



Research for Transport and Logistics Industry

Proceedings of the 3rd International Conference

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Message from the President of Sri Lanka Society of Transport and Logistics (SLSTL)

The continuation of the International Conference for R4TLI - Research for Transport and Logistics Industry for the 3rd consecutive year is an effort to bridge the gap between academia and industry that exists in many developing countries.



The SLSTL also during this year secured hosting the 13th International Conference of the Eastern Asia Society for Transport Studies (EASTS) in September 2019 to be held at the Water's Edge Hotel, Battaramulla which will be run concurrent with R4TLI 2019. This will be an exciting time for the transport community in Sri Lanka as it will bring around 600 international transport sector researchers from over 19 countries across Asia.

A panel of international reviewers from Australia, Canada, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, United States of America, United Kingdom have assisted to carry out double blind reviews and recommend papers for presentation. While 58 abstracts were received, only 34 were accepted for presentation. Around 15 authors have been invited to submit full papers.

I am encouraged by the assistance given by the membership of the Sri Lanka Society of Transport and Logistics (SLSTL). The unstinted financial support from the industry lead by the Walkers CML who have partnered R4TLI for the third successive year and the enthusiastic sponsorship received for the research awards from several leading establishments in the field of transport and logistics has been overwhelming. The sponsorship of PickMe for the Showcase events is also note while acknowledging their commitment toward transport sector research and sustainability.

I also wish to place on record the assistance received from the Conference Chair Dr T Sivakumar and the Organising Committee as well as the Editorial chair Dr T L Gunaruwan who has been assisted by the Editorial Team which has greatly contributed to making this conference a success. The support extended by the Eastern Asia Society for Transport Studies (EASTS) and the personal attendance at the conference by its office bearers is also greatly appreciated.

Amal S Kumarage, PhD

President

Sri Lanka Society of Transport and Logistics

Message from the Chief Guest

I consider it an honour to participate in the proceedings of the 3rd International Conference on Research for Transport and Logistics Industry (R4TLI) organized by the Sri Lanka Society for Transport and Logistics (SLSTL). As someone who values policy-relevant research and who is committed to evidence-based policy, I am very pleased to support the activities of SLSTL.



Transport and logistics affect the lives of all of us and are a critical to the proper functioning of the economy. As a lower-middle-income country where disposable incomes are increasing but infrastructure development, especially with regard to provision of efficient public transport, is lagging, we are reminded of their importance every day. LIRNEasia's engagement with transport has been primarily in the area of extracting policy-relevant insights from big data in the areas of urban design and transport. We know that data alone is not a solution. But we believe that data can be a critical input to holistic solutions. We are pleased by the openness to these conversations on the part of urban and transport planners in Sri Lanka and the region. We believe conferences such as R4TLI can advance the needed understandings.

I extend my warm good wishes for a fruitful conference.

Prof Rohan Samarajiva

Founder Chair, LIRNEasia

Chair, ICT Agency of Sri Lanka

Message from the President of the Eastern Asia Society for Transportation Studies (EASTS)

I am pleased to extend, on the behalf of Eastern Asia Society for Transportation Studies (EASTS: www.easts.info), the warmest congratulations to the 3rd international conference of SLSTL, Research for Transport & Logistics Industry (R4TLI 2018).



EASTS was founded in November 1994 with 13 countries/regions in Eastern Asia. As of September 2015, the member domestic societies join from 19 countries/regions, including Sri Lanka. The primary objective of EASTS is to foster and support excellence in transportation research and practice. Under the objectives, EASTS is organizing biennial International Conferences. Since the 1st Conference held in Manila, Philippines in 1995, 12 conferences were held in EASTS area and provided great opportunities to enrich participants' professional knowledge. The 13th EASTS conference will be held in September 2019 in WatersEdge hotel, Battaramulla, Sri Lank partnering with SLSTL.

We believe SLSTL has contributed significantly in Sri Lanka and could be a more essential key player throughout the world. I believe SLSTL has significant potential and will thrive more with your continuous support and contribution.

Once again, congratulations to the third international conference.

Tetsuo Yai

President of EASTS

Professor, Dr of Eng., Tokyo Institute of Technology

Message from the R4TLI 2018 Conference Co-Chairperson

I am pleased to continue to be associated with the 3rd international conference on “Research for Transport and Logistics Industry (R4TLI 2018)” to be held in Sri Lanka in July 2018, organized by the Sri Lanka Society of Transport and Logistics (SLSTL). As the Co-Chair of the Scientific Committee it was satisfying to have received 58 abstracts of which 34 have been accepted for presentation at the conference. The submissions which have been accepted are of high quality and cover a wide range of topics from theoretical to practical applications as well as logistics to passenger transportation. I am very confident that the R4TLI 2018 will be an outstanding success as in the past years.



I congratulate Prof. Amal Kumarage, Dr T L Gunaruwan, and others for organizing this international conference that will have an impact on academia and industry beyond the shores of Sri Lanka.

S C (Chan) Wirasinghe

Co-Chair, Scientific Committee

Professor of Civil Engineering

Founding Dean (Emeritus) Schulich School of Engineering

Message from the R4TLI 2018 Conference Chairperson

I am honoured and delighted to welcome you to Research for Transport & Logistics Industry (R4TLI: www.slstl.lk/r4tli-2018), the 3rd Annual International Conference on Transport and Logistics organized by the SLSTL partnering with Walkers CML. R4TLI is an initiative that endeavours to promote research and development in the transport & logistics sector in Sri Lanka and the region that would help diagnose its current issues and identify potential improvements based on scientific evidence. This annual research conference intends to build a platform where the needs of the industry can be discussed and scientific processes developed for rectification of issues that can be showcased through research presentations.



R4TLI2018 continues the R4TLI tradition of high-quality though the rigorous review and publication process lead by Editorial chair, Dr T L Gunaruwan from the University of Colombo, Sri Lanka and Co-Chair of scientific committee - Prof Chan Wirasinghe from the University of Calgary, Canada. R4TLI 2018 is organized as a set of tracks in Warehouse Management; Logistics Operations; Bus Transport; Transport Planning; Shipping Operations and Management; Road Infrastructure; Urban Transport; Supply Chain Management; Freight Transport planning; Road Safety; Rail Transport.

We are honoured to have Dr. Rohan Samarajiva, Chair of the ICT Agency of Sri Lanka/founding Chair of LIRNEasia as our Chief Guest to grace this occasion. We are also privileged to have Prof Amal S Kumarage, Senior Professor/ President of SLSTL and Prof Naohiko HIBINO, National Graduate Institute for Policy Studies (GRIPS), Japan as our key note speakers of this conference. We are also fortunate to have two more industry come forward to showcase their best practices from Transport and Logistics Industry in Sri Lanka.

The successful organization of this conference has required the talents, dedication and time of many. I would like to acknowledge Board members of SLSTL, Board members of EASTS, members of organizing committee, Editorial committee, scientific committee, Photographic exhibition committee, industry sponsors, session chairs, session judges, all volunteers, Hotel Waters Edge and at last but not least all participants.

I hope that you will find the conference both enjoyable and valuable.

Eng. (Dr) T Sivakumar
Chairman - Organizing Committee
R4TLI 2018 Conference

Editorial Preface

Graduating into her third successive year, R4TLI has demonstrated her sustainability and her potential in serving ‘to catalyse necessary discourse within the discipline of transport and logistics sector for greater research and development undertakings’, as the Sri Lanka Society for Transport and Logistics (SLSTL) intended in the inaugural 2016 R4TLI Proceedings. We are glad to note that our voice appears to have been heard and well received.

Editorial Committee of the R4TLI-2018 is encouraged that we received 94 title submissions in the beginning, of which 58 Extended Abstracts were effectively submitted, 12 selected for presentations at the Conference and 22 are published herein. The rigorous double blind peer review process adopted also has ear-marked at least seven submissions for development into full research articles to be considered for publication in the forthcoming scientific Journal which we anticipate launching towards the end of this year.

It was an enriching experience to edit and compile this Proceedings by reviewing a wide spectrum of research submissions, ranging horizontally from road transport through railways to aviation and shipping, and vertically from consumer studies to development policy research through industrial and business analyses. This not only enabled us to understand the breadth of the discipline and its implications for various other production and service sectors of the economy, but also to fathom the depth of research conducted not only in Sri Lanka but also in other countries in our region. It is our wish that these research activities will probe deeper into the questions faced by the domestic Transport and Logistics industry and improve its linkages within the region, thus sharpening Sri Lanka’s competitive edge in the ever-complex and dynamic global and regional business environment.

The Editorial Committee for 2018 is grateful to the eminent panel of academics in Sri Lanka and abroad for their painstaking commitment to reviewing the submissions and providing feedback to each of our contributors, at times during the course of several rounds of revision. If not for this effort, we would not have been able to maintain the standards the SLSTL has set for itself or to make this contribution towards industrial research and development in Transport and Logistics.

As we strive to deliver high-quality research pertinent to professional affairs in Transport and Logistics both domestically and internationally, we anticipate that industry practitioners will put the insights gleaned from this effort to good use in their pursuit of excellence for Sri Lanka’s Transport and Logistics industry.

T Lalithasiri Gunaruwan (Chief Editor)

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Chathuni Uduwela

Thivya Amalan
Uthpalee Hewage

Asith Hettiarachchi

**CONFERENCE ON RESEARCH FOR
TRANSPORT AND LOGISTICS INDUSTRY
2018**

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SRI LANKA SOCIETY OF TRANSPORT AND LOGISTICS (SLSTL)
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