *Western Farm Economic Association, Proceedings*, Pullman, Washington, 1967; 137-142.
8. Charnes, A., Cooper W. W. and Rhodes E. "Exposition Interpretation and Extensions of Farrell Efficiency Measures." Unpublished paper, April 30, 1976.
9. Chesbrough, H.W. Business model innovation: Opportunities and barriers. *Long Range Planning*, 2010, 43: 354-363.
10. Clarke, Thomas & Clegg, Stewart, 1998, *Changing Paradigms: the transformation of management knowledge for the 21st century*, Harper Collins Business.

11. Coelli, T. J. 'A guide to DEAP version 2.1: A data envelopment analysis (computer) program', 1996b; CEPA Working Papers No.8/96.
12. Dadashzadeh, M. (2002). Information Technology Management in Developing Countries.
13. Daniel, Wayne W. "Kendall's tau". Applied Nonparametric Statistics (2nd ed.). Boston: PWS-Kent. 1990; pp. 365–377.
14. Deshani, A.L. and Weerasinghe, R.N., Public Entrepreneurship and Delivering Public Services Effectively: A Study in Public Organizations in Galle District, 12th International Conference on Business Management, (December 7, 2015); Sri Lanka.
15. Elapatha, V.W.; Jehan, S.N. An Analysis of the Implementation of Business Process Re-engineering in Public Services. J. Open Innov. Technol. Mark. Complex. 2020, 6, 114. <https://doi.org/10.3390/joitmc6040114>
16. Ezigbo, C.A., Advanced Management Theory and Applications, Enugu: Immaculate Publication Ltd, 2011; 83 - 90.
17. Fare R, Grosskopf S. Nonparametric tests of regularity, Farrell efficiency, and goodness-of-fit. Journal of Econometrics 2005; 6:415–25.
18. Farrell, M., The Measurement of Productive Efficiency. Journal of the Royal Statistical Society, 1957; Series A (General), 120(3), 253-290
19. Fernando, R. L. S. Managerial innovation in delivery service in public sector organizations in Sri Lanka, Governance and Development, 2006, Shrabon Printing Press Dhaka, 221- 237.
20. Fu, V. K. Estimating generalized ordered logit models. Stata Technical Bulletin 44: 27–30. Reprinted in Stata Technical Bulletin Reprints, vol. 8, 1998, pp. 160–164. College Station, TX: Stata Press.
21. Gassmann, O. and Ellen Enkel. "Towards a Theory of Open Innovation: Three Core Process Archetypes." (2004), R&D Management Conference (RADMA), Lsbon, 2004; 6-7

22. Gen Li, "Application of Finite Mixture of Logistic Regression for Heterogeneous Merging Behavior Analysis", *Journal of Advanced Transportation*, vol. 2018
23. Ghatari, A.; Shamsi, Z.; Vedadi, A. Business Process Reengineering in Public Sector: Ranking the Implementation Barriers. *Int. J. Process Manag. Benchmarking* 2014, 4, 1–18.
24. Gyan, P. Economic cost of Sri Lanka's ethnic conflict, *Journal of Contemporary Asia*, 31:3, 2001, 375-384, DOI: 10.1080/00472330180000221
25. Hammer, M.; Champy, J. Reengineering the corporation: a manifesto for business revolution. *Business Horizons*, 1993; vol. 36, issue 5, 90-91
26. Hesson, M.; Ameen, H.; Samaka, M. Business process reengineering in UAE public sector: A town planning case study. *Bus. Process Manag. J.* 2007, 13, 348–378.
27. Hochleitner, F.P.; Arbussà, A.; Coenders, G. Inbound open innovation in SMEs: Indicators, non-financial outcomes and entry-timing. *Technology Analysis & Strategic Management*, 29(2), 2017; 204–218.
28. Hsieh, C.. "What Explains the Industrial Revolution in East Asia? Evidence From the Factor Markets." *American Economic Review*, 2002, 92 (3): 502-526.
29. ICTA, Government Organizations Visitors' Survey, Information Communication Technology Agency of Sri Lanka, (2008b), Colombo, available at: www.icta.lk/
30. Information and Communication Technology Agency of Sri Lanka, Detailed study of the Lanka eGovernment Strategy Project, ICTA/AFC/IC/IC03/58, <https://www.gov.lk/elaws/wordpress/wp-content/uploads/2015/08/GOSL-Integrated-eGovernment-Strategy-Final-Submitted-17-Aug-2014-vcio-1.pdf>
31. Jan De Leeuw, Models and methods for the analysis of correlation coefficients, *Journal of Econometrics*, Volume 22, Issues 1–2, 1983, Pages 113-137,
32. Jayawardena, L., Sri Lanka: Reforming public administration. Paper presented at ADB seminar. Colombo: National Development Council. May 1997.
33. Jehan, S.N.; Elapatha, V.W. Systematic Innovation Based BPR Regime—A Factors Analysis. *Appl. Syst. Innov.* 2020, 3, 50. <https://doi.org/10.3390/asi3040050>

34. Jehan, S.N., Nishantha, G.G.D., Jehan, S.Q. (2010). 'E-governance initiative in Sri Lankan public service delivery'. 2, The 12th International Conference on Advanced Communication Technology (ICACT), 2010; 1625-1629
35. Jian-Bo Yang, Brandon Y.H. Wong, Dong-Ling Xu, Theodor J. Stewart, Integrating DEA-oriented performance assessment and target setting using interactive MOLP methods, *European Journal of Operational Research*, Volume 195, Issue 1, 2009; 205-222.
36. Jorgensen, H., Owen L. and Neus, A., 2008, *Making Change Work Study*, IBM Global Services.
37. Kettinger, W., Teng, J. & Guha, S. Information architectural design in business process reengineering. *J Inf Technol* 11, 27–37, 1996, <https://doi.org/10.1080/026839696345405>
38. LaClair, J. and Rao, R., 2002, *Helping Employees Embrace Change*, McKinsey Quarterly No. 4
39. Lesley Mackenzie-Robb, 2004, "E-Learning and Change Management – The Challenge", Lesley Mackenzie-Robb, Vantaggio Ltd, England, May 2004
40. Liu, X. and Koirala, H. Ordinal Regression Analysis: Using Generalized Ordinal Logistic Regression Models to Estimate Educational Data, *Journal of Modern Applied Statistical Methods*, 11 (1) 2012, available at: <http://digitalcommons.wayne.edu/jmasm/vol11/iss1/21>
41. Macredie R D. and Sandom C., 1999, IT-Enabled Change: Evaluating an Improvisational Perspective, *European Journal of Information Systems*, 8(4), 247-259
42. McCourt, W., Finding a way forward on public employment reform: A Sri Lankan case study. *Asia Pacific Journal of Human Resources*, 2001; 39(1), 1–22
43. Meyer, Eric. "The Specificity of Sri Lanka: Towards a Comparative History of Sri Lanka and India." *Economic and Political Weekly*, vol. 31, no. 7, 1996, pp. 395–398. JSTOR, www.jstor.org/stable/4403796. Accessed 5 Oct. 2020.

44. Najmeh M., Farhad H. L., Azmi B. J., Target setting in data envelopment analysis using MOLP, *Applied Mathematical Modeling*, Volume 35, Issue 1, 2011; 328-338.
45. Nkurunziza, G.; Munene, J.; Ntayi, J; Kaberuka, W. Business process reengineering in developing economies: Lessons from microfinance institutions in Uganda, *Innovation & Management Review*, 16 (2), 2019; pp. 118-142. <https://doi.org/10.1108/INMR-03-2018-0010>
46. Oyelaran-Oyeyinka, Banji & Lal, Kaushalesh, 2004. "Sectoral Pattern of E-business Adoption in Developing Countries," Discussion Papers 07, United Nations University, Institute for New Technologies.
47. Ozcelik, Y. Do business process reengineering projects payoff? Evidence from the United States. *Int. J. Project Manag.* 2010, 28, 7–13.
48. Park, D., & Noland, M. (Eds.). *Developing the service sector as an engine of growth for Asia*, Mandaluyong City, Philippines: Asian Development Bank, 2013; 47-48.
49. Premachandra, A. Sri Lanka's post-civil war development challenge: learning from the past, *Contemporary South Asia*, 24:1, 2016, 19-35, DOI: 10.1080/09584935.2015.1132188
50. Ramasamy, R. Governance and administration in Sri Lanka: trends, tensions, and prospects", *Public Administration and Policy: An Asia-Pacific Journal*, Vol. 23 No. 2, 2020; 187-198. <https://doi.org/10.1108/PAP-03-2020-0020>
51. Ranasinghe, S., Breaking the mindsets: Issues of learning and innovation in Sri Lankan organizations. *Sri Lankan Journal of Management*, 2010, Vol. 7, 3-4.
52. Rödder, W., Kleine, A. & Dellnitz, A. Scaling production and improving efficiency in DEA: an interactive approach. *J Ind Eng Int* 14, 2018; 501–510.
53. Sexton, Clive "Change Management - Coping With Change.", 4 Apr. 2008 EzineArticles.com. 25 Feb. 2010
54. Thanassoulis, E., Portela, M. C. S., & Despić, O. Data Envelopment Analysis: The Mathematical Programming Approach to Efficiency Analysis. In the

Measurement of Productive Efficiency and Productivity Change, 2008, Oxford University Press.

55. Thong, J.Y.; Yap, C.S.; Seah, K.L. Business Process Reengineering in the Public Sector: The Case of the Housing Development Board in Singapore. *J. Manag. Inf. Syst.* 2000, 17; 245–270. [Google Scholar]
56. Wijesinghe, D. Administrative reforms: International perspectives and the case of Sri Lanka. Colombo: 1997; Government of Sri Lanka.
57. Williams, R. Generalized ordered logit/partial proportional odds models for ordinal dependent variables. *Stata Journal* 6, 2006: 58–82.

Appendix No. 1¹

Sri Lanka Country Profile

	1990	2000	2010	2018
World view				
Population, total (millions)	17.33	18.78	20.26	21.67
Population growth (annual %)	1.3	0.6	0.7	1
Surface area (sq. km) (thousands)	65.6	65.6	65.6	65.6
Population density (people per sq. km of land area)	276.3	299.4	323.1	350.3
Poverty headcount ratio at national poverty lines (% of population)	..	22.7	8.9	4.1
Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	9.3	8.8	2.8	0.9
GNI, Atlas method (current US\$) (billions)	8.05	16.41	48.8	87.65
GNI per capita, Atlas method (current US\$)	460	870	2,410	4,040
GNI, PPP (current international \$) (billions)	39.73	80.22	164.22	277.82
GNI per capita, PPP (current international \$)	2,290	4,270	8,110	12,820
People				
Income share held by lowest 20%	8.7	7	7.8	7.1
Life expectancy at birth, total (years)	70	71	75	77
Fertility rate, total (births per woman)	2.5	2.2	2.2	2.2
Adolescent fertility rate (births per 1,000 women ages 15-19)	31	28	22	21
Contraceptive prevalence, any methods (% of women ages 15-49)	66	70	68	65
Births attended by skilled health staff (% of total)	94	96	99	100
Mortality rate, under-5 (per 1,000 live births)	22	17	12	7
Prevalence of underweight, weight for age (% of children under 5)	30.3	22.9	21.6	20.5
Immunization, measles (% of children ages 12-23 months)	80	99	99	99
Primary completion rate, total (% of relevant age group)	97	107	99	102
School enrollment, primary (% gross)	109.9	107.8	99.5	100.2
School enrollment, secondary (% gross)	83	..	97	100
School enrollment, primary and secondary (gross), gender parity index (GPI)	1	..	1	1
Prevalence of HIV, total (% of population ages 15-49)	0.1	0.1	0.1	0.1
Environment				
Forest area (sq. km) (thousands)	23.5	21.7	21	21.2
Terrestrial and marine protected areas (% of total territorial area)	..	..	..	3.4
Annual freshwater withdrawals, total (% of internal resources)	19.7	24.6	24.5	24.5
Urban population growth (annual %)	1.2	0.5	0.6	1.5
Energy use (kg of oil equivalent per capita)	318	443	481	..

(Continued on next page)

¹ Country: Sri Lanka - Data from database: World Development Indicators Last Updated:04/26/2021

(Continued from last page)

CO2 emissions (metric tons per capita)	0.22	0.55	0.65	1.1
Electric power consumption (kWh per capita)	151	295	460	..
Economy				
GDP (current US\$) (billions)	8.03	16.33	56.73	88.43
GDP growth (annual %)	6.4	6	8	3.3
Inflation, GDP deflator (annual %)	20.1	7.3	22.8	4.3
Agriculture, forestry, and fishing, value added (% of GDP)	27	20	8	8
Industry (including construction), value added (% of GDP)	26	27	27	27
Exports of goods and services (% of GDP)	30	39	20	23
Imports of goods and services (% of GDP)	38	50	27	30
Gross capital formation (% of GDP)	22	28	30	30
Revenue, excluding grants (% of GDP)	21	16.8	12.7	13.4
Net lending (+) / net borrowing (-) (% of GDP)	-5.2	-8.4	-6.3	-5.4
States and markets				
Time required to start a business (days)	..	56	38	9
Domestic credit provided by financial sector (% of GDP)	..	..	..	..
Tax revenue (% of GDP)	19	14.5	11.3	11.9
Military expenditure (% of GDP)	2.3	5	2.7	1.9
Mobile cellular subscriptions (per 100 people)	0	2.3	85.7	142.7
Individuals using the Internet (% of population)	0	0.6	12	34.1
High-technology exports (% of manufactured exports)	..	..	1	1
Statistical Capacity score (Overall average)	..	..	77	84
Global links				
Merchandise trade (% of GDP)	57	72	39	39
Net barter terms of trade index (2000 = 100)	82	100	110	116
External debt stocks, total (DOD, current US\$) (millions)	5,868	9,250	21,684	52,909
Total debt service (% of exports of goods, services and primary income)	16.1	12.1	12.3	36.1
Net migration (thousands)	-256	-449	-485	-490
Personal remittances, received (current US\$) (millions)	401	1,154	4,123	7,043
Foreign direct investment, net inflows (BoP, current US\$) (millions)	43	173	478	1,614
Net official development assistance received (current US\$) (millions)	616	222.4	558.6	-247.4

Source: World Development Indicators database

Figures in blue refer to periods other than those specified.

Appendix No. 2

Departments and Ministries Surveyed

- Department of Pensions
- Department of Registrar General
- Ministry of Public Administration
- Ministry of Local Government
- Department of Revenue License
- Department of Railways
- Department of Wildlife Conservation
- Department of Examinations
- Ministry of Higher Education
- Ministry of Urban Development
- Department of Irrigation
- Department of Excise
- Department Immigration Emigration
- Department Import & Export
- Department of Co. Registration
- Department Inland Revenue
- Department of Persons Registration
- Department of Land Settlement
- Ministry of Labor
- Department Census & Statistics
- Ministry of Mahaweli & Agriculture
- Department of Coast Conservation
- Foreign Ministry
- Department of Elections
- Department of Survey
- Department of Postal
- Department of Forest Conservation
- Department of Motor Traffic
- Department of Customs

Appendix No. 3
(English Version)
Survey Questionnaire
(BPR in PSD)

(For Assessment of business process reengineering (BPR) of the service delivery organizations in the public sector of Sri Lanka)

Name of the organization:

Please answer all of the questions given below. Thank you for your support.

It is highly appreciated.

Concept Area	Question No. and the Question	Response				
General						
	Have you done any Business Process Reengineering (BPR) in the organization?	<div style="display: flex; justify-content: space-around;"> Yes No </div>				
	BPR Questions	Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed
<i>Time</i>						
	1. Do you think consumption of time for the whole process has decreased after the introduction of Business Process Reengineering (BPR)?					
	2. Do you have any experienced about the consumption of time has decreased for a particular segment of the whole process?					
<i>Structure</i>						
	3. Have you any idea about the structure of the organization has changed with the BPR?					
	4. Was the changed in the structure of the organization has improved the performance?					
<i>Laws and regulations</i>						
	5. Do you know that has any rules and regulations changed in the organization based on BPR?					
	6. Were that rules and regulations changes, affected the increase of performance in the organization?					
<i>Procedures</i>						
	7. Do you think that has fewer procedures make increased the performance of the organization?					
	8. Have you had fewer procedures in your organization after introducing BPR?					

9. Do you have experience with fewer procedures offering easy and agile service to customers?					
<i>Authority</i>					
10. Do you think that the change of process in the organization has caused you to diminish the approvals?					
11. Do you have any experience that less process in the organization gives fewer approvals?					
<i>Flow of information</i>					
12. Do you think that the flow of information has arrived at the destination properly?					
13. Was the BPR, good mechanism to flow of information in the organization?					
14. Have you any experience that flow of information has quickly arrived based on a smaller number of processes?					
<i>Cross functional activity – Intra and Inter</i>					
15. Do you think that intra organizational activities have improved with process reengineering?					
16. As well as, do you think, the same effect has received in inter-organizational activity?					
17. Have you experienced those cross-functional activities dealing with an easy manner?					
<i>Accessibility</i>					
18. Do you think that being easy accessibility of the process has reached the target destination?					
19. Have you any experienced that improves the performance of the organization based on accessibility?					
<i>Controlling</i>					
20. Do you think that BPR facilitates controlling employees' activity?					
21. Was that controlling concept has improved the performance of the organization?					
<i>Training</i>					
22. Do you have the experience, on the job training programmer in the organization?					
23. Do that training programs based on the improvement of performance in the reengineering process?					
<i>Customer journey</i>					

24. Do you have an idea about the customers have satisfied with their received service?					
25. Do the customers have complaints against the new process of the organization?					
<i>Outsourcing</i>					
26. Do you have any experience of outsourcing facilities for delivering service to customers?					
27. Was that outsourcing facilities have improved the performance of the organization?					
<i>Availability</i>					
28. Have you an idea about the customers have easy availability of service in the organization?					
29. Do you think that all availability services are efficient?					
<i>Responsiveness</i>					
30. Do you think the organization gas responsive to customers?					
31. Do you have a streamlined mechanism for responding to all reengineering processes?					
<i>Once only principle</i>					
32. Have you received the basic information only once?					
33. Was that information enough for providing service to customers again and again?					
<i>Responsibility</i>					
34. Do you have an experience, that the organization has responsibility for customers?					
35. Do the organization and employees have responsibility for it is performance?					
<i>Transparency</i>					
36. Do you think that has some procedures to improve transparency?					
37. Was that transparency concept improved efficiency of service?					
38. Have an idea that the reengineering process offering transparency?					
<i>Monitoring</i>					
39. Do you think that monitoring purposes have easy after applying BPR?					
40. Was the performance of employees has increased when monitoring?					

Appendix No. 4
(Sinhala Version)
Survey Questionnaire
(BPR in PSD)

ප්‍රශ්නාවලිය

සේවා සැපයීමේ රාජ්‍ය අංශයේ ආයතන තුළ ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලිය Business Process Reengineering (BPR) ඇගයීම - ශ්‍රී ලංකාව

ආයතනයේ නම:

ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලියක් ඔබ ආයතනය තුළ සිදු කර තිබේද? **ඔව්/නැත**

කරුණාකර පහත දක්වා ඇති සියලුම ප්‍රශ්න සඳහා ඔබගේ පිළිතුර ලබා දෙන මෙන් කාරුණිකව ඉල්ලා සිටින අතර දැක්වූ සහයෝගයට ස්තූතිය පිරිනමමි.

	ප්‍රකාශනය	අතිශයින් ඵකභව	ඵකභව	සාමාන්‍යයි	ඵකභව නොවේ	අතිශයින් ඵකභව නොවේ
කාලය (TIME)						
01.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලිය (BPR) හඳුන්වා දුන් පසු ආයතනයේ සමස්ත ක්‍රියාවලිය සඳහා ගතකළ කාලය අඩුවීම.					
02.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමත් සමඟ සමස්ත ක්‍රියාවලියේ එක් එක් කොටස් සඳහා විශේෂයෙන් සලකා බැලීමේදී කැප කරනු ලබන කාලය අඩු වීම.					
ව්‍යුහය (STRUCTURE)						
03.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමත් සමඟ ආයතනයේ සමස්ත ව්‍යුහය වෙනස් වී ඇති බව.					
04.	එම ව්‍යුහයේ වෙනසත් සමඟ ආයතනයේ සේවා සැපයීමේ කාර්ය සාධනය ඉහළ ගොස් ඇත.					

නීති හා රෙගුලාසි (LAWS & REGULATIONS)					
05.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමත් සමග නීති සහ රෙගුලාසි වල යම් යම් වෙනස්කම් සිදු වී තිබීම.				
06.	එම නීති හා රෙගුලාසි වෙනස් වීම මත ආයතනයේ කාර්ය සාධනය ඉහළ ගොස් ඇත.				
ක්‍රියාවලීන් (PROCEDURES)					
07.	ක්‍රියාවලීන් ප්‍රමාණය අඩුවීම ආයතනයේ කාර්ය සාධනය ඉහළ නැංවීමට හේතුවක් වී ඇත.				
08.	ආයතනය ප්‍රතිනිර්මාණය කිරීමෙන් පසු ක්‍රියාවලීන්ගේ ප්‍රමාණය අඩු වී ඇත.				
09.	පහසු හා කඩිනම් සේවාවක් ලබාදීම සඳහා ක්‍රියාවලීන් සංව්‍යාස අඩු වීම හේතුවක් විය.				
බලඅධිකාරිය (AUTHORITY)					
10.	ක්‍රියාවලි වෙනස් වීමත් සමග අනුමත කිරීමේ බල අධිකාරයන් අඩු වීම.				
11.	අඩු ක්‍රියාවලි මගින් අඩු අනුමත කිරීමේ තත්වයක් උද්ගත වේ.				
තොරතුරු ගලා යාම (FLOW OF INFORMATION)					
12.	තොරතුරු නිවැරදිව අවසන් ඉලක්කය දක්වා ගලා යාම සිදු වී ඇත.				
13.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලිය මගින් තොරතුරු විධිමත්ව ගලා යාම සිදු විය.				
14.	අඩු ක්‍රියාවලීන් ප්‍රමාණයක් තිබීම හේතුවෙන් තොරතුරු ගලා යාම ඉක්මනින් සිදු වී ඇත.				
භරස් ක්‍රියාකාරී ක්‍රියාකාරකම් - අභ්‍යන්තර හා බාහිර (CROSS FUNTIONAL ACTIVITY - INTRA & INTER)					
15.	ව්‍යාපාර ප්‍රතිනිර්මාණ ක්‍රියාවලිය මත අභ්‍යන්තර ක්‍රියාකාරීත්වයන් ඉහළ ගොස් ඇත.				
16.	බාහිර ආයතන සමග ක්‍රියාකාරීත්වයන් එලෙසම ඉහළ ගොස් ඇති බව.				
17.	ආයතනයේ අභ්‍යන්තර හා බාහිර ක්‍රියාකාරීත්වයන් පහසු අයුරින් සිදු වී ඇත.				

ප්‍රවේශය (ACCESSABILITY)					
18.	ක්‍රියාවලීන්ට පහසුවෙන් ප්‍රවේශවීමට ඇති හැකියාව, ඉලක්ක ගත අරමුණ කරා ලගා කර ඇත.				
19.	ක්‍රියාවලීන්ට ප්‍රවේශවීමට ඇති හැකියාව මත ආයතනයේ කාර්ය සාධනය ඉහළ ගොස් ඇත				
පාලනය (CONTROLLING)					
20.	ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලිය මගින් නිලධාරීන්ගේ ක්‍රියාකාරකම් පාලනය කිරීමට හැකි වී ඇත.				
21.	පාලනය නැමැති සංකල්පය මගින් කාර්ය සාධනය ඉහළ නංවා ගැනීමට හැකියාව ලැබී ඇත.				
පුහුණුව (TRAINING)					
22.	රැකියාව මත පුහුණු වැඩසටහන් පිළිබඳ අන්දැකීම් ඇත				
23.	ප්‍රතිනිර්මාණය කිරීමේ ක්‍රියාවලිය පදනම්ව කාර්යය සාධනය වැඩි දියුණු කිරීම උදෙසා පුහුණු වැඩ සටහන් සකසා ඇත.				
සේවාලාභී ගමනාන්තය (CUSTOMER JOURNEY)					
24.	පාරිභෝගික ආයතනයෙන් ලබන සේවය මත සැහීමකට පත් වේ.				
25.	ප්‍රතිනිර්මාණය වූ ක්‍රියාවලීන්ට එරෙහිව පාරිභෝගික පැමිණිලි ලැබී ඇත.				
බාහිර සේවා ලබා ගැනීම (OUTSOURCING)					
26.	සේවා සැපයීම උදෙසා බාහිර සේවා ලබා ගැනීම් සිදුකර ඇත.				
27.	බාහිර සේවා ලබා ගැනීම් මගින් කාර්යය සාධනය ඉහළ නංවා ගත හැකි විය.				
ලබාගත හැකි බව (AVAILABILITY)					
28.	පාරිභෝගිකයන්ට ආයතනයෙන් සේවය ලබා ගැනීමේ හැකියාව පහසු වී ඇත.				
29.	ලබාගත හැකි සියලු සේවාවන් කාර්යයක්ෂම වේ.				

ප්‍රතිචාර දැක්වීම (RESPONSIVENESS)						
30.	සේවා ලාභීන් වෙත ආයතනය විසින් ප්‍රතිචාර දක්වා ඇත.					
31.	ප්‍රතිනිර්මාණික ක්‍රියාවලීන් වෙත ද පාරිභෝගිකයන්ට ප්‍රතිචාර දැක්වීමේ ක්‍රමවේදයක් ඇත.					
එක්වරක් පමණක් මූලධර්මය (ONCE ONLY PRINCIPLE)						
32.	මූලික දත්ත ලබාගැනීම සිදු කරනු ලබන්නේ එක් වරක් පමණි.					
33.	එක් වරක්ලබා ගන්නා තොරතුරු නැවත නැවත සේවා සැපයීම සඳහා භාවිතා වේ.					
වගකීම (RESPONCIBILITY)						
34.	පාරිභෝගිකයන් වෙත සපයනු ලබන සේවාව සඳහා වගකියනු ලැබේ.					
35.	ආයතනය සහ නිලධාරීන් තමන් සපයනු ලබන සේවාව සඳහා වගකියනු ලැබේ.					
විනිවිදභාවය (TRANSPARANCY)						
36.	සමහර ක්‍රියාවලීන් මගින් විනිවිදභාවය නැමැති සංකල්පය ඉහළ නංවා ඇත.					
37.	විනිවිදභාවය මගින් සේවා සැපයීමේ කාර්යක්ෂමතාවය ඉහළ නංවා ඇත.					
38.	ව්‍යාපාර ප්‍රතිනිර්මාණය මගින් විනිවිදභාවය නැමැති සංකල්පය ඉදිරිපත් කර ඇත.					
අධීක්ෂණය (MONITORING)						
39.	ව්‍යාපාර ප්‍රතිනිර්මාණය කිරීමෙන් අනතුරුව අධීක්ෂණය කිරීම පහසු වී ඇත.					
40.	අධීක්ෂණය මත නිලධාරීන්ගේ කාර්යක්ෂමතාවය ඉහළ ගොස් ඇත.					

Appendix No. 5

(From Chapter No.2)

List of Important Laws Related to Public Services

1. Sri Lanka Institute of Development Administration Act (No. 09 of 1892)
2. Widows and Orphans Pension Ordinance (No.1 of 1898)
3. Government and Judicial Services Officers Retirement Ordinance (No. 11 of 1910)
4. Public Servants' Provident Fund Ordinance (No. 18 of 1942)
5. School Teachers' Pension Act (No. 44 of 1953)
6. Official Languages Act (No. 33 of 1956)
7. Prize Competition Act (No. 37 of 1957)
8. Compulsory Public Service Act (No. 70 of 1961)
9. Government Quarters (Recovery of possession) Act (No. 07 of 1969)
10. Widows and Orphans Pension Scheme Act (Armed Forces) (No. 18 of 1970)
11. Local Government Service Pension Fund (No. 16 of 1974)
12. Local Government Widows' and Orphans' Pensions Fund (No. 16 of 1974)
13. Local Government Widowers' and Orphans' Pensions Fund (No. 16 of 1974)
14. Widowers and Orphans Pension Act (No. 24 of 1983)
15. Official Languages Commission Act (No. 18 of 1991)
16. Provincial Councils Pensions Act (No. 17 of 1993)
17. National Human Resources Development Council of Sri Lanka Act (No. 18 of 1997)
18. Widowers and Orphans Pension Scheme Act (Armed Forces) (No. 60 of 1998)
19. Public Service Pensioners' Trust Fund (No. 40 of 1999)
20. National Institute of Languages Education and Training Act (No. 26 of 2007)
21. Pensions Minute
22. Army Pension and Gratuity Code
23. Air Force Pension and Gratuity Code

Appendix No. 6

Raw Response Data

[illegible]

Raw Response Data (Continued)

S.No.	Organization	Raw Response Data																																									
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40		
10	Department of Railways	5	4	3	3	4	5	5	5	5	4	3	5	4	3	5	4	4	4	5	4	3	4	2	5	2	3	3	4	5	4	4	5	4	4	4	4	4	4	4	4	4	
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7		4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
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10	Department of Wildlife Conservation	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
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3		4																																									

Raw Response Data (Continued)

Raw Response Data																																										
Slno.	Organization										Raw Response Data																															
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40		
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Department of Excise																																										
1	5	4	4	5	3	3	4	4	4	3	3	5	5	5	4	3	4	4	4	3	3	4	3	3	3	3	4	3	3	3	3	4	3	3	4	4	4	4	4	4		
2	4	4	4	4	3	3	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
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4	5	5	5	3	5	5	5	4	2	4	5	5	2	4	5	5	4	5	4	3	5	4	5	4	5	4	5	4	4	3	5	5	5	5	5	5	5	5	5	5	5	
5	5	5	5	5	3	5	5	5	4	2	4	5	5	2	5	5	5																									

Appendix No. 6
Raw Response Data (Continued)

[illegible]

Raw Response Data (Continued)

S.No.		Raw Response Data																																								
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	
Organization		1	5	5	4	5	4	4	5	5	5	5	4	4	5	5	4	4	5	5	4	4	5	5	4	4	5	5	5	5	4	2	5	5	4	4	3	4	4	5		
	2	5	5	4	4	5	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	3	5	5	4	4	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	4	4	4	4	4	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	5	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
	6	4	4	4	4	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	7	5	5	4	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	8	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
	9	5	5	4	4	5	5	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
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Foreign Ministry		1	5	4	4	4	3	3	4	4	4	3	3	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	
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	7	5	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	8	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	9	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	10	5	5	4	4	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
Department of Elections		1	4	4	3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
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	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
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	9	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
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Department of Survey		1	4	4	4	4	4	4	4	1	1	4	3	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
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	8	4	4	3	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
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Department of Postal		1	4	4	4	5	1	3	4	4	5	1	3	4	4	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	2	5	4	5	4	2	2	5	5	5	5	5	4	5	5	4	4	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
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	4	5	4	5	5	3	3	5	5	5	5	4	5	5	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	
	5	4	4	5	4	3	5	4	4	3	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
	6	4	4	4	4	3	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
	7	4	4	4	4	3	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
	8	4	4	3	4	5	5	4	4	4	4	2	2	4	4	4	4	4	4	4	4																					

Appendix No. 6
Raw Response Data (Continued)

		Raw Response Data																																											
SNo.	Organization	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40				
5	Organization	4	4	4	4	4	4	4	3	3	4	5	4	4	4	4	3	4	5	5	4	4	4	4	4	4	3	3	3	5	5	5	3	3	5	4	4	4	4	4	4	4			
6		3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4			
7		4	4	4	3	4	4	4	3	3	4	4	5	4	4	4	4	4	4	3	3	3	3	3	3	3	2	5	5	4	4	4	4	5	5	4	4	5	5	4	4	4	4		
8		3	3	4	4	3	3	3	4	4	4	4	4	4	4	4	3	3	3	3	4	4	4	4	4	4	4	4	3	4	3	5	3	4	4	5	4	5	4	3	3	4	4		
9		4	4	3	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4	3	3	4	4	4	4	4	3	4	4	3	3	3	3	4	4	4	4	4	4	4	4	4		
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1		Department of Motor Traffic	4	4	3	4	4	2	4	4	4	4	4	3	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	
2			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
3			4	5	4	5	3	3	5	5	4	3	4	4	4	4	4	5	5	4	4	4	3	2	5	4	4	5	5	5	5	5	5	4	4	5	4	4	5	4	4	5	4	5	5
4			5	5	4	5	2	4	5	5	5	2	3	5	5	5	4	4	5	5	3	2	4	2	2	5	4	4	4	3	3	5	4	4	5	5	4	4	4	5	5	5	5	5	5
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7	4		4	5	5	3	4	4	5	5	4	3	5	5	5	4	5	5	4	4	4	4	4	4	4	2	4	4	5	5	5	5	4	4	4	4	5	4	5	5	5	5	5		
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1	Department of Customs	4	4	5	5	4	3	5	5	5	2	4	4	4	4	2	4	5	4	4	4	4	4	4	4	4	4	2	2	1	5	2	4	2	5	5	4	4	4	4	5	5	4	4	
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5		5	4	5	5	4	3	2	4	5	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	2	4	4	4	4	4	4	4	5	2	
6		5	4	5	5	3	3	2	4	5	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	2	3	3	4	4	4	4	5	2	
7		5	4	5	5	4	4	5	5	4	4	2	2	4	5	4	4	4	4	4	2	4	3	2	3	3	3	3	2	1	4	1	4	4	4	4	4	3	4	4	4	4	4	5	
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9		2	2	3	3	2	2	5	3	5	5	4	2	2	3	5	3	2	2	3	3	3	3	4	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	3	4	5
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Appendix No. 7

Consolidated Data - All Responses

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Appendix No. 7
Consolidated Data - All Responses
(continued from last page)

	A	B	C	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
1	Legends																	
2	Strongly Agreed																	
3	Agreed																	
4	Neutral																	
5	Disagreed																	
6	Strongly Disagreed																	
7																		
8	S.No.	Organization	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40	
9	1	Department of Pensions	DMU1	3.20	3.20	3.90	3.60	3.90	3.60	3.40	3.90	4.40	4.40	4.00	4.00	4.30	4.50	
10	2	Department of Registrar General	DMU2	3.50	3.30	4.10	3.90	3.70	3.00	3.20	3.20	4.00	3.90	4.10	4.00	3.90	4.20	4.00
11	3	Ministry of Public Administration	DMU3	3.70	3.70	4.10	4.00	3.90	3.90	4.00	4.00	4.00	4.00	3.50	3.40	3.50	3.90	3.90
12	4	Ministry of Local Government	DMU4	3.90	3.80	3.80	3.70	3.90	3.30	3.60	3.50	3.90	3.90	3.50	3.60	3.70	3.80	3.90
13	5	Department of Revenue Licence	DMU5	3.50	3.40	4.10	3.80	3.30	3.20	3.60	3.40	3.90	3.90	4.10	4.00	4.10	4.00	3.70
14	6	Department of Railways	DMU6	3.90	3.80	4.00	3.90	3.80	4.10	3.30	3.60	3.70	3.70	4.10	3.80	3.80	4.00	3.70
15	7	Department of Wildlife Conservation	DMU7	4.00	3.70	4.60	4.50	4.70	4.20	4.50	4.10	4.30	4.20	4.10	3.60	3.70	3.90	4.00
16	8	Department of Examination	DMU8	3.60	3.70	3.60	3.40	3.60	3.40	3.40	3.60	3.60	3.60	3.60	3.70	3.70	3.90	3.90
17	9	Ministry of Higher Education	DMU9	3.80	3.90	4.10	4.00	3.90	3.90	3.60	3.80	4.20	3.80	4.40	4.30	4.30	4.50	4.60
18	10	Ministry of Urban Development	DMU10	3.60	3.30	4.20	4.00	4.10	3.80	3.60	3.50	4.30	4.40	4.20	4.20	4.30	4.30	4.30
19	11	Department of Irrigation	DMU11	3.20	3.10	3.50	3.60	3.20	3.10	3.40	3.30	3.90	4.00	3.80	3.90	3.30	3.60	3.50
20	12	Department of Excise	DMU12	3.90	3.70	3.70	3.50	3.40	3.00	3.30	3.30	4.00	3.90	3.90	3.90	3.90	3.90	3.80
21	13	Department Immigration Emmigration	DMU13	4.50	3.80	4.30	4.10	3.90	3.20	3.50	3.10	4.00	4.00	3.60	3.60	3.40	3.90	3.80
22	14	Department Import & Export	DMU14	3.60	3.10	3.80	3.60	4.00	3.60	3.80	3.90	3.70	4.00	4.10	3.80	3.70	4.00	3.80
23	15	Department Company Name Registrar	DMU15	3.10	2.70	4.00	3.20	3.10	3.20	3.50	3.40	4.00	4.10	3.50	3.30	3.30	3.70	3.00
24	16	Department Inland Revenue	DMU16	3.80	3.70	4.00	3.50	3.90	3.20	3.20	3.80	3.70	3.70	4.20	4.00	4.20	4.10	3.60
25	17	Department of Persons Registration	DMU17	3.80	3.50	4.20	4.00	3.80	2.90	2.70	3.50	4.20	4.20	3.60	3.60	3.60	4.00	3.90
26	18	Department of Land Settlement	DMU18	2.60	2.30	4.40	4.10	4.00	3.60	4.50	4.40	4.00	3.70	4.70	4.00	4.00	4.30	4.10
27	19	Ministry of Labour	DMU19	3.10	3.20	4.40	3.90	4.20	3.90	4.20	4.00	4.50	4.30	4.50	4.20	4.30	4.70	4.50
28	20	Department Census & Statistics	DMU20	3.30	3.50	4.50	4.10	4.00	3.70	3.00	4.00	4.40	4.50	4.50	4.30	4.40	4.50	4.50
29	21	Ministry of Mahaweli & Agriculture	DMU21	3.90	4.20	4.40	4.60	4.90	4.70	4.40	4.00	4.50	4.40	4.60	4.60	4.70	4.50	4.60
30	22	Department of Coast Conservation	DMU22	4.10	4.20	4.50	4.60	4.40	4.30	2.40	4.00	4.40	4.20	4.30	4.40	4.50	4.40	4.40
31	23	Foreign Ministry	DMU23	3.87	3.87	4.53	4.33	4.07	3.67	3.93	3.80	4.13	4.07	3.93	3.80	3.87	3.93	4.27
32	24	Department of Elections	DMU24	4.10	3.70	4.40	4.20	4.10	3.70	3.60	4.00	4.10	4.10	4.00	3.90	3.90	3.60	3.50
33	25	Department of Survey	DMU25	2.90	3.00	4.20	4.20	3.90	3.20	3.20	4.00	4.30	4.30	4.10	4.10	3.80	4.20	4.10
34	26	Department of Postal	DMU26	3.60	3.60	4.00	4.00	4.00	3.80	2.60	2.20	4.80	4.60	4.60	4.20	4.00	4.40	4.60
35	27	Department of Forest Conservation	DMU27	2.40	2.40	4.00	4.40	4.20	3.60	2.20	1.40	4.00	4.40	4.20	3.60	4.00	4.20	3.80
36	28	Department of Motor Traffic	DMU28	4.13	4.13	4.13	4.07	3.93	3.93	3.93	4.00	3.87	4.00	4.00	3.93	4.20	4.40	4.40
37	29	Department of Customs	DMU29	2.70	2.70	3.40	2.70	3.90	2.40	2.50	2.80	3.20	3.10	3.20	3.40	3.40	3.70	3.40

Appendix No. 8

Consolidated Data - Input Response

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Legends Strongly Agreed Agreed Neutral Disagreed Strongly Disagreed												
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	S.No.	Organization	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Input
			S	S	R	R	S	R	C	C	C	R	
			Input Data										
			Input Data										
			Input										
1	Department of Pensions	DMU1	4.10	4.20	3.60	3.90	3.80	4.00	3.70	2.60	2.80	2.60	
2	Department of Registrar General	DMU2	3.50	3.90	3.40	3.70	3.60	3.90	3.50	3.60	4.00	3.00	
3	Ministry of Public Administration	DMU3	3.50	3.60	3.90	4.00	3.70	3.70	3.50	3.90	3.90	3.70	
4	Ministry of Local Government Kotte Municipality Council	DMU4	3.80	3.90	4.00	3.60	3.60	3.80	3.80	3.80	3.50	3.60	
5	Ministry of Local Government Department of Revenue Licence	DMU5	3.50	3.70	3.40	3.60	3.80	4.00	3.70	3.30	3.20	2.80	
6	Department of Railways	DMU6	3.80	4.10	4.00	3.70	3.30	4.00	3.60	3.80	3.90	3.20	
7	Department of Wildlife Conservation	DMU7	3.50	4.00	3.80	4.00	4.30	4.50	3.90	3.80	4.30	3.90	
8	Department of Examination Jayawardanapura Zone office	DMU8	3.60	3.50	2.90	3.80	3.70	3.30	3.60	3.30	3.50	3.20	
9	Ministry of Higher Education	DMU9	3.80	4.10	3.60	4.10	3.90	4.10	4.20	3.70	3.90	2.60	
10	Ministry of Urban Development Urban Development Authority	DMU10	3.60	3.80	3.00	3.60	3.60	3.90	3.90	3.80	3.60	3.20	
11	Department of Irrigation	DMU11	3.70	3.00	3.70	3.10	3.50	3.30	3.50	3.30	3.00	3.20	
12	Department of Excise	DMU12	3.70	3.90	3.10	3.90	3.80	3.90	3.70	3.70	4.00	2.60	
13	Department of Immigration Emigration	DMU13	4.10	4.30	3.80	4.00	3.60	4.70	3.90	3.30	3.50	2.80	
14	Department of Import & Export	DMU14	3.60	3.80	3.40	4.20	3.60	4.00	3.40	3.10	3.00	2.20	
15	Department of Company Name Registrar	DMU15	3.60	3.60	3.00	3.90	3.60	3.40	3.30	2.70	3.00	3.70	
16	Department of Inland Revenue	DMU16	4.00	3.60	3.40	3.50	3.80	3.40	3.80	3.70	3.80	3.30	
17	Department of Persons Registration	DMU17	4.40	4.00	4.10	3.60	3.60	4.20	4.00	4.00	3.80	3.30	
18	Department of Land Settlement	DMU18	3.60	3.80	3.90	4.30	4.20	4.30	4.40	3.90	3.80	2.60	
19	Ministry of Labour Employee Provident Fund	DMU19	3.20	3.50	2.10	3.70	3.70	4.40	3.60	4.50	4.40	2.70	
20	Department of Census & Statistics	DMU20	4.10	4.20	3.90	4.60	4.10	3.90	3.40	3.60	4.50	3.20	
21	Ministry of Mahaweli & Agriculture Mahaweli Authority	DMU21	4.20	4.30	4.10	4.40	4.50	4.50	4.10	4.40	4.60	4.00	
22	Department of Coast Conservation	DMU22	4.10	4.30	3.70	4.50	4.30	4.40	4.30	3.10	3.90	2.30	
23	Foreign Ministry	DMU23	4.27	4.47	3.80	4.20	4.07	4.00	3.80	3.73	3.80	3.00	
24	Department of Elections Commission of Elections	DMU24	3.50	3.60	3.60	3.80	3.60	3.30	3.40	3.80	3.70	2.80	
25	Department of Survey	DMU25	3.60	3.90	4.10	3.50	4.00	3.90	3.50	4.00	4.00	2.30	
26	Department of Postal	DMU26	4.60	4.40	2.20	4.40	4.20	4.40	3.40	3.80	3.80	2.40	
27	Department of Forest Conservation	DMU27	3.20	4.00	2.80	3.60	3.40	4.00	3.20	3.00	3.20	3.00	
28	Department of Motor Traffic	DMU28	4.00	4.13	3.53	4.33	4.20	3.80	3.60	3.47	3.67	3.40	
29	Department of Customs	DMU29	4.00	4.30	3.20	3.80	3.30	3.60	3.60	2.70	3.00	2.50	

Appendix No. 8
Consolidated Data - Input Response
(continued from last page)

	A	B	C	N	O	P	Q	R	S	T	U	V	W		
1	Legends														
2	Strongly Agreed														
3	Agreed														
4	Neutral														
5	Disagreed														
6	Strongly Disagreed														
7															
8	Question No. in Original Survey														
9															
10															
11	S.No.	Organization													
12			1	Department of Pensions	DMU1	3.20	3.20	3.60	3.40	3.90	4.40	4.40	3.90	4.00	4.30
13			2	Department of Registrar General	DMU2	3.50	3.30	3.00	3.20	3.20	4.00	4.00	3.90	3.90	4.20
14			3	Ministry of Public Administration	DMU3	3.70	3.70	3.90	4.00	4.00	4.00	4.00	3.50	3.50	3.90
15			4	Ministry of Local Government Kotte Municiple Council	DMU4	3.90	3.80	3.30	3.60	3.50	3.90	3.90	3.50	3.70	3.80
16			5	Ministry of Local Government Department of Revenue Licence	DMU5	3.50	3.40	3.20	3.60	3.40	3.90	3.90	4.10	4.10	4.00
17			6	Department of Railways	DMU6	3.90	3.80	4.10	3.30	3.60	3.70	3.70	4.10	3.80	4.00
18			7	Department of Wildlife Conservation	DMU7	4.00	3.70	4.20	4.50	4.10	4.30	4.20	4.10	3.70	3.90
19			8	Department of Examination Jayawardanapura Zone office	DMU8	3.60	3.70	3.40	3.40	3.40	3.60	3.60	3.60	3.70	3.90
20			9	Ministry of Higher Education	DMU9	3.80	3.90	3.90	3.60	3.80	4.20	3.80	4.40	4.30	4.50
21			10	Ministry of Urban Development Urban Development Authority	DMU10	3.60	3.30	3.80	3.60	3.50	4.30	4.40	4.20	4.20	4.30
22			11	Department of Irigation	DMU11	3.20	3.10	3.10	3.40	3.30	3.90	4.00	3.80	3.30	3.60
23			12	Department of Excise	DMU12	3.90	3.70	3.00	3.30	3.30	4.00	3.90	3.90	3.90	3.90
24			13	Department Immigration Emmigration	DMU13	4.50	3.80	3.20	3.50	3.10	4.00	4.00	3.60	3.40	3.90
25			14	Department Import & Export	DMU14	3.60	3.10	3.60	3.80	3.90	3.70	4.00	4.10	3.70	4.00
26			15	Department Company Name Registrar	DMU15	3.10	2.70	3.20	3.50	3.40	4.00	4.10	3.50	3.30	3.70
27			16	Department Inland Revenue	DMU16	3.80	3.70	3.20	3.20	3.80	3.70	3.70	4.20	4.20	4.10
28			17	Department of Persons Registration	DMU17	3.80	3.50	2.90	2.70	3.50	4.20	4.20	3.60	3.60	4.00
29			18	Department of Land Settlement	DMU18	2.60	2.30	3.60	4.50	4.40	4.00	3.70	4.70	4.00	4.30
30			19	Ministry of Labour Employee Provident Fund	DMU19	3.10	3.20	3.90	4.20	4.00	4.50	4.30	4.50	4.30	4.70
31			20	Department Sensus & Statistics	DMU20	3.30	3.50	3.70	3.00	4.00	4.40	4.40	4.50	4.40	4.50
32			21	Ministry of Mahaweli & Agriculture Mahaweli Authority	DMU21	3.90	4.20	4.70	4.40	4.00	4.50	4.40	4.60	4.70	4.50
33			22	Department of Coast Conservation	DMU22	4.10	4.20	4.30	2.40	4.00	4.40	4.40	4.30	4.50	4.40
34			23	Foreign Ministry	DMU23	3.87	3.87	3.67	3.93	3.80	4.13	4.07	3.93	3.87	3.93
35			24	Department of Elections Commission of Elections	DMU24	4.10	3.70	3.70	3.60	4.00	4.10	4.10	4.00	3.90	3.60
36			25	Department of Survey	DMU25	2.90	3.00	3.20	3.20	4.00	4.30	4.30	4.10	3.80	4.20
37			26	Department of Postal	DMU26	3.60	3.60	3.80	2.60	2.20	4.80	4.60	4.60	4.00	4.40
38			27	Department of Forest Conservation	DMU27	2.40	2.40	3.60	2.20	1.40	4.00	4.40	4.20	4.00	4.20
39			28	Department of Motor Traffic	DMU28	4.13	4.13	3.93	3.93	4.00	3.87	4.00	4.00	3.93	4.20
40			29	Department of Customs	DMU29	2.70	2.70	2.40	2.50	2.80	3.20	3.10	3.20	3.40	3.70

Appendix No. 8
Consolidated Data - Input Response
(continued from last page)

	A	B	C	X	Y	Z	AA
1	Legends						
2	Strongly Agreed						
3	Agreed						
4	Neutral						
5	Disagreed						
6	Strongly Disagreed						
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S.No.	Organization	Output (Avg)	S BPR 1 Structure (S)	R BPR2 Rules (R)	C BPR3 Control (C)
1	Department of Pensions	3.68	4.00	3.49	3.74
2	Department of Registrar General	3.62	3.55	3.46	3.87
3	Ministry of Public Administration	3.78	3.70	3.79	3.81
4	Ministry of Local Government Kotte Municipice Council	3.72	3.70	3.68	3.77
5	Ministry of Local Government Department of Revenue Licence	3.61	3.60	3.51	3.73
6	Department of Railways	3.77	3.70	3.79	3.79
7	Department of Wildlife Conservation	4.04	3.98	4.08	4.01
8	Department of Examination Jayawardana pura Zone office	3.52	3.55	3.43	3.60
9	Ministry of Higher Education	3.91	3.90	3.78	4.09
10	Ministry of Urban Development Urban Development Authority	3.76	3.63	3.58	4.07
11	Department of Irrigation	3.40	3.38	3.32	3.51
12	Department of Excise	3.66	3.68	3.48	3.87
13	Department Immigration Emmigration	3.76	3.83	3.77	3.71
14	Department Import & Export	3.59	3.73	3.56	3.56
15	Department Company Name Registrar	3.42	3.55	3.33	3.44
16	Department Inland Revenue	3.70	3.80	3.52	3.86
17	Department of Persons Registration	3.75	3.88	3.52	3.97
18	Department of Land Settlement	3.85	4.00	3.64	4.01
19	Ministry of Labour Employee Provident Fund	3.83	3.60	3.53	4.33
20	Department Sensus & Statistics	3.97	4.10	3.73	4.19
21	Ministry of Mahaweli & Agriculture Mahawli Authority	4.35	4.25	4.31	4.46
22	Department of Coast Conservation	3.99	4.18	3.80	4.11
23	Foreign Ministry	3.91	4.15	3.81	3.90
24	Department of Elections Commission of Elections	3.70	3.68	3.62	3.80
25	Department of Survey	3.69	3.88	3.36	4.01
26	Department of Postal	3.79	3.85	3.51	4.11
27	Department of Forest Conservation	3.31	3.00	3.13	3.71
28	Department of Motor Traffic	3.91	4.08	3.91	3.82
29	Department of Customs	3.19	3.60	2.96	3.24

Appendix No. 9

Consolidated Data - Output Response

	A	B	C	D	E	F	G	H	I	J
1	Legends Strongly Agreed Agreed Neutral Disagreed Strongly Disagreed									
2	5									
3	4									
4	3									
5	2									
6	1									
7	1									
8	Question No. in Original Survey									
9	Consolidated Output Response Data									
10	S.No.	Organization		Q1	Q2	Q3	Q4	Q5	Q6	Q7
11	1	Department of Pensions	DMU1	4.40	4.20	3.60	4.20	4.00	3.70	3.60
12	2	Department of Registrar General	DMU2	4.20	4.10	3.50	3.70	3.80	3.00	3.00
13	3	Ministry of Public Administration	DMU3	4.10	3.90	3.80	4.10	4.00	3.80	3.70
14	4	Ministry of Local Government Kotte Municiple Council	DMU4	3.80	3.70	3.40	4.00	3.90	3.50	3.40
15	5	Ministry of Local Government Department of Revenue Licence	DMU5	4.10	3.80	3.10	3.80	3.70	3.40	3.60
16	6	Department of Railways	DMU6	4.30	4.10	3.80	3.80	4.10	3.60	3.50
17	7	Department of Wildlife Conservation	DMU7	4.40	4.20	3.60	4.50	4.20	3.40	3.30
18	8	Department of Examination Jayawardanapura Zone office	DMU8	3.70	3.80	3.10	3.90	3.70	3.30	3.30
19	9	Ministry of Higher Education	DMU9	4.10	4.00	3.60	4.50	4.20	3.70	3.90
20	10	Ministry of Urban Development Urban Development Authority	DMU10	4.30	3.70	2.90	3.60	3.80	3.00	3.10
21	11	Department of Irrigation	DMU11	3.60	3.30	3.10	3.60	3.30	3.20	3.40
22	12	Department of Excise	DMU12	4.30	4.10	3.50	4.00	3.80	3.00	3.40
23	13	Department Immigration Emigration	DMU13	4.20	4.10	3.70	4.00	4.50	3.00	2.70
24	14	Department Import & Export	DMU14	4.20	3.90	3.70	4.20	4.10	3.10	3.10
25	15	Department Company Name Registrar	DMU15	4.10	4.00	3.00	3.70	3.80	3.30	3.30
26	16	Department Inland Revenue	DMU16	3.70	4.00	3.40	3.90	3.50	3.10	3.00
27	17	Department of Persons Registration	DMU17	4.20	4.00	3.90	4.00	4.00	3.30	3.10
28	18	Department of Land Settlement	DMU18	4.60	4.50	3.90	4.60	3.90	3.80	3.80
29	19	Ministry of Labour Employee Provident Fund	DMU19	4.40	4.40	2.20	4.00	3.80	1.80	2.10
30	20	Department Sensus & Statistics	DMU20	4.70	4.30	3.80	4.50	4.30	3.80	3.90
31	21	Ministry of Mahaweli & Agriculture Mahaweli Authority	DMU21	4.50	4.40	4.60	4.40	4.60	4.40	4.40
32	22	Department of Coast Conservation	DMU22	4.60	4.60	4.00	4.60	4.40	4.20	3.80
33	23	Foreign Ministry	DMU23	4.53	4.40	3.93	4.47	4.07	3.73	3.93
34	24	Department of Elections Commission of Elections	DMU24	4.10	3.90	3.60	3.80	4.10	3.30	3.10
35	25	Department of Survey	DMU25	4.10	4.10	3.80	3.70	3.50	2.80	2.70
36	26	Department of Postal	DMU26	4.60	4.00	2.60	4.60	4.60	3.40	3.80
37	27	Department of Forest Conservation	DMU27	4.00	3.80	2.40	4.20	4.00	4.20	4.00
38	28	Department of Motor Traffic	DMU28	3.87	4.00	3.73	4.27	4.13	3.60	3.80
39	29	Department of Customs	DMU29	4.00	3.50	3.30	4.60	4.00	2.60	2.70

Appendix No. 9
Consolidated Data - Output Response
(continued from last page)

	A	B	C	K	L	M	N	O	P	Q
1	Legends									
2	Strongly Agreed									
3	Agreed									
4	Neutral									
5	Disagreed									
6	Strongly Disagreed									
7	Question No. in Original Survey									
8										
9	Consolidated Output Response Data									
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9	S.No.	Organization		Q8	Q9	Q10	Q11	Q12	Q13	Q14
10	1	Department of Pensions	DMU1	4.00	3.90	4.00	4.10	4.00	4.00	3.70
11	2	Department of Registrar General	DMU2	3.60	3.60	4.00	3.70	3.50	3.70	3.60
12	3	Ministry of Public Administration	DMU3	3.90	3.80	3.90	3.70	3.40	3.60	3.50
13	4	Ministry of Local Government Kotte Municipice Council	DMU4	3.80	3.90	3.60	4.00	3.50	3.90	3.70
14	5	Ministry of Local Government Department of Revenue Licence	DMU5	4.20	3.70	3.60	3.80	3.70	4.10	3.80
15	6	Department of Railways	DMU6	3.80	3.70	3.90	3.80	3.80	3.50	3.60
16	7	Department of Wildlife Conservation	DMU7	3.60	3.50	3.50	3.90	4.10	4.00	3.60
17	8	Department of Examination Jayawardanapura Zone office	DMU8	3.80	3.70	3.60	3.40	3.80	3.60	3.60
18	9	Ministry of Higher Education	DMU9	4.40	4.50	4.30	4.40	4.00	4.00	3.80
19	10	Ministry of Urban Development Urban Development Authority	DMU10	3.80	3.80	3.60	3.80	3.40	4.10	3.80
20	11	Department of Irrigation	DMU11	3.30	3.40	3.20	3.50	3.20	3.30	3.60
21	12	Department of Excise	DMU12	4.10	3.90	3.40	3.90	3.50	4.00	3.60
22	13	Department Immigration Emigration	DMU13	3.90	3.90	3.70	3.90	3.70	4.50	3.80
23	14	Department Import & Export	DMU14	4.20	4.20	4.00	4.20	3.20	4.20	3.50
24	15	Department Company Name Registrar	DMU15	3.70	3.70	3.70	3.60	3.70	3.20	3.20
25	16	Department Inland Revenue	DMU16	3.40	3.80	3.30	4.10	3.70	3.30	3.80
26	17	Department of Persons Registration	DMU17	3.80	3.90	3.80	3.70	3.40	3.90	4.10
27	18	Department of Land Settlement	DMU18	4.30	4.20	4.60	4.30	4.60	4.70	4.20
28	19	Ministry of Labour Employee Provident Fund	DMU19	4.40	4.40	4.00	4.20	3.70	4.50	3.90
29	20	Department Census & Statistics	DMU20	4.40	4.50	4.30	4.10	4.20	4.20	3.70
30	21	Ministry of Mahaweli & Agriculture Mahaweli Authority	DMU21	4.80	4.80	4.60	4.10	4.60	4.40	4.40
31	22	Department of Coast Conservation	DMU22	4.40	4.50	4.40	4.40	4.30	4.50	4.40
32	23	Foreign Ministry	DMU23	4.13	4.13	4.20	4.20	4.00	4.27	3.73
33	24	Department of Elections Commission of Elections	DMU24	3.50	3.60	3.70	3.70	3.60	3.30	3.50
34	25	Department of Survey	DMU25	3.90	3.90	4.00	3.90	4.00	3.90	3.20
35	26	Department of Postal	DMU26	4.40	4.20	3.60	4.40	4.00	4.20	3.80
36	27	Department of Forest Conservation	DMU27	3.80	3.40	3.80	3.60	3.60	3.60	4.00
37	28	Department of Motor Traffic	DMU28	4.27	4.07	3.80	4.00	3.93	3.93	3.40
38	29	Department of Customs	DMU29	3.30	3.50	3.50	3.50	3.40	3.40	3.70

Appendix No. 9
Consolidated Data - Output Response
(continued from last page)

	A	B	C	R	S	T	U	V	W	X
1	Legends									
2	Strongly Agreed									
3	Agreed									
4	Neutral									
5	Disagreed									
6	Strongly Disagreed									
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9	S.No.	Organization		Q15	Q16	Q17	Q18	Q19	Q20	Output (Avg)
10	1	Department of Pensions	DMU1	3.60	3.90	3.60	3.90	4.00	4.50	3.95
11	2	Department of Registrar General	DMU2	4.00	4.10	3.90	3.70	4.00	4.00	3.74
12	3	Ministry of Public Administration	DMU3	3.90	4.10	4.00	3.90	3.40	3.90	3.82
13	4	Ministry of Local Government Kotte Municipality Council	DMU4	3.60	3.80	3.70	3.90	3.60	3.90	3.73
14	5	Ministry of Local Government Department of Revenue Licence	DMU5	4.00	4.10	3.80	3.30	4.00	3.70	3.77
15	6	Department of Railways	DMU6	3.90	4.00	3.90	3.80	3.80	3.70	3.82
16	7	Department of Wildlife Conservation	DMU7	4.20	4.60	4.50	4.70	3.60	4.00	3.97
17	8	Department of Examination Jayawardanapura Zone office	DMU8	3.80	3.60	3.40	3.60	3.70	3.90	3.62
18	9	Ministry of Higher Education	DMU9	4.20	4.10	4.00	3.90	4.30	4.60	4.13
19	10	Ministry of Urban Development Urban Development Authority	DMU10	3.70	4.20	4.00	4.10	4.20	4.30	3.76
20	11	Department of Irrigation	DMU11	3.10	3.50	3.60	3.20	3.90	3.50	3.39
21	12	Department of Excise	DMU12	3.80	3.70	3.50	3.40	3.90	3.80	3.73
22	13	Department Immigration Emigration	DMU13	4.50	4.30	4.10	3.90	3.60	3.80	3.89
23	14	Department Import & Export	DMU14	3.50	3.80	3.60	4.00	3.80	3.80	3.82
24	15	Department Company Name Registrar	DMU15	3.10	4.00	3.20	3.10	3.30	3.00	3.49
25	16	Department Inland Revenue	DMU16	3.70	4.00	3.50	3.90	4.00	3.60	3.64
26	17	Department of Persons Registration	DMU17	3.60	4.20	4.00	3.80	3.60	3.90	3.81
27	18	Department of Land Settlement	DMU18	4.10	4.40	4.10	4.00	4.00	4.10	4.24
28	19	Ministry of Labour Employee Provident Fund	DMU19	3.90	4.40	3.90	4.20	4.20	4.50	3.85
29	20	Department Census & Statistics	DMU20	4.10	4.50	4.10	4.00	4.30	4.50	4.21
30	21	Ministry of Mahaweli & Agriculture Mahaweli Authority	DMU21	4.70	4.40	4.60	4.90	4.60	4.60	4.54
31	22	Department of Coast Conservation	DMU22	4.30	4.50	4.60	4.40	4.40	4.40	4.39
32	23	Foreign Ministry	DMU23	4.20	4.53	4.33	4.07	3.80	4.27	4.15
33	24	Department of Elections Commission of Elections	DMU24	4.00	4.40	4.20	4.10	3.90	3.50	3.75
34	25	Department of Survey	DMU25	4.20	4.20	4.20	3.90	4.10	4.10	3.81
35	26	Department of Postal	DMU26	4.40	4.00	4.00	4.00	4.20	4.60	4.07
36	27	Department of Forest Conservation	DMU27	4.60	4.00	4.40	4.20	3.60	3.80	3.85
37	28	Department of Motor Traffic	DMU28	3.80	4.13	4.07	3.93	4.00	4.40	3.96
38	29	Department of Customs	DMU29	3.20	3.40	2.70	3.90	3.40	3.40	3.45