Perera, M.A.K.N., Nazeer, F.S. and De Alwis A.M.L., 2023. The customer satisfaction on the railway infrastructure in Sri Lanka: A study on railway stations. In: Sandanayake, Y.G., Waidyasekara, K.G.A.S., Ramachandra, T. and Ranadewa, K.A.T.O. (eds). *Proceedings of the 11th World Construction Symposium*, 21-22 July 2023, Sri Lanka. [Online]. pp. 1039-1048. DOI: https://doi.org/10.31705/WCS.2023.83. Available from: https://ciobwcs.com/papers/

THE CUSTOMER SATISFACTION ON THE RAILWAY INFRASTRUCTURE IN SRI LANKA: A STUDY ON RAILWAY STATIONS

M.A.K.N. Perera[1], F.S. Nazeer[2] and A.M.L. De Alwis[3]

ABSTRACT

Railway infrastructure is one of the core items of railway systems, which ensures the quality and efficiency of the service. As it appears, the railway infrastructure in Sri Lanka is not well maintained. This underperforming situation can lead to a considerable negative impact on the satisfaction of railway users. Hence, conducting an in-depth investigation on customer satisfaction in railway stations under railway infrastructure in Sri Lanka is a timely requirement. Thus, this study aimed to investigate the present customer satisfaction level at Sri Lankan railway stations. Specifically, this study focuses on improving customer satisfaction at railway stations based on the services and facilities provided. A comprehensive literature review has been conducted to review the railway infrastructure, Sri Lankan Railways (SLR), facilities and services provided by SLR, and factors that affect customer satisfaction. Further, data was collected through the distribution of a questionnaire survey among a sample of railway users. The quantitative research approach was undertaken to derive reliable outcomes with the support of RII analysis. As per the key findings, customer satisfaction on railway stations remains in a low to medium level based on several factors. The key issues recorded under the facilities and services of railway stations are delays in train arrival, uncleaned condition, and lack of data sharing.

Keywords: *Customer Satisfaction; Facilities and Services; Railway Infrastructure; Railway Stations; Sri Lanka Railways (SLR).*

1. INTRODUCTION

The railway infrastructure is the foundation of which the railway system is built (Market Data Forcast, 2022). It ensures that trains run safely, steadily, and reliably with greater railway scale and speed, and higher demands are placed on railway infrastructure maintenance quality (International Union of Railway, 2021). However, the railway infrastructure system is very complex, it covers a large distance, has a greater number of supporting components and structural layers to safe and dependable services for customers and freight (Kaewunrune et al., 2015). Moreover, various types of railway infrastructure can be identified such as railway stations, bridges, viaducts, equipment, railway drainage systems and electrification systems (Ueda et al., 2003).

[1] Undergraduate, Department of Building Economic, University of Moratuwa, Sri Lanka, kameshi0812@gmail.com
[2] Lecture, Department of Facilities Management, University of Moratuwa, Sri Lanka, Shabrina@uom.lk
[3] Lecture, Department of Facilities Management, University of Moratuwa, Sri Lanka, madinia@uom.lk

The railway infrastructure influence customer satisfaction and the quality of railway services as well (Sooriyabandara & Hewage, 2015). In terms of the combination of customer satisfaction and railway infrastructure, railway station is an important location, which are being stopped for passengers on their journey (Hagen, 2015). Further to the author, improving the quality of railway stations has a significant impact on passenger satisfaction with train travel. Thus, customers' needs are critical in improving the quality of a train journey, including the use of railway stations to design user-friendly railway stations. Hence, it is important to determine what passengers find appealing and what aspects are most important.

In Sri Lanka, 'Sri Lanka Railways' (SLR) is the government department functioning under the Ministry of Transport, which is a major transport service provider and is the only rail transport organisation in the country (Sri Lanka Railways, 2023). It is solely responsible for providing transport service and railway infrastructure in Sri Lanka. The SLR is the owner of all the railway tracks and other railway infrastructure (Damsara & Srisoma, 2019). The department transport around 135 million people per year (The Central Bank of Sri Lanka, 2019). Further, the railway transportation of daily commuters to their workplaces is unavoidable in Sri Lanka (Ministry of Transport and Highway, 2022). Each day, the railway transports over 3.72 million people via 396 trains, including 67 long-distance and 16 intercity trains (Ministry of Transport and Highway, 2022).

However, the people are not appealing to the railway services in the country, simply because of the quality issues, and hence, it affects passenger intentions to use railway service (Ranawana & Hewage, 2015). Similarly, most railway users are not much satisfied with the services and quality of railway stations (Randiwela & Jayaweera, 2017). The authors further elaborated that Sri Lankan railway customers are particularly unsatisfied with the services and facilities in railway stations.

As observed, railway stations create a high impact on the level of customer satisfaction. Therefore, this study focuses on the current facilities and services, which are provided by SLR for railway users and evaluates the level of customer satisfaction for each service and facility provided by them for their customers. Further, this research is provided with information relating to the current condition of railway stations in Sri Lanka. Since the scope of this research aligned with assessing customer satisfaction with public railway infrastructure in Sri Lanka, the level of customer satisfaction on the services and facilities provided by railway stations in Sri Lanka was assessed under railway infrastructure. Accordingly, this research paper is reflected the current customer satisfaction level and factors, which are affected the level of customer satisfaction in the railway stations in Sri Lanka.

2. LITERATURE REVIEW

2.1 RAILWAY INFRASTRUCTURE

The infrastructure of transportation is one of the main factors in the nation's assets portfolio in every country (Dimitriou & Sartzetaki, 2016). Further, railway infrastructure is a very complicated and multi-disciplinary engineering system that includes structures, steelwork, timberwork, bridges, and tunnels which support giving flexible guidance for the railway system (The railway Technical, 2019). Over the past century, rail transportation has developed comparatively most sufficiently than ever (Kaewunruen et al., 2015). Further to the authors, the key social and environmental benefits of rail travel

include, minimising carbon emissions, less traffic congestion, minimising traffic fatalities and increased usage of land. Similarly, railways as a form of mass transit have distinctive features such as large capacity and high safety standards and are free of traffic congestion (Brons et al., 2009). According to Fulmer (2018), the types of railway infrastructure in the world can be categorised as railway stations, railway tracks, bridges, tunnels and railway yards.

According to various railway infrastructure, railway stations are the main parts of the railway service, which directly holds the passenger crowd (Sideris et al., 2015). Further, the contradictions between the facilities provided by railway stations and the requirements of the population are the main factors which affect customer satisfaction with railway service (Brons et al., 2009).

2.2 CUSTOMER SATISFACTION WITH RAILWAY INFRASTRUCTURE

Satisfaction of the customer is the key to success, and it is heavily influenced by the actions of front-line service providers (Lee et al., 2016). Further to the author, the customers should be treated like assets, by respecting their different needs, preferences, and habits. In terms of railway transportation, the quality of the services is the main factor for increasing customer satisfaction; at the same time the quality of railway transportation is based on the quality of the railway infrastructure (Zitrický et al., 2015). The authors further stated that safety, quality, flexibility, and efficiency are the main factors for increasing customer satisfaction in the railway system in a country. Further, the evaluation of customer satisfaction is more important for the railway system, to make decisions regarding improving railway facilities in the railway system, adjusting the railway trip provided, openings of new railway stations and capacity changes for passengers (Chandrasena & Silva, 2019). When referring the customer satisfaction with railway infrastructure is ideal to move with the railway stations (Hagen, 2015; Petrovic et al., 2010; Randiwela & Jayaweera, 2017).

2.3 SRI LANKAN RAILWAYS (SLR)

The railway of Sri Lanka is one of Asia's oldest rail networks, recently celebrated its 150th anniversary. Considering the history of the railway in Sri Lanka, rail transportation was introduced by the British to transfer the coffee plantation from Kandy to Colombo port because coffee is most famous in a European country and on the world market (Sri Lanka Railways, 2011). After the development of road transportation, the revenue from railway transportation become lost, and also the SLR operated with losses (Jayasinghe & Pathiranage, 2013). Nevertheless, the SLR has survived more than 150 years even with losses due to the everyday commuters such as workers, students and tourists (Sri Lanka Railways, 2011). The SLR is now customer-focused and has a market share of roughly 6.0% for passenger travel and 0.7% for goods travel and it is inescapable that it will transport daily commuters in Sri Lanka to their places of employment. In addition, Sri Lanka has a monopoly market regarding the railway system (Yaparathna & Ratnajeewa, 2018). Most countries use electrical railway systems even before the 20th century, but still, Sri Lanka uses diesel engines for railway transportation (Halpita et al., 2011).

2.3.1 Railway Stations in Sri Lanka

In Sri Lanka, there are 167 main railway stations,153 substations, and 40 train halts combined (Sri Lanka Railways, 2014). Most of the railway stations were built by the

British during the British colonial period; however, still, Sri Lanka is using the railway station built by the British (Samarasinghe & Jayasinghe, 2019). Even though railway stations represent the unique social character and culture in the area for instance, compared to coastal line railway construction, upcountry railway line construction is substantially more enclosed (Samarasinghe & Jayasinghe, 2019). However, the Sri Lankan railway station architecture design is closer to the European railway design (Samarasinghe & Jayasinghe, 2019). The Colombo Fort is the main and first railway station, as well as this station, was constructed and put into use in 1980 (Sri Lanka Railways, 2011). At present Colombo Fort operates ten railway platforms and also serves 0.2 million passengers per day consisting of cafeterias, changing rooms, passenger waiting areas, and so on. Further, disabled passengers can use special accommodations at some of the railway stations (Sri Lanka Railways, 2011).

2.4 FACILITIES AND SERVICES IN SRI LANKA RAILWAYS STATIONS

Facilities and services of the railway stations support to attract people for the railway service (Masirin et al., 2016). The facilities and services to be provided in railway stations as per Randiwela and Jayaweera (2017) and Sri Lanka Railways (2022) are listed below:

- Seat reservation and ticketing services,
- Season ticketing services,
- Providing information (customer information screens),
- Waiting room facility,
- facilities (separate and common toilets),
- Seating facilities in stations,
- Retaining room facilities,
- Canteen facilities,
- Safety lockers facilities,
- Wi-fi facilities, and
- Disability access to railway stations.

2.5 CUSTOMER SATISFACTION FOR SERVICES AND FACILITIES IN SRI LANKA RAILWAY STATIONS

In SLR, passengers are mostly considering the schedule of the train, cancellation of the train, availability of facilities in stations and trains, accessibility, and safety of the railway system (Randiwela & Jayaweera, 2017). In that case, most of the customers are not much satisfied with the services and facilities provided by the SLR stations (Chandrasena & Silva, 2019). Due to that reason, this study is focused on identifying the significant factors that affect railway customer satisfaction in Sri Lanka. However, a lack of studies had been carried out to improve customer satisfaction in public railway stations in Sri Lanka. Therefore, this research focuses on filling that gap. The most common issues in services and facilities in railway stations, which impact customer satisfaction observed from the literature were tabulated in Table 1.

Table 1: Issues in services and facilities in railway stations

Issues in Services and Facilities in Railway Stations	References
• Antiquated ticket-issuing procedures and information-providing procedures • Less number of customer information screens	(Chandrasena & Silva, 2019)

Issues in Services and Facilities in Railway Stations	References
• There is no suitable procedure for reserving suitable seats based on passenger preference	(Mihiranga et al., 2021)
• Disabled people, there is no access to enter the train by wheelchair • No well-programmed seat reservation process at the railway stations • Available restrooms and waiting rooms in stations are not consistently cleaned	(Praja, 2019)
• Delays of the trains • Unclear information • Security issues • Issues with seating facilities	(Sunarto, 2009).
• Toilets in the railway station are in poor cleaning condition. • Restroom, retaining room and platforms are not cleaned	(Warakapitiy, 2016)

3. RESEARCH METHODOLOGY

In terms of assessing customer satisfaction with railway stations, it was recommended to cover a considerable size of sample from SLR users. In this regard, a quantitative survey is the best option if the researcher needs to make inferences from a representative data set (Rouse, 2017). In terms of research approaches, the quantitative approach supports drawing results from a large population (Neuman, 2011). Therefore, the quantitative research approach was used to continue the study. As well as many researchers mentioned, between 30-500 is a sufficient sample size for collecting the data through a quantitative questionnaire survey and this sample size is appropriate for the selection of a sample using the random sampling method (Delice, 2002). Therefore, the group of 40 railway users were used as the sample via the random sampling method by vising the Western province railway stations in Sri Lanka. Regarding the evaluation of customer satisfaction with services and facilities in railway infrastructure, the RII method was used. Further, for calculating the RII, a quantitative questionnaire survey was conducted (Azman, et al., 2019).

According to Fernando (2010), the satisfaction level was ranked as high level, medium level and low level based on the result of analysis of RII,

- Low Level (RII<50%),
- Medium Level (50%<RII<70%),
- High Level (RII>70%).

According to Akadiri (2011) and Hamdoun (2021), five impact and importance levels are identified from the RII value. Such values are presented in Table 2.

Table 2: RII value for impact level

Value	Impact/Importance
$0.8 \leq RII \leq 1$	High
$0.6 \leq RII < 0.8$	High-Medium
$0.4 \leq RII < 0.6$	Medium
$0.2 \leq RII < 0.4$	Medium- Low

Considering identified issues in railway stations, the above-mentioned table was used as a reference table for categorising the level of impact of each issue on customer satisfaction. This study will be a representative of the current facilities and services which are provided by SLR for railway users and evaluates the level of customer satisfaction for each service and facility provided by SLR for their customers. As a whole, this research is provided overall information relating to the current condition of all the railway stations in Sri Lanka.

4. RESEARCH FINDINGS

4.1 LEVEL OF CUSTOMER SATISFACTION FOR SERVICES AND FACILITIES IN RAILWAY STATIONS IN SRI LANKA

When considering evaluating customer satisfaction, the Likert scale was applied. The RII values given in Table 3 are used to rank the level of satisfaction at railway stations.

Table 3: RII value for level of customer satisfaction

RII value	Satisfaction Rank
RII < 50 %	Low
50%< RII<70%	Medium
RII > 70%	High

Adapted from: (Fernando , 2010).

Literature findings on the services and facilities available in railway stations were used to assess the level of customer satisfaction. The findings were analysed by using the RII analysis method. According to the satisfaction categories in Table 3, the satisfaction of the railway customers are calculated and presented in Table 4.

Table 4: Customer satisfaction level on service and facilities in railway stations

Services and Facilities in Railway Stations	RII	Percentage of RII (%)	Satisfaction level
Seat reservation and ticketing services	0.67	67	Medium
Season ticketing services	0.62	62	Medium
Providing information (customer information screens)	0.50	50	Medium
Waiting room facility	0.47	47	Low
Toilet facilities (separate and common toilets)	0.46	46	Low
Seating facilities in stations	0.50	50	Medium
Retaining room facilities	0.525	52.5	Medium
Canteen facilities	0.354	35.4	Low
Safety lockers facilities	0.28	28	Low
Wi-fi facilities	0.314	31.4	Low
Disability access to railway stations	0.56	56	Medium

Considering the final result of the survey carried out for identifying the level of customer satisfaction, it was identified all factors in medium and low-level customer satisfaction.

According to that results, SLR customers are not highly satisfied with the services and facilities provided by railway stations. Further, "seat reservation and ticketing services (RII value - 0.67)" and "season ticketing service (0.62 RII)" these two factors in a medium level of customer satisfaction as well as comparing other factors these two factors had the highest RII value. However, "customer information screens (0.50 RII value)", "seating facilities (RII - 0.50), retaining room facilities (RII 0.525)" and "disability access facilities (RII - 0.56)" are in the broader line of the medium satisfaction level and those are closer to the lower satisfaction level. Moreover, "waiting room facilities (RII - 0.47)", and "toilet facilities (RII - 0.46)" in a low customer satisfaction level as well as "canteen facilities", "safety lockers" and "Wi-Fi facilities" had very low RII values compared to other facilities and services. As well as above-mentioned three factors also have lower customer satisfaction levels. Considering the findings of the questionnaire survey, the minimum range of RII value factors (<50%) needs more attention.

4.2 EVALUATE THE IMPACT OF ISSUES IN CURRENT SERVICES AND FACILITIES IN SRI LANKA RAILWAYS STATIONS

Literature findings on the issues faced by railway users in the railway station's services and facilities were used to assess the current existence of those issues, based on the customer experiences. The findings were analysed by using the RII analysis method. According to the availability of issues the impact categories in Table 2 (Akadiri, 2011; Hamdoun 2021) were used. The impact of those issues on customer satisfaction at the railway stations was tabulated in Table 5.

Table 5: Impact level of issues in services and facilities in railway stations

Issues in Services and Facilities in Railway Stations	RII	Rank	Impact Level
Poor quality of ticketing service (Antiquated ticket issuing procedures)	0.474	10	Medium
No proper procedure for the reservation of a seat based on passenger preference	0.560	8	Medium
Lack of availability in customer information screens	0.702	4	High-medium
Available restrooms and waiting rooms in stations are insufficient and uncleaned	0.782	2	High-medium
No access for disabled people, to enter the train by wheelchair.	0.514	9	Medium
Poor cleaning condition in platforms	0.697	5	High-medium
Limited seating facilities and poor quality of seating facilities	0.691	6	High-medium
Security problems in railway stations	0.617	7	High-medium
Lack of information provided by stations to customers	0.702	3	High-medium
Poor cleaning condition in toilets	0.862	1	High

Based on the outcome of the survey, the RII was applied to rank the items based on their impact level. According to the rank "Poor cleaning condition in toilets (0.862)" is the highest rank factor based on the RII analysis. Further, this issue is a high impact on customer satisfaction. The second highest factor is "Available restrooms and waiting rooms in stations are insufficient and cleaned (0.782)". The next impactable factor on customer

satisfaction is “Lack of information provided to customers” and “lack of availability of customers information screens in railway station” Both these factors have the same RII value such value is 0.702. Further, ranks 5 to 7 have the same range of RII value which has a high-medium impact on customer satisfaction. Moreover, rank 8, and 9 have low RII value than other RII rank value and these two factors have a medium impact on customer satisfaction. However, rank 10 is the lower rank of this study and it is 0.474 regarding the “poor quality of the ticketing system”. Further, this factor has a low impact on railway customer satisfaction based on the RII value table.

Considering the above-discussed issues based on RII value, the highest RII values should need high priority than other factors. According to this study “poor cleaning condition of toilets” and “insufficient and uncleaned condition of available restrooms and waiting rooms in stations” are the main dissatisfied areas of the customers.

5. CONCLUSIONS

Sri Lanka is a mixed economic country and most of the services and goods are provided by the government of the country. Further, this mixed economy always focused on the customers while providing services and goods. Considering customer, satisfaction is the benchmark for identifying the quality of services and facilities. The railway is the main transportation service in Sri Lanka. Also, this railway service directly aligns with the customers who have used the railway as their transportation media for different purposes. Therefore, evaluating customer satisfaction with the railway is useful to identify the quality of the SLR service. Hence, most foreign customers also use this railway as their transportation mode. Most customer-aligned railway infrastructure are railway stations. Therefore, this study focuses on evaluating customer satisfaction with railway stations under the services and facilities provided. According to the research finding literature review useful to identify the facilities and services provided by the railway stations in Sri Lanka as well as through the literature review identified the significant factor which is impact on customer satisfaction. Further, the RII method is used to evaluate the level of customer satisfaction and identify the Identity impact level for each factor (issue) for customer satisfaction. Based on research findings most customers are not much satisfied with the services and facilities provided by SLR and most of the services and facilities have low satisfaction levels on research analysis. Considering the factors which impact customer satisfaction, these factors were ranked based on RII value and this research paper presents the RII rank of each identified factor. Moreover, this research provides a clear understanding to users of this research regarding the current satisfaction level for each service and facilities are provided by railway stations also this research is useful for identifying the main factor which affects the level of customer satisfaction. Further, this research paper reflects the current condition of all railway stations in Sri Lanka.

6. REFERENCES

Azman, N. S., Ramli, M. Z., Razman, R., Zawawi, H., Ismail, I. N., & Isa, M. R. (2019). Relative Importance Index (RII) in Ranking of Quality Factors on Industrialised Building System (IBS) Project in Malaysia. *5th International Conference on Green Design and Manufacture*, pp. 1-7. AIP Publishing.

Brons, M., Givoin, M., & Rietveld, P. (2009). Access to railway stations and their potential in increasing rail use. *Transportation Research Part A*, pp.136-149.

Chandrasena, P., & Silva, G. D. (2019). A Study of Finding Choice Modle for Class-Wise Railway Passenger Demand for Sri Lanka Railways. *Transport Reserach Forum*, pp.47-49. Retrieved from https://uom.lk/sites/default/files/civil/files/TRF 2019_0.pdf#page=69.

Damsara, K., & Srisoma, R. (2019). Analysis of Punctuality in Railway Transportation; Coastal Railway Line Sri Lanka. *Annual Sessions of IESL*, pp.398-394.

Delice, A. (2002). The Sampling Issues in Quantitative Research. *Educational Sciences Theory & Practice*, pp.1-18.

Dimitriou, D. J., & Sartzetaki, M. F. (2016). A decision framework for cross-border railway infrastructure project. *International Journal of Industrial and System Engineering*, *10*(11), pp.3658-3663.

Fernando , K. (2010). *Data Analysis - Analysis Using RII Method.* University of Moratuwa. Retrieved from http://dl.lib.uom.lk/bitstream/handle/123/10399/pre-text.pdf?sequence=3

Fulmer, J. E. (2018). *What in the world is infrastructure? Infrastructure Investor.* Retrieved from https://30kwe1si3or29z2y020bgbet-wpengine.netdna-ssl.com/wp-content/uploads/2018/03/what-in-the-world-is-infrastructure.pdf.

Halpita, A., & Thelijjagoda, S. (2011). An exploratory study on how technology makes changes in railway transportation in Sri Lanka. *Proceedings of the Annual Research Symposium* (p. 55). Faculty of Graduate Studies, University of Kelaniya.

Hagen, M. V. (2015). Effect of Station Improvement Measures on Customer Satisfaction. *Journal of Traffic and Transportation Engineering 3*, pp.7-18.

International Union of Railway. (2021, 01 01). *railway infrastructure maintenance strategy for different operation needs in Asia-Pacific*. Retrieved from International Union of Railway: https://uic.org/projects/article/railway-infrastructure-maintenance-strategy-for-different-operation-needs-in#Project-information.

Jayasinghe, A., & Pathiranage, N. (2013). *Connectivity Analysis as an Alternative Predictor of Transit Demand: The case of Railway Network*, [Unpublished Master's theses] University of Moratuwa. http://dl.lib.uom.lk/bitstream/handle/123/18802/05.Amila%20Jayasinghe%2CNirosha%20Pathiranage.pdf?sequence=2&isAllowed=y

Kaewunruen, S., Sussman, J. M., & Einstein, H. H. (2015). Strategic framework to achieve carbon-efficient construction and maintenance of railway infrastructure systems. *Frontiers in Environmental Science*, 3, 6. doi: 10.3389/fmats.2014.00008

Lee, Y. C., Wang, Y. C., Lu, S. C., Hsieh, Y. F., Chien, C. H., Tsai, S. B., & Dong, W. (2016). An empirical research on customer satisfaction study: A consideration of different levels of performance. *SpringerPlus*, 5(1), pp.1-9.

Market Data Forcast. (2022, January). *Railway Infrastructure Market*. Retrieved from Market Data Forcast: https://www.marketdataforecast.com/market-reports/rail-infrastructure-market.

Masirin, M. I., Fuad, I. I., & Nordin, N. h. (2016). Railway Station Facilities in Rural and Urban Services Based on Observation and User Feedback. *METEC Web of Conferences*. doi:10.1051/matecconf/20164703012.

Mihiranga, G., Weerasooriya, W., Palliyaguruge, T., Gunasekera, P., & Gamage, M. (2021). User-friendly Enhanced machine learning-based railway management system for Sri Lanka. *2021 IEEE 12th Annual information technology, electronics and Mobile communication conference*, pp.441-447.

Ministry of Transport and Highways. (2022, August 10). *Sri Lanka Railways*. Retrieved from Ministry of Transport and Highways: https://www.transport.gov.lk/web/index.php?option=com_content&view=article&id=104&Itemid=193&lang=en.

Neuman, W. L. (2011). Social research methods: Qualitative and quantitative approaches. Boston, Allyn & Bacon.

Petrović, M., Jenić, V., & Kaužljar, D. (2010). The role of railway stations in increasing transport demand. *WIT Transactions on the Built Environment,* 111, pp.249-260.

Praja. (2019, June 18). *Smart ticketing machines for Substandard Railway Station in Sri Lanka*. Retrieved from Praja.: https://praja.lk/english/smart-ticketing-machines-for-substandard-railway-stations-in-sri-lanka/.

Ranawana, H., & Hewage, D. (2015). Factors Affecting Service Quality in Pubic Bus Transportation in Sri Lanka.*8th international research conference, KDU*, pp.103-109.

Randiwela, P., & Jayaweera, S. (2017). Tourists' attitude toward railway transport services in Sri Lanka. *Oxford Business & Economic Conference*.

Sooriyabandara , C., & Hewage , D. (2015). Analysis of factors affecting passenger satisfaction on service quality in public Transporation in Sri Lanka. *proceedings*, pp.178-185.

Samarasinghe, A., & Jayasinghe, S. (2019). Hierarchical identity and space; a study on long surviving railway station interior in Sri Lanka. *Faculty of Architecture Research Unit (FARU), University of Moratuwa*, pp.307-315.

Sideris, A. L., Taylor, B. D., & Voulgaris, C. T. (2015). Passenger flows in underground railway stations and platforms. *Mineta Transportation Institute Report*.12-43. Retrieved from https://scholarworks.sjsu.edu/mti_publications/120/.

Sri Lanka Railways. (2011, October 07). *Colombo Fort Railway Station*. Retrieved from Sri Lanka Railways: http://www.railway.gov.lk.

Sri Lanka Railways. (2014). *Performance Report.* Colombo: *Departement of Sri Lanka Railway*.Retrieved from https://parliament.lk/uploads/documents/paperspresented/performance-report-department-of-srilanka-railway-2014.pdf.

Sri Lanka Railways. (2022, March 22). *Our Services*. Retrieved from Sri Lanka Railways: http://www.railway.gov.lk/web/index.php?option=com_content&view=article&id=289&Itemid=62&lang=en.

Sri Lanka Railways. (2023, Jul 15). *Overview*. Retrieved from Sri Lanka Railways: http://www.railway.gov.lk/web/index.php?option=com_content&view=article&id=138&Itemid=176&lang=en.

Sunarto, R. S. (2009). *Contractual Governance of Indonesia Railway System Case Study: Customer Satisfaction in Jabodetabek Area Vs Varmlandstrafik AB.* Karlstad University, Service Science Program.

The Central Bank of Sri Lanka. (2019). *Economic and Social Statistics of Sri Lanka. Colombo: Lanka.* The Central Bank of Sri Lanka, Retrieved from https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/statistics/otherpub/ess_2019_e.pdf.

The railway Technical. (2019). *Infrastructure*. Retrieved from The railway technical website:https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.railway-technical.com/infrastructure/&ved=2ahUKEwjA-96rso_6AhVIynMBHRenBiYQtwJ6BAh0EAE&usg=AOvVaw3bh1E9Rq6Y54YaGgl04Ob8.

Ueda, H., Miyauchi, T., & Tsujimura, T. (2003). Applications of Lifecycle assessment to Shinkanses vehicles and cross ties in Japan. *Proc.Inst.Mech.Eng.J.Rail Rapid Transit*, pp.217-278.

Warakapitiy, K. (2016, January 31). *Discrimination: Local push for toilet equality at Railway Station*. Retrieved from https://www.sundaytimes.lk/160131/news/discrimination-locals-push-for-toilet-equality-at-railway-stations-181343.html.

Yadav, A. (2022, July 20). *Essay on Railway Station*. Retrieved from EssayBanyan.com:https://www.essaybanyan.com/essay/essay-on-railway-station/.

Yaparathna, H., & Ratnajeewa, D.R. (2018). Analysis of factors affecting customer satisfaction with rail transits and intermodal connectivity in Sri Lanka [Extended Abstract]. In T.L. Gunaruwan (Ed.), *Proceedings of 3rd International Conference on Research for Transport and Logistics Industry 2018* (pp.117-121). Sri Lanka Society of Transport and Logistics.

Zitrický, V., Gasparik, J., & Peceny , L. (2015). The methodology of rating quality standards in regional passenger transport. *BazTech*, pp.59-72. Retrieved from https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-081f5ade-9426-4016-a891-1a8b5e09087a.