

A Study on the Importance of Introducing Railway Organizational Structural Reforms in Sri Lanka: A Passenger Transport Perspective

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Abstract

William Coase, introducing his theorem on cost efficiency in 1975, had explained that allowing free trade would result in the optimum outcome under any specific economic condition. Privatisation was the best solution that was presented over the world to cut the financial inefficiency that was created by the monopolies of state-owned entities out. Even at that, structural reforms are encouraged over outright privatisation. 'Regulatory Reforms' is an on-going process that optimizes the regulatory performance of an economy. Many potential problem areas would occur, if we were to consider the long-term trial-and-error process of introducing railway structural reforms; such as, (1) whether the structural reforms that will undertake will be appropriate for an industry as technically complex as railways, (2) whether a system of negotiated contracts will lead to lower transaction costs than a

system of administered commands, (3) whether the vertical separation of infrastructure and operations will ignore the likelihood of pursuing the concepts of an integrated economy; such as investment planning and land-use planning at the strategic level, maintenance planning at the tactical level, and planning to recover from possible infrastructure failures at the operational level, (4) whether there will be practical problems, when determining the costs of regulating the infrastructure management, (5) whether there will be diseconomies of scope form jointly operating freight and passenger services, (6) whether a split into three or four operators will be more efficient than separating operations market into less than three or more than four competitors, (7) whether the franchising bid will not be competitive, (8) whether franchising contracts would be difficult to specify, award, enforce, and renew, even if there were some sort of a competition that

resulted in the winning bid not being efficient, (9) whether there will require a substantial risk premium, where franchising will not be exclusive, or (10) whether allocative efficiency gains will be more problematic, although productive efficiency gains will be likely. Nevertheless, If the final outcome was idealist, bringing a net financial surplus in the economy, those kinds of structural reforms would always be advisable.

Keywords - Railway Structural Reforms, Regulatory Policy Making, Financial Performance Efficiency, Developing Countries

1. INTRODUCTION

As one of the oldest rail services in Asia, Sri Lanka Railway (SLR) will complete its 159 years of service by December 27, 2023. (Kesavan et al., 2015). In the early 20th century, SLR was established as Ceylon Government Railway (CGR), in order to operate as the major mode of freight transportation all over the country. Over time, road transportation which was the main passenger transport saturated and there was a need for an alternative mode of transport. The marginal productivity of roads and vehicles were researched and identified (Shaja M.M.M., Sobika M. & Bandara Y.M., 2023). Further, the road transportation became unattractive since the safety driving was an unsolved issue which was mainly interconnected with the socio-economic characteristics of the drivers and the utility of driving (Shaja M.M.M., & Bandara Y.M., 2020). By the late 20th century, SLR's purpose was gradually redefined to majorly act as a mode of passenger transportation. (Hyat, 2021) The

operative level of SLR is actually a network, which includes the two key components; infrastructure (i.e., facilities), and operations (i.e., functions). Rail facilities consist of tracks and stations, signaling and level crossings, and rolling stocks.

There are two types of rail tracks, which are based on the difference between the track gauge that is usually measured as the inner width between the two railings (Puffert, 2001); broad gauge rail tracks, and narrow gauge rail tracks. The inner width of a standardized broad gauge rail track is 5ft 6in (i.e., 1.670m), while that of a standardized narrow gauge rail track is 2ft 6in (i.e., 0.762m) (Hyatt, 2021).

The broad gauge rail network of SLR contains of two Upcountry lines (i.e. the Colombo-Peradeniya-Badulla line, and the Colombo-Kandy-Matale line), two Southern coastal lines (i.e. the Colombo-Matara line, and the Mutual line from Colombo Port to the harbour works quarry at Mahara, Ragama), the Northern line (i.e. the line from Polgahawela to Kankesanthurai (KKS)), two North Western lines (i.e., the Talaimannar line from Medawachchiya to Talaimannar, and the Puttalam line from Ja Ela to Aruwakkadu), and two Eastern lines (i.e. the Maho-Trincomalee line, and the Maho-Batticaloa line). (Hyatt, 2021)

The narrow-gauge railway network of SLR contained of two significant lines; the Udu Pussellawa Railway (UPR) line (i.e., from Nanu Oya to Ragala), and the Kelani Valley (KV) line [i.e., from Maradana to Avissawella, and to Yatiyantota (i.e., towards North from Avissawella), and to

Rathnapura (i.e. towards South from Avissawella)]. Unfortunately, by 1977, all the narrow gauge rail lines that belonged to SLR discontinued their operations due to their high maintenance costs. Some parts of them were even lifted to be used in other broad gauge railway maintenance. (Hyatt, 2021)

SLR possesses five types of rolling stocks; locomotives (i.e. steam engine locomotives, and Internal Combustion Engine (ICE) locomotives), multiple units, carriages, goods wagons, and oil tankers, of which only the first three items are related with passenger transportation. (Hyatt, 2021)

Rail functions consist of train services and ticket issuing. There are two main types of train services; passenger train services, and freight train services. Commuter passenger train services and tourism passenger train services are the two types of passenger train services offered by SLR.

At present, SLR operates a total of 1492 km in track length, 181 main and 162 sub stations, 59 diesel-electric locomotives, 30 diesel-hydraulic locomotives, 875 km of mechanical interlocking, 575 km of electric interlocking, 650km of Central Lighting System (CLS), 180 km of Centralized Traffic Control (CTC), 136 electric barriers, 405 bells and flashlights, 136 mechanized barriers, 7 winged-type gates, and 300 protected road signs, accounting for more than 300 passenger trains that commute over 350,000 passengers daily (MTH, 2022), which is a 5 to 6 percentage from the total passenger transportation share in the market (SLRD, 2011).

One crucial characteristic of the studies that were carried out prior to and about three

decades after the independence regarding CGR, was their focus on contributing to the future development of rail transportation in Sri Lanka, where the rail mode share was as high as 40% in the market. (Kesavan et al., 2015)

1.2 Problem Statement

SLR started to become a loss-making entity only a few decades after independence. Rail mode share has immensely decreased due to the unsatisfactory level of service performance that is measured by means of; the actual arrival times against the scheduled arrival times, comfortable seating facilities, and safe journey. SLR has come to a point where customers demand more trips, online ticketing facilities, and adequate maintenance of tracks and trains. (Kesavan et al., 2015).

Rail transportation is one of the two main on-land public transportation methods in Sri Lanka, but considering the easy access to most of the geographical area in the country, other transportation modes; such as motor-taxis and public bus transportation service have come forward, giving a tough competition to the public rail transportation service. (Kesavan et al., 2015)

The reason why rail services cannot match the competition from other transportation modes is because SLR lags behind with unsophisticated technologies, due to its leapfrog type of infrastructural development, which is led by the high bureaucracy (Kesavan et al., 2015) and the unsuccessful strategies in capturing the financial performance (Danthanarayana and Kumarage, 2021), attached to it.

As a department under the State, SLR gets fully subsidized by the Government Treasury annually. SLR also gets funded by some capital grants that are influenced by time to time policy making decisions of the Government. (Danthanarayana and Kumarage, 2021)

Apart from the revenue being decreased, SLR has outgrown its self-sufficiency (Kesavan et al., 2015) with the rapidly increasing recurring expenditures that annually gets consumed by its operational and maintenance functions, even at a level of non-growing capital expenditure, where there incur no expenses in new infrastructural developments. From a numerical perspective, although, SLR has confronted a 62 percent of sudden increment in revenues during the post-war season (i.e. from 2009-2014), due to the rebirth of the Northern line, the operational loss was 118 percent, when compared to the figures from 1999 (Danthanarayana and Kumarage, 2021).

The study of Danthanarayana and Kumarage (2021) has found out that a large portion of recurrent costs has been consumed by the Personal Employee Emoluments (PEEs) in SLR, which are basically the salaries, wages, overtime and holiday payments, and other allowances; such as the fuel allowance.

Most employees are attracted to job security and pension benefits, being recruited under a Governmental Department (Danthanarayana and Kumarage, 2021). Knowing this, some differently subjective parties try to exploit their powers to acquire people's voting rights via different Trade Unions (TUs).

TUs demand more increments in remuneration, short shifts, and holidays (Kesavan et al., 2015). It is evidently clear that TUs over-power the authority of the management in SLR, as it is indicating a 13.18 wage ratio, compared to the 11.83 ratio in other Governmental Departments. (Danthanarayana and Kumarage, 2021)

On the other hand, it is way easier for TUs to manipulate workers' minds, since SLR lacks adequate inaugural, training and development programmes to make them understand its vision and long-term objectives. (Kesavan et al., 2015)

Simply, certain governmental regulations have offended the authority of the administration of SLR to overpower other coalitions. After all, the government seems to neglect introducing adequate regulatory structural reforms into SLR. (Kesavan et al., 2015; Danthanarayana and Kumarage, 2021)

SLR is being operated as a service-oriented organisation. Sri Lankan Government has been keeping SLR's monopoly up to date, in order to provide equal opportunity of transportation to passengers from all income levels. (Kesavan et al., 2015)

Throughout its history, there have been conducted research on some significant aspects related to SLR, but when compared to other industries, and the same industry over the world, the amount of studies done goes too little. Even at that, mostly research has covered the historical, technical and human resources aspects of SLR. There is little to no studies based on the administrative structure of SLR. (Kesavan et al., 2015)

Current administrative structure of SLR consists of three sub departments; the Chief Engineer Mechanical Sub Department, the Chief Engineer Way and Works Sub Department, and the Chief Engineer Signaling and Telecommunication Sub Department. All sub department heads report to the General Manager of Railway (GMR), who is bound to directly report to the Secretary to the Ministry of Transport and Highways (MTH). (SLRD, 2011; Kesavan et al., 2015)

SLR gains its revenues as operating revenues and non-operating revenues, among which the former is prominent and the latter is miscellaneous. Since the fare is significantly lower than of any other public transportation mode, SLR will have to either run more trains or lay more lines to achieve a predefined target of revenue than to now. (Danthanarayana and Kumarage, 2021)

Investing in the development of public transportation infrastructure is a contribution to an economy as it fulfils the daily transportation needs of people (Abeysekara, 2021), keeping supply chains connected (Edward et al., 2003).

The developed countries generally invest about 31 percent of its GDP annually, upon this purpose. The main concern on this subject is that this type of investments will take around 20 to 30 years (i.e. a long term) to gain profits. That is why transportation infrastructure investments are mostly undertaken by national governments. (Abeysekara, 2021)

When it comes to the projects on the development of public transportation infrastructure, developing countries; such as

Sri Lanka, usually lack the necessary financial and technical feasibility in this regard. After all, developing the commuter passenger rail service to access most of the geological area will be a huge investment project. Therefore, Sri Lanka has to go through solicited projects that seek the assistance of the external funding sources that would make a nation indebted over a long term, mostly resulting in lower than standard economic benefits (Abeysekara, 2021) due to the high bureaucracy of SLR that hinders to pass through certain steps to efficiency (Kesavan et al., 2015) which has become a critical discussion at the statutory level (Kumarage, 2022).

Transportation policies are after all, a type of public policies that are subjected to non-linear (i.e. not an effect of just one cause), complex, dynamic, co-evolving (i.e. simultaneously evolving with the evolution of other policies), cognitively-biased, and reactive in nature. (Kumarage, 2022)

Most of the current rail transportation policies are being conducted without a clear conscience by the authorities. Some rules are not written by the Law but have been implied by conduct over years (i.e. implicit), while others are written by Law but have been oblivious to authorities over decades (i.e. explicit). Either way, this gap is an immense opportunity for differently interested parties to drag the objective of SLR away from profits; such as the government decision back in 1978 to increase the import of motor vehicles, in order to increase the national tax return. (Kumarage, 2022)

Beyond everything, most of the recent explicit transportation policies, and all the

administrative transportation policies have been identified to result in failure, because of their lack of strategic foundation. Most policies have failed due to the excess optimism without maintaining flexibility over the implementation, containing the objectives of treasury-based funding without self-financing, and viewing them only from a fully nationalized perspective from the beginning. (Kumarage, 2022)

1.3 Theory and Objectives

Sri Lanka indicated a minus 7.8 national GDP growth in 2022, which had been the biggest drop since 2019 (The World Bank Data, 2023). Sri Lanka heavily depended on the tourism income, which basically stopped flowing in after the COVID-19 outbreak. The political instability in the first half of 2022 stopped migrant workers from depositing remittance in local banks, leading to a huge fall of national liquid foreign currency reserves. The sudden escalation of the USD rate when importing fuel and fertilizer made the international Ceylon tea export market to fall apart. At a crucial time as this, keeping inefficient state-owned entities; such as SLR, would further add to the debt burden of the Central Government. Therefore, converting them into profit making entities is essential. (Kesavan et al., 2015)

This study was based on Coase's theorem, which was introduced in 1975 by William Coase and explains that under any specific economic circumstance, valuing and allowing free trade of property rights would result in an optimum outcome. (Preston, 1996)

Even under the political environment in the British colonial era, although transportation infrastructure development investments of CGR were committed by the State, rail operations were self-sufficient, hence, no subsidiary was provided for service provision to retain (Kumarage, 2022).

Going along with the Coase's theorem, railways better undergo other structural reforms than outright privatisation, since its nature is attached to time, space and safety, oscillating between profitability and non-profitability as situations given (Preston, 1996). Imahashi (2000) also described the on-going nature of railway structural reforms. Despite all doubts, if the end result would be ideal and bring a financial surplus, such railway structural reforms are advisable (Imahashi, 2000).

What interests introducing railway structural reforms in Sri Lanka are the inefficiencies of national monopolies, when competition is restricted as described by Imahashi (2000).

Followed by the lack of studies in the area of introducing regulatory reforms into SLR, this paper aimed over five objectives. They were (1) to analyse the most productive types of railway structural reforms in the world, (2) to gather the most compatible approaches to structural reforms in SLR, (3) to qualitatively evaluate the feasibility of adopting the selected structural reforms, (4) to draw an initial plan to structural reforms in SLR, and (5) to discuss possible recoveries against some potential risks of introducing railway structural reforms.

2. LITERATURE REVIEW

2.1 Introduction to Literature

General railway structural reforms are derived by the two axes; the vertical axis, and the horizontal axis, and the two movements; the regulation, and the deregulation. According to these two measures, there exist four prominent railway markets; (1) both vertically and horizontally integrated, (2) vertically integrated and horizontally separated, (3) vertically separated and horizontally integrated, and (4) both vertically and horizontally separated. (Ali and Eliasson, 2022)

The vertical axis concerns infrastructure management (i.e. track development and maintenance, capacity allocation, traffic control, and real estate management) and service provision (i.e. ticket issuing, and running trains), while the horizontal axis concerns the number of parties who are responsible over the same function. (Ali and Eliasson, 2022)

The most primitive rail markets are both vertically and horizontally integrated. Oftentimes, these types of markets are state-owned monopolies. The governing executive is solely responsible for both infrastructure management and service provision (Ali and Eliasson, 2022). SLR also belongs to this category.

The secondary rail markets are vertically integrated and horizontally separated (Ali and Eliasson, 2022). Horizontal separation can have two forms; one is the freight service being separated from the passenger service (i.e. functional distinction) and the other is, allocating rail services into certain

geographical areas (i.e. geographical sub-division) (Mizutani, 2004) . While most railways in the world manifest functional distinction (Ali and Eliasson, 2022), Japanese Railway (JR) especially exhibits geographical sub-division (Imahashi, 2000).

The tertiary rail markets are vertically separated and horizontally integrated. These types of rail markets are hard to find. The only practical examples are the United States passenger rail market, and the Japanese freight rail market (Ali and Eliasson, 2022). The strategy behind is cutting excessive financial burdens down, where the market share of that function is lower (Imahashi, 2000).

The most sophisticated rail markets are both vertically and horizontally separated. Here, the horizontal separation is in the form of functional distinction. Not as it seems, there can exist various types of ownership structures in this type of rail markets. (Ali and Eliasson, 2022)

As this study is conducted from a passenger rail transportation perspective, here considers three geographies, where railway structural reforms in the passenger train services are most experienced; (1) European Railways (ER) as they were subjected to most trials of reforms (Ali and Eliasson, 2022), (2) JR because Japanese regulatory affairs regarding railways before reforms were similar to the current circumstances in SLR (Mizutani, 2004), and (3) Russian railways because it discusses some potential risks of introducing railway structural reforms (Bykadorov, Kibalov and Kin, 2017).

Japan was the first to introduce railway structural reforms in their country

(Mizutani, 2004). After Sweden, other countries in the European Union (EU) followed (Ali and Eliasson, 2022). In fact, the discussion upon ERs and JR makes it to one point where railway structural reforms could be situated without being overly capitalised or nationalized. ERs discuss how to refrain railway structural reforms from capitalization, while JR discusses how to refrain railway structural reforms from nationalization.

2.2 European Railways

Early ERs were fully privatized. Private sector owned and operated railways, while managing infrastructure. Capitalised monopolies created three major issues; (1) the conflict of capacity allocation (i.e. Capacity allocators favoured companies under their same mother company, as there was a heavy competition to share the same space and time on rail tracks. Hence, entry was impossible.) (Ali and Eliasson, 2022), (2) the high rail fare (i.e. Private sector was profit-oriented. To increase the revenues, they increased rail fares that middle to low income passengers could not afford) (Preston, 1996), and (3) the unsafe travel conditions (i.e. As the private sector was profit-oriented, to cut the costs down, they avoided maintaining safety standards, putting passengers in danger.) (Preston, 1996). As a remedy, in the early 20th century, ERs were rapidly nationalized, and European national railways indicated a decline in their regulatory, operational and financial performances afterwards. The effect was allowing the private sector to enter into the railway market again. (Ali and Eliasson, 2022)

The European Commission (EC) only demanded the separation of the accounts function from other operations in the 1st directive (i.e. 91/440/EEC). Only the 3rd and 4th directives allowed the open access to domestic passenger rail services market, during the recent 2007-2016 period. Most of the recent ERs are both vertically and horizontally separated. Vertical separation is prominent. Even under the same European legislation, EU countries indicate various types of railway structural reforms. (Ali and Eliasson, 2022)

There are two most common passenger railway market structures in modern Europe; (1) organizational separation (i.e., infrastructure management, capacity allocation and service provision are done by subsidiaries under the same parent or holding company), and (2) institutional separation (i.e. infrastructure management and capacity allocation are done by a state owned institute or a governmental agency, while service provision is done by private sector companies. Among these two types, institutional separation is considered as a complete and more efficient type of vertical separation which allows objective competition. (Ali and Eliasson, 2022)

2.3 Japanese Railways

The Japanese National Railway (JNR) confronted several major conflicts as a state-owned monopoly. (1) As it depended on large government subsidies that were easily accessible, making profits was not nearly one of its major priorities. (2) The bad political influence on JNR made TUs more powerful than the management, which impeded the growth of it. (Mizutani, 2004)

(3) The high bureaucracy made even huge financial allocations inefficient. (4) The over-expansion of the administrative function made it difficult and time-consuming to come up with centralized decisions. (5) Some divisions such as the Civil Engineering Department overpowering the decision making authority of the management, made it even worse. (Mizutani, 2004)

In order to extricate JNR from its downfall, going for a market economy was a need, since the private sector could not refrain from earning profits. (Mizutani, 2004)

Even though privatisation was a must, JNR did not pursue an outright privatisation. As a first step, it was assigned under Japanese National Railway Settlement Corporation (JNRSC), which acted as a kind of stock holding company for JNR. Infrastructure management was separated from service provision (i.e. vertical separation) at an early stage. Later, passenger rail services were separated from freight rail services (i.e. functional distinction under horizontal separation) as well.

After considering the high density of population residing near the major rail lines accumulating an immense demand over commuter services in selective urban areas which were far apart from each other, later it was decided to separate JRs geographically rather than vertically. This avoided the conflict of capacity allocation on the same rail track as well (Mizutani, 2004). However, which private sector party would manage which geographical subdivision would ultimately be a decision of the government. (Imahashi, 2000; Ali and Eliasson, 2022).

JNR was incorporated into six regional subdivisions under JNRCS. They are the three Honshu JRs (i.e. JR East, JR West and JR Central), and the three Island's JRs (i.e. JR Hokkaido, JR Shikoku and JR Kyushu). The first to incorporate was the JR East in 1993, followed by JR West in 1996, JR Central in 1997. Even by 2002, only JR East was fully privatized. While the other two Honshu JRs are yet to be fully privatized, the three Island's JRs need to indicate profits if they were to be corporate.

3. RESEARCH METHODOLOGY

Considering the technical complexity of railways, this research pursues a qualitative strategy. The research methodology follows a case study since it intensely describes a unique phenomenon within a single organisation. As mentioned in the '1.3 Theory and Objectives' section, this research indicates five objectives.

The first objective is to analyse the most productive types of railway structural reforms in the world. Upon the completion of this objective, a desk research was carried out. As this study is conducted from a passenger rail transportation perspective, here considered three geographies, where railway structural reforms in the passenger train services are most experienced; (1) European Railways (ER) as they were subjected to most trials of reforms (Ali and Eliasson, 2022), (2) JR because Japanese regulatory affairs regarding railways before reforms were similar to the current circumstances in SLR (Mizutani, 2004), and (3) Russian railways because it discusses some potential risks of introducing railway structural reforms (Bykadorov, Kibalov and Kin, 2017).

The second objective that was to gather the most compatible approaches to structural reforms in SLR, and the third objective that was to qualitatively evaluate the feasibility of adopting the selected structural reforms, were fulfilled through a series of structured interviews that were conducted under the Delphi method, which accumulated individual opinions to form the most favourable opinion at the end. Considering the biased interests of the TUs in SLR, this method would escalate the objectivity of the study.

The sample of interviewees were a stratified simple random one, selected from the three engineering sub-divisions of SLR since they are the staff with the most adequate operational and managerial knowledge and skills about SLR. Among the sixteen railway engineers who were interviewed for the academic purpose of this study, eight were from the Chief Engineer (Mechanical) sub-department, six were from the Chief Engineer (Way and Works) sub-department, and the other two were from the Chief Engineer (Signaling and Telecommunication) sub-department. The characteristics of the sample are described in the table 3.1 below.

Table 3.1: Characteristics of the sample selected

Inter view ee ID	Sub Department	Subject Area
E1	The Chief Engineer (Mechanical) Office	Engineer (Mechanical)
E2	The Chief	Engineer

	Engineer (Mechanical) Office	(Electrical)
E3	The Chief Engineer (Mechanical) Office	Engineer (Mechanical)
E4	The Chief Engineer (Mechanical) Office	Engineer (Mechanical)
E5	The Chief Engineer (Mechanical) Office	Engineer (Mechanical)
E6	The Chief Engineer (Mechanical) Office	Engineer (Electrical)
E7	The Chief Engineer (Mechanical) Office	Engineer (Mechanical)
E8	The Chief Engineer (Mechanical) Office	Engineer (Electrical)
E9	The Chief Engineer (Way and Works) Office	Engineer (Design)
E10	The Chief Engineer (Way and Works) Office	Engineer (Design)

E11	The Chief Engineer (Way and Works) Office	Engineer (Bridge Works)
E12	The Chief Engineer (Way and Works) Office	Engineer (Upper District)
E13	The Chief Engineer (Way and Works) Office	Engineer (Lower District)
E14	The Chief Engineer (Way and Works) Office	Engineer (Nanu Oya)
E15	The Chief Engineer (Signalling and Telecommunication) Office	Engineer (Signalling)
E16	The Chief Engineer (Signalling and Telecommunication) Office	Engineer (Signalling)

As this case study solely focuses on SLR, and its outcomes account for social welfare, it is of high ecological value (Sekaran and

Bougie, 2016). The study area of this research is extremely unique. Consequently, there could not be much generalizability attached to this study according to Sekaran and Bougie (2016). However, the Oxford exclaims that the generalizability of a case study could not necessarily mean the wider applicability over many industries, rather the capability to generate a model out of it. If that was the argument, since this research is suggesting a general model for a deregulated rail market structure in a developing country, there would definitely be an intensive analytical value, hence, much generalizability, in this research.

After considering these four areas that are essential for the general railway structural reform policy formations, a questionnaire was prepared, consisting of eight questions on par with the research objectives. They are; (1) what the variations of the general structural reforms (i.e., market structure, entry, ownership, and competition regulations) are most suitable for the railway market in Sri Lanka, and (2) why those forms will be more compatible for SLR and country's context, (3) whether there is a capability for railway structural reforms in Sri Lanka, provided by the current economic condition (4) what the possible advantages / disadvantages that Sri Lanka would experience would be, if the nation were to adopt railway structural reforms, (5) whether the advantages / disadvantages would weigh more than the other, (6) what the possible changes that would happen in the structure of the SLR, if it were to adopt structural reforms, and (7) considering the advantages / disadvantages, and the possible changes in the structure of

the SLR, whether the suggested reforms would be worth adopting, and (8) whether the suggested railway structural reforms would have the capability to put an end to the alteration between the privatisation and the nationalization of railway market policies.

The first question of the questionnaire was a descriptive research question, while all others were exploratory research questions. (Sekaran and Bougie, 2016)

11 out of the 16 railway engineers were interviewed using the face-to-face interviewing approach, since they were on duty within the sub-department premises. The other five railway engineers were interviewed over the phone, since they were on field-duty or at outstations.

After transcribing the information from the interviews, they were analyzed according to the themes. Firstly, the responses of the similar type of questions were gathered into one place. Secondly, the major points discussed by most of the experts were identified as 'Main Themes'. Thirdly, several variations under each main theme, and the drivers of those changings were identified as 'Sub Themes'.

Using the data collected and analyzed, the fourth objective to draw an initial plan to structural reforms in SLR and the fifth objective to discuss possible recoveries against some potential risks of introducing railway structural reforms were completed, going beyond mere qualitative research.

4. FINDINGS

After going through several studies, four types of general structural reforms and 17

types of their key variations could be identified in the desk research.

Ali and Eliasson (2022) mentioned vertical and horizontal integration and separation of railway markets in their study. Mizutani and Uranishi (2020) named this first general factor as 'Market Structure'. There are four key variations to this [i.e. (1) market being both vertically and horizontally integrated, (2) market being vertically integrated and horizontally separated, (3) market being vertically separated and horizontally integrated, and (4) both market being vertically and horizontally separated. Even though these are the major types, other forms of market structure; such as, one of the competing or complementary functions being vertically or horizontally integrated, while the other being vertically or horizontally separated, could always exist (Ali and Eliasson, 2022).

Following is the concern on who owns, develops, maintains, rail infrastructure and allocates capacity and gets profited from rail operations. Misutani and Uranishi named this second general factor as 'Ownership Regulation'. Ali and Eliasson (2022) recognized five types of market ownerships; (1) being owned by the State, (2) being owned by a governmental agency, (3) being owned by a subsidiary of a parent company, (4) being owned by a subsidiary of a holding company, or (5) being owned by a non-profit organisation.

The third general factor is 'Entry Regulation' that describes how competing operators would approach the market (Mizutani and Uranishi, 2020) with the four key variants; (1) entry being franchised to a single firm (i.e., only one actor being

available in the market) (2) entry being franchised to separate companies in separate geographical areas, (3) entry being franchised to several companies to compete in the same geographical area, and (4) free entry (i.e., any desired party from private-sector could start their rail operations at any given time) (Ali and Eliasson, 2022).

The fourth general factor is ‘Competition Regulation’ that describes how operators altogether exist and act in the market (Mizutani and Uranishi, 2020) with the four key variants; (1) the monopoly (i.e., There will be only one actor per each function in the railway market, and all the actors altogether will provide complementary services for each other.), (2) the duopoly (i.e., There will be two actors per each function in the railway market, and these two actors will have to compete in winning the larger share of the passenger market for the provision of the services of that function.), (3) the limited oligopoly (i.e., There will be three or four actors per each function in the railway market, and these actors will have to compete in winning the largest share of the passenger market for the provision of the services of that function.), and (4) the unlimited oligopoly (i.e., There will be 30-40 actors per each function in the railway market, and these actors will have to compete in winning the larger share of the passenger market for the provision of the services of that function.).

After analyzing the responses of the industry experts, several main themes could be identified as the topics of discussion in this research. They are; (1) the market structure, (2) the entry into the market, (3) the ownership of railway market functions,

(4) the promotion of competition among actors in the market, (5) the impacts of railway structural reforms on the passenger market, (6) the non-operational income generation methods, (7) the areas to concern before a policy is to introduce, and (8) the organizational support to adopt railway structural reforms. A summary of the findings are in Table 4.1 below.

Table 4.2: Thematic Analysis of the Data

Theme	Respondents	No of responses	Response Rate
Need of introducing regulatory reforms in SLR	E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	16	100.00%
Vertical separation between infrastructure and operations	E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	16	100.00%
Infrastructure management	E1 E2 E4 E5 E6 E7 E8 E9	15	93.75%

under government	E10 E11 E12 E13 E14 E15 E16		
Operations privatization	E1 E2 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	15	93.75 %
Operations privatization under the control of government	E1 E2 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	15	93.75 %
Market entry franchising to several companies to compete	E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	15	93.75 %
Duopoly or limited oligopoly market	E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16	15	93.75 %

Changing SLR administrative structure from Department to Corporation or Authority	E2 E3 E4 E9 E10 E11 E12 E13 E14 E15 E16	11	68.75 %
Reducing expenses	E7 E8 E9 E10 E11 E12 E13 E15 E16	9	56.25 %
Increasing non-operating revenues	E7 E8 E9 E10 E11 E12 E13 E15 E16	9	56.25 %

Sub-themes under these categories explain what the most compatible approaches to structural reforms in SLR are.

Industry experts, in general, fully agree upon bringing structural reforms into SLR. They even explain a few reasons why SLR should be restructured. One is that in the prevailing circumstance, SLR lacks modern technologies to cope with the functions of SLR. Another reason is the over-employment of unskilled and union-wise powerful labour force within the organisation leading to inefficiencies in operations. A third reason is the traditional procedures of SLR being time-consuming.

A fourth reason is that the Government is not paying adequate attention to gain proper economic benefits from SLR.

According to them, vertical separation of managing infrastructure from providing services is essential. Most of them suggest that the authority to invest on maintenance of infrastructure should be kept with the Government.

Horizontal separation between freight and passenger rail services should be subjected to further discussion. Number of actors that are competing to operate a single function is also subjected to further discussion, but most had an idea that having two to four actors would be sufficient overall. A significant percent accepted the ideal form of a government franchisor could be an Authority or a Corporation.

When the welfare-oriented market gets converted into a profit-oriented market, there could arise some socio-economic issues as rail transportation services are unable to reach the lower income generating population. Therefore, once there lay an outline for a fully functioning blueprint for railway structural reforms, all these aspects should be taken into account. Reducing recurrent expenses and increasing non-operational costs were also mentioned in more than half of the answers.

5. DISCUSSION, CONCLUSION & IMPLICATIONS

After analyzing the collected data of this study, an ideal concept for railway structural reforms in Sri Lanka could be drafted. There, service provision would be separated from infrastructure management. Ali and Eliasson (2022) validate this choice

in their study, saying the most sophisticated and stabilized railway markets are vertically separated.

According to Abeysekara (2021), generally it will take around 20-30 years for infrastructure development investments to indicate profits. This characteristic influences most of the transportation infrastructure development projects to be undertaken by the national Governments, instead of the private-sector.

When coming to railway structural reforms, industry experts' opinion is to keep the burden of infrastructure management with the Government. Ali and Eliasson (2022) explain retaining infrastructure management within the control of the Government as an advantage to make space for the new private sector entrants into the operations rail market.

However, Preston (1996), Imahashi (2000), and Mizutani and Nakamura (2004) suggest that as an initial step, ownership, development and maintenance of rail tracks and stations, signaling and level crossings, and rolling stocks could be done by the government, while service provision could be assigned to the private sector, till the private sector gets established in the railway market, and then gradually partnering up with the private sector for maintenance and later developing of railway infrastructure. However, to avoid the conflict of capacity allocation at organizational separation, rail tracks would still be owned by the government, which would prepare train schedules as well (Ali and Eliasson, 2022).

As mentioned earlier, the private sector may have access to the operational market.

However, as Preston (1996) argued, there could incur several shortfalls of privatizing the operational aspect of railways. Fare price and safety requirements of passengers might get into conflicts with the profit orientation of the private sector. Therefore, rail operations should still be overhead by the government. On the other hand, if much pressure was put on the private sector upon reducing fare prices, they would not enter into the railway operations market. Anyhow, to cater passengers from less than standard income earning, attaching several carriages presenting economy classes could be advisable.

The control over the private sector actors could be maintained, if the market entry of the operations rail market were franchised to several actors to compete upon the same geographical area rather than providing open access. Preston's (1996) study discusses benefits of franchising rather than outright privatisation. An efficient franchise would result in optimally utilizing the existing rail infrastructure, providing a higher quality service for passengers and goods that could ensure increments in the rail market shares, and guaranteeing the maximum value for money of both the people that utilize the service, and the nation as a whole that invest on developing transportation infrastructure in railways.

Some might argue that separating responsibilities among separate parties would lead to increased transaction costs, but the revelation of links that connect parties, only made the transactions process more transparent (Preston, 1996).

As Imahashi (2000), and Mizutani and Nakamura (2004) mentioned, SLR would

not compliment a geographical subdivision approach, since the area of the whole country is smaller and that of one island. Only functional distinction would be advisable.

Freight services would be separated from passenger services. Consequently, both passenger and freight rail shares could be increased by using separate tracks. Two to four actors could compete for the provision of services under each functional distinction. However, when there would be competing operators on the same track, time and capacity conflicts among competitors may incur. Hence, the government should act as the railway's capacity allocator. This goes with Ali's and Eliasson's (2022) argument that there should be a centralized control over capacity allocations on railways.

When comparing this ideal situation to the prevailing circumstances of the nation, SLR still has a long way before converting into a sophisticated reformation. This time-consuming process will consist of two initial stages to the ultimate long-term approach, which is described as the ideal situation; (1) the short-term approaches, and (2) the medium-term approaches. The latter is discussed first for better understanding. The private sector would not prefer investing in loss-making industry, even if it was to be franchised. Therefore, indicating that profits could be made in future with real data is essential. Hence, a medium-term approach would be sensible.

As suggested by the studies, a cut off in the permanent workforce is essential, but this could incur major industrial disputes. Hence, SLR would have to maintain the

current workforce until their retirement. However, SLR could be converted into an acting agent of the government for the time being, and decrease its high bureaucracy by transforming into an Authority or a Cooperation, hiring workers on contract-basis, only when certain projects are implemented.

This acting agency character prior to railway structural reforms, is described in Mizutani's and Nakamura's (2004) study that explains how Japan implemented railway structural reforms. Japan indicated the humanist transition in the socio-cultural aspect related to privatizing a state-owned entity. The franchising agent acted as an intermediary, and smoothly transferred the dismissed employees into other governmental agencies, where the workforce would shortfall.

The short-term approach to railway structural reforms focuses on reducing expenditures and increasing revenues of SLR using the existing resources in SLR. It would also be a backup for the preparation to implement medium term strategies of railway structural reforms.

Under reducing expenses, reducing fuel expenditures were taken into account by railway engineers. Electrification of the railway network, at least within the suburban areas, was highly opinionated. To generate the amount of electricity needed for this step, the idea of setting solar panels up alongside major rail lines, and establishing minor power stations on the lands that belong to SLR was presented. This procedure does not require any affirmations from the Government since by regulations, SLR is already permitted to

produce electricity, using their own resources. SLR is the only governmental entity that is awarded with this benefit. Reducing the amount of electricity bought from the Ceylon Electricity Board (CEB) for the consumption in offices and yards also, solar panels could be set up.

Under increasing revenues, escalating non-operational revenues is highly recommended. SLR is rumoured to own most of the land area of the country in its possession. Utilizing these lands for the agricultural and purified water industries could gain extra incomes, while making a useful contribution from the workers as well. Mizutani's and Nakamura's (2004) study explains how Japanese railways gradually became a profit-gaining entity, using non-rail revenues.

After all, the most important fact for structural reforms to last long, is the retention of long-term national policies that would pull the weight of the struggling nature of transportation policies to gain profits off from their infrastructure investments. As Bykadorov, Kibalov, and Kin (2017) have mentioned, a transportation policy would only benefit after five to six years of establishment, and Russian railways recognized a rush to change the national policies before the transportation policies to cover the investment expenditures, hindering the transportation infrastructure from making profits (Bykadorov, Kibalov, and Kin, 2017).

Therefore, having efficient long-term national transportation policies, would highly support to benefit from railway structural reforms in Sri Lanka. It does not

necessarily mean that not having strong transportation policies decades prior to railway structural reforms is a must as they can be gradually developed over the process of reformation. Nonetheless, after imposing a good harmonization of policies, it would be appreciable to wait upon a minimum of 20 years without doing major subjective changes to it other than the routine monitoring, reviewing, and controlling procedure.

Anyway, still none of the countries could establish an equilibrium between nationalization and privatisation. The separation or integration is always subjected to trial and error. The only way to find the equilibrium is not oscillating between the two dead ends as governments may change, but closely monitoring and testing the minor changes between the most probable points to variate the efficiency of a reformation in between.

Still, the overall advantage of railway structural reforms to the Sri Lankan economy seem to bring about a net surplus, outdoing all its disadvantages, making SLR structural reforms advisable.

On a final note, this study only discusses a general approach toward railway structural reforms in Sri Lanka as an introduction to the topic. Since this is completed as transportation logistics research, it might obviously lack in the technical, legal, political, human resources, and many other factors that might relate to structural reforms. Hence, future researchers could go into in depth analyses of each section in this study, find other undiscovered aspects, and contribute to strengthen the foundation for the best approach to implement railway

structural reforms in Sri Lanka. However, as Kesavan et al., (2015) mentioned, contributing to the future development of Sri Lanka, should be one crucial characteristic of each study.

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