Proceedings of the 4th Belt and Road Initiative Conference (BRI 2019)

In collaboration with the Asian Logistics Round Table (ALRT)

1-3 August 2019, Bangkok, Thailand

Hosted by:

Logistics & Supply Chain Management Program,
Chulalongkorn University, Thailand

Chulalongkorn Business School,
Chulalongkorn University, Thailand

Transportation Institute,
Chulalongkorn University, Thailand

Co-organised by:

Ocean College,
Zhejiang University, China

Jungsok Research Institute of International Logistics and Trade,
Inha University, Korea

Asian Logistics Round Table (ALRT)

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Conference Program

Venue: Mandarin Hotel Bangkok

Day 1 : August 1st, 2019 (Thursday)	
08:00 – 09:00	Registration
09:00 – 10:30 (Room: Mandarin C)	**Opening Ceremony** 9:00 **Conference Opening Declaration** by Conference Co-Chair, Professor Paul Tae-Woo Lee, Ocean College, Zhejiang University, China **Welcome Speech and Conference Report** by Conference Co-Chair, Professor Kamonchanok Suthiwartnarueput, Chulalongkorn University, Thailand **Welcome Speech and Conference Opening Remark** by Professor Bundhit Euaarporn, Ph.D. (President of Chulalongkorn University, Thailand) **Congratulatory Remark** by Professor Wang Ruifei, Executive Dean, Ocean College, Zhejiang University, China **Appreciation to Conference Contributors** by Professor Wang Ruifei, Executive Dean, Ocean College, Zhejiang University, China Conference Co-Chair, Professor Kamonchanok Suthiwartnarueput, Chulalongkorn University, Thailand 9:20 **Taking Memorial Photo** **Keynote Speech Session1:** Chaired by Professor Jun Yeop Lee, Conference Co-Chair Jungseok Research Institute of International Logistics and Trade, Inha University, Korea 9:30 **Mr. Worrawut Mala, President of State Railway of Thailand** ***Future Rail Network in Thailand 2025***

	10:00 **Professor Britta Gammelgaard, Copenhagen Business School ; Editor-in-Chief of International Journal of Logistics Management** ***Supply Chain Management in Time of change*** 10:30 **Ms. Azhar Jaimurzina, Chief of the Transport Connectivity and Logistics Section of the Transport Division of UNESCAP** ***The sustainable transport perspective and its implications for national and regional infrastructure connectivity initiatives***
10:30 – 11:00	Refreshment and Networking Break
11:00 – 12:30 (Room: Mandarin C)	**Keynote Speech Session2:** Chaired by Asst. Prof. Tartat Mokkhamakkul, Chulalongkorn University, Thailand 11:00 **Professor Suisheng Zhao, Denver University, US; Editor-in-Chief of Journal of Contemporary China** ***Belt and Road Initiative as the Signature of President Xi Jinping Diplomacy*** 11:20 **Associate Professor. Dr. Sompop Manarungsan, President of Panyapiwat Institute of Management** ***China's Major Infrastructural Diplomacy*** 12:00 **Professor Inkyo Cheong, Vice President, Inha University, Korea** ***Uncertainty of WTO Trade System and Implications for Regional Economic Cooperation***
12:30 – 13:30	Lunch (Krua Laung Restaurant)

	Paper Session			
13:30 – 15:00 *(Session 1)*	**Session 1A** **Room: Mandarin C** **Chair Session:** Kevin X. Li (Zhejiang University, China) **BRI &SCM** ❖ **Paper 001:** Literature Review on Belt and Road (B&R) initiative: focusing on the influence on maritime *(Zhongzhen Yang, Dongxu Chen)* ❖ **Paper 002:** Environmental governance of transportation infrastructure under Belt and Road Initiative: a unified framework *(Xueqin, Wang; Kum Fai, Yuen; Yiik Diew, Wong; Kevin X. Li* ❖ **Paper 003:** Sea- Air Multimodal Freight Transport Network Design *(Chia-Hsuan Lin, Tsung-Sheng Chang)*	**Session 1B** **Room: Karaked** **Chair Session:** Prem Chhetri (RMIT University, Australia) **Transport** ❖ **Paper 004:** Trends in linkage between air and rail transport research between 1997 and 2018 *(Waralee Peetawan)* ❖ **Paper 005:** Co-evolution of Airline and Corporate Connectivity in Asia *(Hidenobu Matsumoto and Koji Domae)* ❖ **Paper 006:** Airline network competition in inter-continental market *(Ningwen Tu, Zhi-Chun Li, Xiaowen Fu, Zheng Lei)*	**Session 1C** **Room: Rodsukorn** **Chair Session:** Thira Chavarnakul (Chulalongkorn University, Thailand) **Trade & SCM** ❖ **Paper 007:** Geopolitical risk and its impact on capital structure decisions of listed shipping companies (Suntichai Kotcharin, Sakkakom Maneenop) ❖ **Paper 008:** The Effect of the Verified Gross Mass (VGM) Implementation in Australia *(Eda Aras and Peggy Shu-Ling Chen)* ❖ **Paper 009:** A Study on the Joint Implementation of Korea Peninsula on BRI *(Htet Htet Kyaw Nyunt, Ikseong Kim, Changgon Kim)*	**Session 1D** **Room: Pornphailin** **Chair Session:** Cheng-Wei Lin (Kainan University, Taiwan) **Simulation & Optimization** ❖ **Paper 013:** Model-based Event-triggered Tracking Control for Underactuated Surface Vessels *(Yingjie Deng, Xianku Zhang, Chenfeng Huang)* ❖ **Paper 014:** A study of Freight Impedance and Distribution Models of Inland Water Transport along Yangtze River Economic Belt with Ship Visa and AIS Data *(Deng, Guihua, Zhong, Ming)* ❖ **Paper 015:** A Robust Optimization Model for Berth Allocation Problem in Container Terminals Based on Genetic Algorithm *(Zongbao Wang, Jiaqi Yang)*
15:00 – 15:30	Refreshment and Networking Break			

15:30 – 17:00 *(Session 2)*	**Session 2A** **Room: Mandarin C** **Chair Session:** Hyun-Duk Kim (Sunchon National University, Korea) **Maritime** ❖ **Paper 019:** Shipping companies' resilience: The influence of modularity and response diversity *(Prashant Bhaskar, Stephen Cahoon, Shu-Ling Chen)* ❖ **Paper 020:** A Comparative Analysis of Green Port Policies between China's and South East Asian Sea Ports under Belt and Road Initiative *(Rattaporn Teerawattana, Yi-Chih Yang, and Ying-En Ge)* ❖ **Paper 021:** Optimizing Empty Container Management by Integrating Empty Container Reposition and Container Leasing Strategies (*Hao-Chih Chen, Tsung-Sheng Chang)*	**Session 2B** **Room: Karaked** **Chair Session:** Hwa-Joong Kim (Inha University, Korea) **Maritime** ❖ **Paper 022:** Tanker Loading and Unloading Volumes Estimation Leveraging AIS and Maritime Open Data *(Yi shu LIN and Huiling ZHONG)* ❖ **Paper 023:** Decision-making of Port Enterprise Safety Investment Based on ALARP Risk Level *(Yuhui Sun, Haiyan Wang, Jie Chen)* ❖ **Paper 024:** Risk assessment of bauxite import maritime supply chain using the combination of FMEA and FBN *(Jiachen Sun, Jiaqi Yang, Haiyan Wangc, Yao Ren)* ❖ **Paper 025:** Ports Competition Optimization Strategy and Maritime Transport Chain Configuration Decision along the Maritime Silk Road *(Lili Qu, Grace W.Y. Wang, Xueqin Wang)*	**Session 2C** **Room: Rodsukorn** **Chair Session:** Ahmad Abareshi (RMIT University, Australia) **Performance &Efficiency** ❖ **Paper 029:** Extended Logistics Performance Index: In-depth Analysis *(Ornicha Anuchitchanchai, Patanapong Sanghatawatana)* ❖ **Paper 030:** Assessment of Terminal Efficiency and Productivity in West Africa *(DEGBE Sewodo Augustin and Bingliang SONG)* ❖ **Paper 031:** Factor Effecting the Internet of Things Technology Adoption in Supply Chain *(Chatchai Antarasena, Uthai Tanlamai, Thira Chavarnakul)*	**Session 2D** **Room: Pornphailin** **Chair Session:** Peggy Shu-Ling Chen (University of Tasmania, Australia) **Simulation** ❖ **Paper 016:** Simulation as a Tool for Improving Transportation Contract Management *(Siri-on Setamanit)* ❖ **Paper 017:** Maritime Transport Network Analysis: A Critical Review of Analytical Methods and Applications *(Maneerat Kanrak, Hong-Oanh Nguyen, Yuquan DU)* ❖ **Paper 018:** Impacts of Freight Rate Spot Market on Long-term Interactions between Carrier and Shipper: Game-theoretic Analysis *(Kelly Yujie WANG, Yuan WEN, Tsz Leung YIP, Zuojun FAN)*
18:00-20:00	**Conference Gala Dinner @ Mandarin Hotel Bangkok (Room: Mandarin A)**			

Day 2: August 2nd ,2019 (Friday)				
08:30 – 09:00	Registration			
09:00 – 10:30 *(Session 3)*	**Session 3A** **Room: Mandarin C** **Chair Session:** Masahiro Ishii (Sophia University, Japan) **Infrastructure** ❖ **Paper 032:** Evaluating the effects of Gang-Zhu-Ao Bridge on Connecting China to Southeast Asia: A Case Study of Air-Bridge-Air Path Linked by Hong Kong-Zhuhai Airport *(Jing Lu, Cheng Lv, Tao Feng, Zhongzhen Yang, Zheqing Wang)* ❖ **Paper 033:** Space pattern and location characteristics of logistics nodes and enterprises based on points of interest (POI): A case study of Shanghai and Wuhan *(Min Tu,Zhuorui Chen)* ❖ **Paper 034:** Multiport Cooperative Location Model with a Safe-Corridors Setting in the Context of the Belt and Road Initiative *(Kang Chen, Xu Xin, Tao Zhang, Zhongzhen Yang)*	**Session 3B** **Room: Karaked** **Chair Session:** Zhong Ming (Wuhan University of Technology, China) **Maritime** ❖ **Paper 026:** Maritime logistics perspectives on short sea shipping sustainable solutions to road congestions under Belt and Road Initiative *(Cristina Dragomir; Yui-yip Lau; Liquan Guo; Adolf. K. Y. Ng)* ❖ **Paper 027:** Competitiveness and Growth Diagnosis of Maritime Transportation in Alexandria Port – Egypt *(Yongseok Choi, Ahmed Ashraf)* ❖ **Paper 028:** The Impact of BRI on the Countries in Bay of Bengal Area *(Htet Htet Kyaw Nyunt, Jeongdae Hur, Hyundeok Kim)*	**Session 3C** **Room: Rodsukorn** **Chair Session:** Xuehao Feng (Zhejiang University, China) **Trade & SCM** ❖ **Paper 010:** Evaluation of seafarers' psychological competency based on TOPSIS-RSR *(Xin Rao and Qing Liu)* ❖ **Paper 011:** Investigating the relationships between Guanxi and Supply Chain Integration in the BRI Firms: a conceptual framework for China's Belt and Road Initiative *(Michael Wang, Ahmad Abareshi)* ❖ **Paper 012:** Patterns of Chinese Foreign Direct Investment: A Spatio-temporal Modelling Approach *(Rifan Ardianto, Prem Chhetri, and Bonita Oktriana)*	**Council Meeting of Asian Logistics Round Table (ALRT)**
10:30 – 10:50	Refreshment and Networking Break			

10:50 – 12:20 *(Session 4)*	**Session 4A** **Room: Mandarin C** **Chair Session:** Babak Abbasi (RMIT University, Australia) **Extended Abstract** ❖ **Paper 035:** Facility Location and Capacity Planning with Consideration of Policy Guidance and Uncertain Demand under One Belt One Road Initiative *(Yaping Fu, Di Wu, Hongfeng Wang, Xuehao Feng)* ❖ **Paper 036:** New Silk Road and Trans-Asian Railway: Analysis with the Focus on the European Hinterland and the Case of the Czech Republic *(Petr Kolar, Martin Jancalek)* ❖ **Paper 037:** Terminal location and sharing problem in a competitive environment *(Yanjie Zhou and Kap Hwan Kim)*	**Session 4B** **Room: Karaked** **Chair Session:** Zhongzhen Yang (Ningbo University, China) **Extended Abstract** ❖ **Paper 038:** Belt and Road Initiative: Opportunities and Challenges for China in the Middle East *(Enayatollah Yazdani)* ❖ **Paper 039:** Impacts of High-speed Trains on International Tourist Arrival to China *(Yuting Xue, Pairach Piboonrungroj)* ❖ **Paper 040:** The Influence of Belt and Road Initiative on the New Suez Canal *(Ousama Ibrahim, Hwa Seon, Hyundeok Kim)*	**Session 4C** **Room: Rodsukorn** **Chair Session:** Victor Gekara (RMIT University, Australia) **Extended Abstract** ❖ **Paper 041:** The coordinated development of China's inland ports based on the matching of logistics capability and demand along the Belt and Road *(Hairui Wei, Zhi-hua Hu)* ❖ **Paper 042:** Policy Implications of BRI by Text Mining Approach *(Jun Yeop Lee, Oh Kyoung Kwon, Prem Chhetri, Juhyeon Lee)*	**Session 4D** **Room: Pornphailin** **Chair Session:** Koichiro Tezuka (Nihon University, Japan) **Extended Abstract** ❖ **Paper 043:** Valuation of Revenue Bond for Port Investment *(Masahiro Ishii, Satoru Hashimoto, Koichiro Tezuka, Motokazu Ishizaka)* ❖ **Paper 044:** Design of Berth Allocation Problem Allocation Problem Visual Model: Case Study Indonesia Port of Tanjung Priok *(Armand Omar Moeis, Lusyane Eko Tantri, Teuku Yuri Zagloel, Akhmad Hidayatno, Andri Mubarak, Arry Rahmawan Destyanto)*
12:20 – 13:30	Lunch (Krua Laung Restaurant)			

13:30 – 14:30	**Session 5A Room: Mandarin C** **Chair Session:** Dr. Feng Xuehao (Zhejiang University, China) **Exploring Joint Research by Young Scholars** **Keynote speech**: "Big data: Opportunities to Improve Transport Operational Decisions" by Professor Babak Abbasi, RMIT University, Australia • Dr. Patanapong Sanghatawatana, Transportation Research Institute, Chulalongkorn University, Thailand • Dr. Feng Xuehao, Maritime Logistics and Free Trade Islands Research Center, Ocean College, Zhejiang University, China • Dr. Ahmad Abareshi, School of Business IT and Logistics, RMIT University, Australia • Dr. Peggy Shu-Ling Chen, Australian Maritime College, University of Tasmania, Australia • Dr. Ornicha Anuchitchanchai, Transportation Research Institute, Chulalongkorn University, Thailand • Ph.D. Students from Logistics and Supply Chain Management Program, Chulalongkorn University, Thailand	**Special Session: Room: Rodsukorn** **Workshop on Global Research Network (GRN) Program** (Note: This session is a closed event only for the GRN members. This workshop was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2017S1A2A2041812).
14:30 – 14:50	Refreshment and Networking Break	
14:50 – 16.30 (Room: Mandarin C)	**"Meeting Editors" Session** (Chaired by Professor Kamonchanok Suthiwartnarueput, Chulalongkorn University, Thailand) • Professor Britta Gammelgaard EIC of *International Journal of Logistics Management* (IJLM) • Professor Suisheng Zhao, EIC of *Journal of Contemporary China* (JCC) • Professor Kevin X. Li, EIC of *Maritime Policy & Management* (MPM) • Professor Xiaowen Fu, Editor of *Transport Policy* • Professor Hwa-Joong Kim, Managing Editor of *Journal of International Logistics and Trade* (JILT)	

16:30 – 17.00 (Room: Mandarin C)	**Closing Ceremony** • Chaired by Professor Kamonchanok Suthiwartnarueput (Chulalongkorn University, Thailand), Jun Yeop Lee (Jungseok Research Institute of International Logistics and Trade, Inha University, Korea), and Paul Tae-Woo Lee (Ocean College, Zhejiang University, China) • Best papers award • Announcement of Asian Logistics Round Table Conference by Dr. Peggy Shu-Ling Chen, Australian Maritime College, University of Tasmania, Australia • Announcement of 5th Belt and Road Initiative Conference by Dr Duminda Jayaranjan, Defence University, Sri Lanka • Closing remarks: Professor Kamonchanok Suthiwartnarueput, Professor Jun Yeop Lee, and Professor Paul Tae-Woo Lee
Day 3: August 3rd ,2019 (Saturday)	
09:00 – 12:00	**Boat Trip (All participants and their spouse are welcomed.)** 7:30 Pick up at the hotel

Note: The paper presentation program may be slightly changeable subject to participants' unexpected circumstance.

Belt and Road Initiative Conference 2019

and Asian Logistics Round Table

Bangkok, Thailand

1-3 August 2019

Opening ceremony

Conference Organisers' Welcome Message

By Prof.Kamonchanok Suthiwartnarueput,
Chulalongkorn University, Thailand

The Belt and Road Initiative Conference was held its first forum in 2016 by the Royal Melbourne Institute of Technology (RMIT), Australia. The second and third conferences were organised in Zhejiang University, China in 2017, and RMIT, Vietnam, in Ho Chi Minh City last year, respectively. The fourth BRI conference is currently held here by Chulalongkorn University in Bangkok, Thailand.

In association with the Asian Logistics Round Table (ALRT). The ALRT was founded by eminent professors in the field of logistics and supply chain, comprising of 11 institutes in covering Asia, America, Europe, and Australia.

Chulalongkorn University has been a founding member of both the ALRT and BRI committee since 2008 by the Logistics and Supply Chain Management program, a part of the graduate curriculum. We have also held the 6th ALRT conference in 2014, discussing developments within multi-dimension environment. Today, we are pleased to host the 4th BRI conference in collaboration with Zhejiang University in China and Inha University in Korea.

The objectives for this conference are to ensure and conceptualise implications for trade, transport infrastructure, and logistics in the ASEAN region in attempt to understand their impacts on global supply chain routes and maritime connectivity.

Total 112 participants have attended coming from 12 countries with 71 excellent papers The research papers will be presented under 5 groups namely in fields of logistics and supply chain, transport, changes in production, sustainability issues, and more.

We hope this conference contributes to sharing knowledge and experience in the above fields and building more stable foundation for BRI and ALRT in the future.

Thank you.

Welcome Speech and Conference Opening Remark

By Professor Bundit Euaarporn,
Chulalongkorn University President's, Thailand

Ladies and Gentlemen,

I am delighted to personally welcome you to the fourth instalment of the Belt and Road Initiative Conference in collaboration with Asian Logistics Round Table (ALRT). This year's conference main them, focusing on the BRI's challenges and opportunities will mark a reflection on the progress and visions of the transcontinental policy into a more practical and efficient structure.

The BRI Conference, first held back in 2016 at RMIT University in Melbourne Australia, has been a potential framework-- serving as a continuum of China's multilateral scheme and possible implications of a better trading system to not only boost the economy and confidences in one's own resources, but also enhance an interconnected effort across borders.

The changing global trade landscape has often offered new opportunities for businesses to prosper, but also obstacles to overcome. It is within BRI's interests to perceive a future with stronger markets and competitions, humanitarian benefits, and sustainable inclusivity among more than 75countries. However, it is also the challenges that should be considered to further understand the possibility of change, not to mention possible spontaneity. This conference is a great opportunity for those who possess such knowledge and abilities to foster an international perspective to that means, especially in the 21st century. Speakers today from 12 countries have gathered to share their idea on the impacts and alternatives of the BRI's productivity.

We hope this event may initiate interesting topics and discourses to coordinate not only BRI in the right direction, but also the audience's own endeavor in this field of logistics in the future.

Thank you

Congratulatory Remark

By Professor Wang Ruifei, Executive Dean,
Ocean College, Zhejiang University, China

Good morning, President of Chulalongkorn University, Professor Bundhit Euaarporn, Conference Chair, Professor Kamonchanok Suthiwartnarueput, Distinguished Guests, Ladies and Gentlemen!

It is my great honor to be here to attend the 4th BRI conference and address congratulatory remark. First of all, on behalf of Ocean College, Zhejiang University, I would like to express our great gratitude to Chulalongkorn University, which organizes this wonderful conference.
I am sure that this Belt and Road Initiative (BRI) conference in collaboration with Asian Logistics Round Table will be a very fruitful platform for all of you to share your knowledge and experience with the participants and make good friends.

As the co-organizer of this conference, Our Ocean College, Zhejiang University is located at Zhoushan archipelago, China. Zhoushan is not only a beautiful city, but also the starting point of the 21st Century Maritime Silk Road. I welcome all of you to Zhoushan in the foreseeable future!

I do hope that you will enjoy this conference and make unforgettable memoirs in Bangkok.

Keynote Speakers

VORAVUTH MALA

Mr.Voravuth Mala is the President of State Railway of Thailand. He received a Master of Business Administration (M.B.A.) in Transport Management and Distribution Management from Golden Gate University, San Francisco, CA, a Master of Accountancy (M.Acc) from Chulalongkorn University, Bangkok, and a Bachelor of Business Administration (B.B.A.) in Finance from Assumption University, Bangkok.

Previously, he worked in many positions in State Railway of Thailand. He was a Deputy Governer of Property Management Business Cluster Acting Governor, a Deputy Governer (Locomotive and Rolling – Stock Business Cluster, a Head of Administration, and Head of Strategy), a Deputy Traffic Manager – Operations, a Chief of Freight Marketing Division, a Chief of Traffic Region, a Chief of Freight Marketing Division, a Chief of Container Section, a Chief of Pricing Section, and a Chief of Revenue Planning Section.

SOMPOP MANARUNGSAN

Associate Professor. Dr. Sompop Manarungsan is currently the President of Panyapiwat Institute of Management which is under CP group Thailand. He received his Ph.D. in Development Economics in 1989 from Groningen University, The Netherlands, Master of Art in Economics, (English Language Program) in 1978 from Thammasat University, Thailand, Master of Art in Agricultural and Rural Development in 1982 from Institute of Social Studies. The Hague, The Netherlands and Bachelor of Art in Economics in 1975 from Thammasat University, Thailand.

He experts in China's trade and economy. His research interest covers International economics, development strategies, economics crisis management, China-Japan-USA economics. He was a committee of experts in foreign trade negotiations in Ministry of Commerce, The Board of Investment, and National Agriculture Credit Management. He was also a lecturer in Chulalongkorn University, Thailand.

SUISHENG ZHAO

Suisheng Zhao is Professor and Director of the Center for China-US Cooperation at Josef Korbel School of International Studies, University of Denver. He is the founder and chief editor of the *Journal of Contemporary China*. He received his Ph.D. degree in political science from the University of California-San Diego, M.A. degree in Sociology from the University of Missouri and BA and M.A. degrees in economics from Peking University. He is a member of the Board of Governors of the US Committee of the Council for Security Cooperation in the Asia Pacific, a member of National Committee on US-China Relations, a Campbell National Fellow at Hoover Institution of Stanford University, and a Research Associate at the Fairbanks Center for East Asian Research in Harvard University. He is the author and editor of more than a dozen of books, including *Debating Regime Legitimacy in Contemporary China: Popular Protests and Regime Performance (*2017); *The Making of China's Foreign Policy in the 21st Century, Historical Sources, Institutions/Players, and Perceptions of Power Relations (*2016). His articles have appeared in *Political Science Quarterly*, *The Wilson Quarterly, Washington Quarterly, International Politik,* and distinguished elsewhere.

BRITTA GAMMELGAARD

Dr. Britta Gammelgaard is Professor of Logistics and Supply Chain Management at Copenhagen Business School, Denmark.

Professor Gammelgaard´s main research interests are global supply chain management, supply chain innovation and strategic procurement. Her work has been published in Danish as well as international scientific journals, such as Journal of Business Logistics (JBL), International Journal of Physical Distribution & Logistics Management (IJPD&LM) and Journal of Purchasing & Supply Management. In 2009 she was awarded with the prestigious Danish prize for research in transport, Hedorfs Fonds Transportforskningspris, and has received a number of awards for her research and services to the discipline.

Professor Gammelgaard has been the Editor-in-Chief of International Journal of Logistics Management since 2017.

AZHAR JAIMURZINA

Azhar Jaimurzina is Chief of the Transport Connectivity and Logistics Section of the Transport Division of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). The Section supports member States in their efforts to develop integrated intermodal transport connectivity by assisting in further development of the Asian Highway, Trans-Asian Railway and Dry Ports networks and implementation of the necessary measures to improve the operational efficiency of transport systems, including through common regional frameworks, harmonized technical and operational standards and rules, application of new technologies to cross-border transport and innovations in logistics.

Previously Ms. Jaimurzina has worked as Chief of the Infrastructure Services Unit of the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), Economic Affairs Officer for the Trade Logistics and Technology Branch of the United Nations Conference on Trade and Development (UNCTAD) and Economic Affairs Officer of the Transport Division of the United Nations Economic Commission for Europe (UNECE). She has worked with more than seventy developed and developing countries and transition economies world-wide. In doing so, she provided substantive support to a wide range of the UN intergovernmental bodies and groups of experts, carried out comprehensive UN technical assistance and capacity building projects and drafted or contributed to a large number of UN analytical reports, legal instruments and technical standards on infrastructure development, inland transport, trade logistics and trade facilitation. Ms. Jaimurzina holds a Master Degree in International Law from Université Libre de Bruxelles and a Master Degree in International Relations from University of Chicago.

INKYO CHEONG

Dr. Inkyo CHEONG is Professor of International Trade at the university, Incheon, Korea. He served as Vice President at the university, and Chairman of FTA Research Forum, and a member of advisory committees for various Ministries and national agencies. He had been President of Korea's Negotiation Association (2011-2012), Korea's International Trade Economist Association (2010) and Research Fellow for eight years (1996-2004) in the Korean Institute for International Economic Policy (KIEP).

He had been instrumental in establishing the groundwork for Korea's FTA policy, and has been actively involved as a member of Korea's negotiation team and advisor in negotiating Korea's FTAs with Chile, Singapore, ASEAN, US, EU, Japan, Vietnam, South America (Mercosur) and others. Most of his career was in a trade policy, and research on SMEs has been conducted at the context of trade policy and business support.

International Steering Committee

NO	NAME		INSTITUTE	COUNTRY
1.	Kamonchanok	Suthiwartnarueput	Chulalongkorn University	Thailand
2.	Jun Yeop	Lee	Inha University	Korea
3.	KapHwan	Kim	Pusan National University	Korea
4.	Kim	Hyundeok	Sunchon National University	Korea
5.	Masahiro	Ishii	Sophia University	Japan
6.	Min	Tu	Wuhan University of Technology	China
7.	Paul Tae-Woo	Lee	Zhejiang University	China
8.	Peggy Shu-Ling	Chen	University of Tasmania	Australia
9.	Petr	Kolar	University of Economics	Prague
10.	Prem	Chhetri	RMIT University	Australia
11.	Satoru	Hashimoto	Teikyo University	Japan
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14.	Young-Tae	Chang	National University of Singapore	Singapore
15.	Hwa-Joong	Kim	Inha University	Korea
16.	Zaili	Yang		
17.	Grace	Wang	Texas A&M University at Galveston	USA
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19.	Ming	Zhong	Wuhan University of Technology	China
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22.	Ming K.	Lim		
23.	Suisheng	Zhao	Denver University	USA
24.	Zho-Hau	Hu	Shanghai Maritime University	China
25.	Adolf. K. Y.	Ng	University of Manitoba	Canada
26.	Babak	Abbasi	RMIT University	Australia
27.	Xuehao	Feng	Zhejiang University	China
28.	Ying-En	Ge	Shanghai Maritime University	China
29.	Mathews	Nkhoma	RMIT	Vietnam
30.	Namati	Sirisoma	Defence University	Sri Lanka
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Local Steering Committee

NO	NAME		INSTITUTE	COUNTRY
1.	Kamonchanok	Suthiwartnarueput	Chulalongkorn University	Thailand
2.	Thira	Chavarnakul	Chulalongkorn University	Thailand
3.	Manoj	Lohatepanont	Chulalongkorn University	Thailand
4.	Tartat	Mokkhamakkul	Chulalongkorn University	Thailand
5.	Pongsa	Pornchaiwiseskul	Chulalongkorn University	Thailand
6.	Paveena	Chaovalitwongse	Chulalongkorn University	Thailand
7.	Rahuth	Rodjanapradied	Chulalongkorn University	Thailand
8.	Chackrit	Duangphastra	Chulalongkorn University	Thailand
9.	Danupon	Ariyasajjakor	Chulalongkorn University	Thailand
10.	Siri-on	Setamanit	Chulalongkorn University	Thailand
11.	Krisana	Visamitanan	Chulalongkorn University	Thailand

2019 BRI Conference Papers (Abstracts)

Paper code 001

Literature Review on Belt and Road (B&R) initiative: focusing on the influence on maritime transport and logistics

Zhongzhen YANG, Ningbo University, China.

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Dongxu CHEN, Dalian Maritime University, China.

Abstract

This paper reviews the literatures concerning maritime transport and logistics in the context of the Belt and Road (B&R) initiative. The literature review is done by systematically collecting the existing literatures, which are related to transport and logistics and other elements (such as investment, trade and Political-Economic) that have a significant impact on the transport and logistics, over a period of 7 years since the B&R was initiated by the Chinese government in 2013. A method is proposed based on content analysis methodology involving a four-step process.

Keywords: Literature review, the Belt and Road initiative (BRI), Maritime Silk Road, transport and logistics, investment, trade, Political-Economic

Paper code 002

Environmental governance of transportation infrastructure under Belt and Road Initiative: a unified framework

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Yiik Diew Wong, Nanyang Technological University, Singapore.

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Kevin X. Li, Zhejiang University, China.

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Abstract

China's Belt and Road Initiative (BRI) has attracted much attention in the field of transportation research. With a primary goal to improve regional and global connectivity, the initiative proposes a massive development programme of transportation infrastructure (TI) linking China with the rest of the world. While it creates a tremendous development opportunity, the unprecedented scale of TI construction also brings with various challenges. In particular, the environmental impacts of the TI projects are of critical concern. Herein, smooth implementation of the TI projects would depend on the capacity of all the concerned actors to conduct collaborative planning and integrate environmental considerations. Therefore, from a multi-actor perspective, this paper aims to provide a unified framework of the environmental governance of the TI projects under the BRI. It is achieved by a focused review of relevant research articles and technical reports published in both English and Chinese. Based on the review findings, the framework along with four propositions are proposed, focusing on the key actors (who), the environmental considerations (what), and the governance structures (how). The study concludes with theoretical and managerial implications.

Keywords: Belt and Road Initiative, Transportation Infrastructure, Environmental Governance, Literature Review, Multi-stakeholder perspective, Transport policy

Paper code 003

Sea-Air Multimodal Freight Transport Network Design

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Abstract

Shippers are quite often confronted with the problem that air freight is too expensive and sea freight is too slow. Sea-air multimodal transport can provide a solution to the problem by allowing shippers to opt for first sea freight and then air freight. It has been shown that efficiently combining the two transport modes can offer a 30 to 50 percent faster service than ocean freight and can have cost savings of 40 to 60 percent compared to air freight. That is, sea-air multimodal transport allows shippers to manage their supply chains more cost effectively and quickly. However, these advantages accrue only to those who can efficiently integrate these two transport modes. Currently, most shippers rely on freight forwarders to make global shipping as seamless as possible by utilizing multiple transport modes. Besides, some logistics companies, e.g., DHL Express, also provide multimodal transport services to the shippers. Obviously, freight forwarders can only use existing sea and air services to arrange their shipping. On the other hand, the logistics companies may use existing and/or develop their new sea-air transport services. This research aims at helping a container shipping company and an air freight company design their cooperative sea-air multimodal freight transport networks, which involve both existing and new developed sea-air transport services. More precisely, the goal of this research is to optimally design the cooperative sea-air multimodal freight transport networks to maximize the volume of sea-air freight that are used to be shipped by air freight or by sea freight. So far, we have not found research works in the literature that address the same problem as the one considered in this research. Liu et al. (2014) address a global intermodal liner shipping network design problem that involves an inland transportation subsystem and an ocean liner shipping subsystem. They argue that most of the cargos have inland origins and/or destinations. However, existing studies on liner shipping network design assume port-to-port demand. Therefore, they first propose an approach to convert inland OD demand to port-to-port demand, and then develop a framework for global intermodal liner shipping network design. They verify their proposed approach by applying it to a large-scale network example. Furthermore, there are studies that apply existing multiple transportation modes to optimize freight routing, scheduling and delivery service (see, e.g., Chang, 2008; Cho et al., 2012). Moreover, there are research works on sea or air network design problems. Actually, the network design of liner shipping routes has recently attracted much attention (see. e.g., Brouer et al., 2014). Hence, a variety

of network design problems have been studied. For example, design a single liner ship route without transshipment; design multiple ship routes without transshipment; design a butterfly ship route; and design a hub and spoke liner shipping network. By contrast, air freight network design problems have received little attention. Brouer et al. (2014) prove that the liner-shipping network design problem is NP-hard. Our considered problem of simultaneously designing sea-air system and service networks is obviously NP-hard. Hence, this research tackles this complicated network design problem by first mathematically modeling this NP-hard problem, then proposing efficient matheuristics hybridizing metaheuristics and mathematical programming for its solution. Finally, experiments are conducted to exam the performance of the proposed models and solution algorithms. In addition, this research also applies the proposed models and algorithms to real-life case studies. It is worth noting that sea-air cargo can be derived from the cargo that has been upgraded from direct seafreight and/or the cargo that has been downgraded from direct airfreight (Raguraman and Chan, 1994). They also point out that in practice, most sea-air cargo has been downgraded from direct airfreight.

Keywords: Multimodal, Sea-Air, Network Design, Matheuristics

Paper code 004

Trends in linkage between air and rail transport research between 1997 and 2018

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Abstract

In modern days, air transport is a major player in worldwide international passenger transport, while rail transport dominates domestic passenger transport in certain region. Both aviation and railroad industries have been employing more advanced technologies as well as business strategies to facilitate more passengers with higher speed and better service level. The competition between air carriers and high-speed trains in Europe and Northeast Asia has become more intense after the success of high-speed rail development, making it a substitution of air transport for the mid-range distance trip. The relationships between air and rail transport has been competitive, cooperative and integrative mode of transport. This paper discusses the linkage between air and rail transport research between 1997 and 2018 by using content analysis based literature review. Literature scope for this research includes economic (investment, cost, demand, and profit), social (welfare and travel behavior), environment, operations, and business strategies. Forms of rail transport in this research are high-speed rail and urban rail transit connected to aviation infrastructure. Research's geography, methodologies, keywords, main context and themes are reviewed. From the analysis, research themes can be categorized as modal comparison, modal competition, modal cooperation, modal integration, and modal influence between air and rail transport. Economic models have been used extensively during the time span while some optimization models are still regularly applied. It has been found that during 1990s and 2000s, most research are based in European countries. However, since 2015, China is an emerging country for carrying out research concerning air and rail transport, possibly due to significant development in its high-speed rail network as well as aviation infrastructure. While modal competition and modal influence are the most popular research themes, modal integration and modal cooperation are still the theme of interest since both air-rail transport can be successfully integrated when railroad acts as feeders (for example, airport rail link) to air carriers. Further application of this research is also recommended.

Keywords: Air transport, Air-rail transport, High-speed rail, Content-based analysis

Paper code 005

Co-evolution of Airline and Corporate Connectivity in Asia

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Abstract

This paper examines international air traffic movements on the segment level and, in turn, assesses the competitive hub status of primary cities from the perspective of international air links. For this purpose, the paper develops a refined gravity model by embedding the measure of city links based on economic activity and some dummy variables into an established gravity model composed of GDP per head, population and distance. Its focus of attention is Asia, where cross border competition has been witnessed among global cities for the role as a key international air traffic hub. The results demonstrate that the city links variable is much more prominent, showing the fundamental role that the intra-regional connectivity between firms now plays as a dynamic influence upon air transport activity. A stronger presence of a number of previously secondly ranked cities is also confirmed as international air traffic hubs, including Seoul, Kuala Lumpur, Bangkok and Hanoi.

Keywords: Airline Traffic Movements, City Links, Hub Status, Gravity Model, Asia

Paper code 006

Airline network competition in inter-continental market

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Abstract

As an increasing number of countries liberalize their skies, some airlines, notably carriers in the Middle East, have been able to extend their hub-and-spoke networks beyond domestic borders. This allows them to serve international destinations without going through traditional gateway hubs, so that they can compete with airline alliances relying on the traditional dual-gateway, or the so-called "dog-bone" networks. This paper proposes a stochastic model to investigate the competition between airlines running traditional dog-bone and hub-and-spoke networks in a liberalizing inter-continental market. The proposed model considers the interactions among three types of stakeholders, namely a regulator that aims to maximize the expected social welfare by designating the locations of new gateways; airlines that maximize profits by optimizing the service offerings and airfares; passengers that minimize their own travel disutility. Such a model is applied to analyze the Europe - China aviation market, so that the comparative advantages of different networks can be examined and quantified. The modeling results provide evidence-based recommendations on airline competition and airport development, and infrastructure investment needs in markets being liberlized.

Keywords: Network cooperation and competition; Hub-and-spoke network; Dog-bone network; International gateway hub; Demand uncertainty.

Paper code 007

Geopolitical risk and its impact on capital structure decisions of listed shipping companies

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Abstract

Geopolitical risk (GPR), for which Caldara and Iacoviello (2018) developed the calculation method, is defined as the risk associated with wars, terrorist acts, and tensions between states that affect the normal and peaceful course of international relations. With the unique nature of the shipping industry which consists of cyclical and capital-intensive companies, we question whether GPR influences firms when making leverage decisions based on their expectations about the future economic and political environment. Our main results show that shipping firms lower their financial leverage in response to higher geopolitical risks. This result remains significant even we control for relevant macroeconomic factors. The negative effect of geopolitical risk to capital structure decisions is more pronounced during the period of high economic or stock market growth. Moreover, the effect is distinctive for container firms and Asian shipping firms.

Keywords: Geopolitical Risk, Capital Structure, Maritime Financial Management, Global Shipping Industry

Paper code 008

The Effect of the Verified Gross Mass (VGM) Implementation in Australia

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Abstract

In container shipping, the declaration of the accurate mass is of prime importance in terms of prevention of accidents and consequently losses. After the incidents of vessels such as Napoli, Anabella, Deneb, accuracy in the implementation of the provisions of the Chapter VI Part A of the SOLAS, 1974 convention and the warranty of accurate information declaration of packed containers by shippers had been questioned. As a result, the Verified Gross Mass (VGM) amendment to the Chapter was entered into force aiming to strengthen the safe practices of accurate weight declaration of packed container by shippers. This study investigates the impact of the VGM implementation by surveying key stakeholders engaged in international containerized trade in Australia, including shippers, container shipping companies and terminal operators. The effects of VGM implementation investigated included relationships, organizational practices, responsibility, financial cost, time delay, safety and the accuracy of VGM data. The findings revealed industry's positive perception towards the VGM amendments and confirmed its positive impact on safety for shipping companies and terminal operators. However, there are some problems in implementing the VGM rules. The organizational practices have been affected, with a major challenge of clarifying the responsibility for the VGM implementation. Shippers have been the most affected organizations in terms of financial costs, mostly occurred in the outsourcing the weighing service; and extra steps needed for outsourcing the VGM data have been found as the primary reason for time delays. The result also revealed that in Australia inaccurate VGM had been caused by the imported and transshipped containers.

Keywords: Verified Gross Mass (VGM), container, Australia

Paper code 009

A Study on the Joint Implementation of Korea Peninsula on BRI

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Abstract

The idea of Silk Road Economic Belt was firstly introduced by President Xi during his trip in Kazakstan in 2013. Chinese government's Vision and Action Plan foresees the three northern Chinese provinces — Liaoning, Jilin, and Heilongjiang which will become the part of a Northeast Asian economic zone and will link to Russia, Mongolia, and the Korean Peninsula. South Korea developed its own "Eurasia initiative" (EAI) in 2013 either which is based on economic cooperation in Euro-Asia through infrastructure projects. However, North Korea is still too much restricted and in concern for the survival of the regime to allow the economic cooperation and opening up.

This study tends to highlight on the perspective of joint implementation of Korea Peninsula on BRI and to study how the BRI and EAI can be compatible to each other for the perspective of economic integration. The secondary data is collected from the government websites of each nation, reports, articles and previously issued papers. Descriptive analysis method is used. The findings tend to describe the joint implementation between the China and South Korea so far and how much the government of each country invested on the infrastructure projects. The implications will be stated after comparing the outlook of the two initiatives that either they can coexist or is there any possibility to create further tensions in the region. The push of one country shall not diminish the other's economic grip.

Keywords: Belt Road Initiative, Eurasia Initiative, Economic, Cooperation, Joint

Paper code 010

Evaluation of seafarers' psychological competency based on TOPSIS-RSR

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Abstract

Qualified seafarers are the key to achieving safe and efficient shipping. Special working environment and occupational requirements make mental health an important factor in determining seafarers' competency. This study defines the connotation of seafarers' psychological competency, and analyses its influencing factors from three aspects: seafarers' personality characteristics, professional psychology and working attitude. Using the existing crew mental health survey data of the project team, EFA(the exploratory factor analysis) is used to establish seafarers' psychological competency evaluation index system, and the validity of the index system is verified by CFA(confirmatory factor analysis). On this basis, TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) and RSR (Rank-sum ratio) are combined to construct seafarers' psychological competency evaluation model, and the psychological competency of the Yangtze River crew is evaluated. The results of the model reflect the current situation of Yangtze river crew' psychological competency and the differences in psychological competency of seafarers with different working ages. The conclusion is of great significance to crew management, maritime safety and security.

Keywords: Seafarers，Psychological Competency，TOPSIS，RSR

Paper code 011

Investigating the relationships between Guanxi and Supply Chain Integration in the BRI Firms: a conceptual framework for China's Belt and Road Initiative

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Abstract

Belt and Road Initiative (BRI, 一带一路倡议) has two important components including Silk Road economic belt (丝绸之路经济带) and 21st century maritime Silk Road (21 世纪海上丝绸之路). The BRI is substantially funded by China, with Chinese firms and banks taking up most of the financial and economic space. According to the data from the National Information Centre in China, there are four types of BRI firms including Chinese Central Government-owned enterprise, Chinese local government-owned enterprises, private enterprises, and Chinese and foreign joint ventures enterprises contributing to the BRI. State-owned enterprise and private enterprise plays a vital role for implementation of the BRI initiative. We call them BRI firms. Guanxi is considered as a cultural characteristic that has strong implications for interpersonal and is a crucial system of beliefs in Chinese culture. We focus on the two types of relationships: interpersonal and inter-firms in this study. Supply chain integration is considered as a firm capability, they are visibility, agility and flexibility. The paper presents a conceptual framework to understand the relationships between guanxi and the supply chain integration in the Chinese firms. Over the last five years, more and more countries joined the BRI. Meanwhile the BRI firms require more complex international supply chain networks to continue supporting and delivering the BRI projects. Many firms may face the same question: How to integrate the supply chain to improve the overall efficiency and effectiveness? This paper sheds new light on an idea about developing guanxi (relationships) in supply chains to facilitate the supply chain integration. This would contribute to the BRI literature and help managers and researchers to have a better understanding of the guanxi and the supply chain integration. Moreover, this may provide some suggestions and new insights for all the Chinese and foreign firms who would like to participate in the BRI.

Keywords: Guanxi, Supply Chain Integration, BRI Firms, Belt and Road Initiative

Paper code 012

Patterns of Chinese Foreign Direct Investment: A Spatio-temporal Modelling Approach

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Abstract

Chinese foreign investment has significantly grown with the rapid rise of the Chinese economy. Knowing the location, timing and major drivers of foreign investment are crucial for understanding the patterns of choices and shifts in policy. Belt and Road Initiative (BRI) is meant to design to reconfigure the investment landscape of Chinese foreign direct investment. Greater investment is expected to flow in to BRI participating countries is the assumption along with their capacity attractive foreign investment. This paper tests these assumptions by developing a spatio-temporal model that incorporate space and time dependencies, and the drivers of the situated context. The Geographically and Temporally Weighted Regression (GTWR), an extended Geographically Weighted Regression (GWR) by integrating data measured in time, is employed to panel data of China's outward FDI Stock and FDI Flow from 2011 to 2015 to explore spatial and temporal trends of the magnitude and the direction of the dominant variables at country level. Logistic Performance Index, size of the GDP, Shipping Linear Connectivity Index and Container Port Throughput are used as the key drivers to ascertain their spatial and temporal influence on FDI Stock and Flow. A comparison between participating and non-participating countries in BRI is also conducted to examine the differences in the scale and direction of investment. The analysis shows that GDP and Container Port Throughout have positive effect on the increases of China's outward FDI Stock to Asia region especially after 2013 when the BRI was introduced. The implementation of OBOR tends to reduce the China's outward FDI Stock and Flow to Australia. Other non-participating countries in region have not experienced similar situation. There is no significant changing of the influence of GDP on China's outward FDI Stock dan FDI Flow to America region, Western Europe,ad Western Africa before and after the implementation of OBOR. However, in Western European countries, Africa and America, the Container Port Throughput tend to have significantly influence to China's outward FDI Flow to those region. The increasing value of the Container Port Throughput reduces the China's outward FDI Flow to Western Europe countries, Africa and America region eventhough those regions are not participating to China's OBOR scheme.

The findings provide the evidence to inform policy making to help identify the winners and losers of the investment, scale and direction of investment and the key drivers that shape the distributive investment patterns globally. This study also helps the Chinese government to redesign strategies to evaluate the key drivers shaping the past investment patterns and assess the strategic investment in preferential countries which are aligned to BRI to improve trade relationships and business partnerships.

Paper code 013

Model-based Event-triggered Tracking Control for Underactuated Surface Vessels

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Abstract

This paper integrates the model-based event-triggered control (MBETC) with the tracking activity of the underactuated surface vessel (USV). In this scheme, the continuous access of state signals is no longer needed, and transmission happens only when the triggering condition is violated. Based on Neural Networks (NNs), an adaptive model is established and further deduces the control laws, including the virtual control laws and the actual ones. The Gauss error functions are employed to smooth the jumping of virtual control laws at triggering instants. Then, a composite triggering condition is devised and the dead-zone operator is involved to guarantee the minimum inter-event time between two triggering instants. The closed-loop system can be deemed as an impulsive dynamic system and semi-global ultimate boundedness (SGUB) can be guaranteed through analysis. Finally, the effectiveness and feasibility of the proposed scheme is validated by simulation.

Keywords: Model-based event triggered control, Underactuated surface vessel, Trajectory tracking

Paper code 014

A study of Freight Impedance and Distribution Models of Inland Water Transport along Yangtze River Economic Belt with Ship Visa and AIS Data

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Abstract

This study aims to analyze freight impedance factors, then develop trip distribution models to predict the time and distance distribution of specific freight (e.g., steel vs. coal) through waterway transportation, based on ship visa and AIS data collected along the Yangtze River. This paper mainly considers two types of freight impedance factors: the distance and the time impedance. First, AIS data from different sections of the Yangtze River is used to calculate the speed of ships traveling downstream or upstream, as there is a significant different between the speed of the vessels traveling in the two direction. Then the speeds are used to calculate travel time of vessels traveling through each section of the Yangtze River, as each of them is unique in geography and hydrology. Then based on the travel time calculated and distance measured, two types of impedance matrices are developed, with one being time-based and the other distance-based. Using ship visa and AIS data from October 2010, the parameters of two types of gravity distribution models (one for time-based and the other for distance-based) are estimated and calibrated respectively. A Trip Length Distribution (TLD) method is applied to validate the predicted distribution patterns of the four types of cargo, with the actual distribution data collected in October 2012. The results show that the Coincidence Ratios (CR) values for the time-based distribution models based on the inverse power and the exponential function are 0.82 and 0.86 respectively, while the CR values for the distance-based models are 0.81 and 0.83 respectively. The results from this paper shows that the gravity distribution models based on time impedance have a better prediction performance in simulating freight distribution patterns along the Yangtze River, than its distance-based counterparts.

Keywords: waterway transport, freight impedance models, gravity model, TLD, CR

Paper code 015

A Robust Optimization Model for Berth Allocation Problem in Container Terminals Based on Genetic Algorithm

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Abstract

Berth allocation problem (BAP) is a significant issue to be concerned in container terminals' planning and operation. This paper studied how to obtain a berth plan under uncertain handling time of vessels. A berth allocation model aiming at minimizing the port time of ships was established, and a greedy algorithm was used to allocate quay cranes in the light of first come first served (FCFS) rules to get a basic berth plan. Based on this plan, a multi-layer coding genetic algorithm was used to provide an optimum solution in deterministic environment. Then, the buffering capacity was introduced to assess the robustness of berth plans. The Pareto optimal solutions of berth plans were obtained by a NSGA-II algorithm. Finally, in a series of solutions above, three solutions with different robustness values were selected in order to confirm their robustness under uncertain environment. Their abilities of absorbing disturbances of different levels were evaluated by simulation experiments.

Keywords: Container terminals, Berth allocation problem, Genetic algorithm, Robust performance

Paper code 016

Simulation as a Tool for Improving Transportation Contract Management

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Abstract

Transportation management is one of the areas that has strong impact on organization performance. For a company that does not have sufficient expertise and resource, it would be better to outsource this function to logistics/transportation provider. The company can form contracts or hire trailers at spot rate. By forming a contract, specific number of trailers will be dedicated to the company and the cost per trip will be lower than the spot rate. However, there is a minimum number of trips required for each trailer per month. If not properly managed, the company may end up paying more with the contract. This paper further experiments with the simulation model developed in the author's previous work (Setamanit, 2018) to enable the manager to identify appropriate fleet size and negotiate for better contract condition, resulting in better on-time delivery and lower cost. The result shows that the case study company should increase the number of contracted trailers from 10 to 16 trailers and negotiate for a minimum number of 39 trips per trailer per month. This will help the company decrease late delivery from 14% to 0.02% and reduce costs by 660,722.38 Baht per year. Furthermore, the simulation model is used to plan for future contract negotiation when there are uncertainties in demand for transportation. It is found that if the demand increases within 20% of the current situation, the delivery delay may increase but is still in an acceptable range. However, if the demand increases by 25%, the proposed contract will not be able to meet the on-time delivery criteria. Thus, the company will need to negotiate for a new transportation contract. In conclusion, simulation model proves to be an important tool that enables one to gain better understanding of the contract situation and be able to manage the transportation contract that best suits the company's objective.

Keywords: Outsourcing, Simulation Modelling, Transportation Contract, Transportation Management

Paper code 017

Maritime Transport Network Analysis: A Critical Review of Analytical Methods and Applications

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Abstract

This paper presents a critical review of the economic network analysis methods and their applications to maritime transport. A network can be presented in terms of its structure, topology, characteristics as well as the connectivity with different measures such as density, degree distribution, centrality (degree, betweenness, closeness, eigenvector and strength), clustering coefficient, average shortest path length and assortativity. Various models such as the random graph model, block model, and ERGMS can be used to analyse and explore the formation of a network and interaction between nodes. The utility of the connection between nodes in a network can be defined using the connections model. In addition, the stability of a network can be analysed using the blocking flow model. The review of the existing theories and models has found that these models are rather computationally intensive. They are based on simple underlying models of network formation and relationship between ports in the network, both at the local and global level. Based on the review, a conceptual framework for maritime transport networks is developed, and the applications for future research are also discussed.

Keywords: Transportation networks, Shipping network, Statistical properties, Network analysis, Models and applications

Paper code 018

Impacts of Freight Rate Spot Market on Long-term Interactions between Carrier and Shipper: Game-theoretic Analysis

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Abstract

Freight rate spot market in the liner shipping industry has a significant development during the recent years, and it interplays with the long term contract between the carrier and shipper. Under this background, this paper presents a Stackelberg games model by taking into account both the carrier's long-term decision (freight rate) as well as the shipper's long-term decision (shipment capacity procurement amount) and spot market supplement procurement decision. Facing market uncertainty, the shipper is risk-averse. The scenarios include considering only the long-term contract, only the spot freight market and considering both of the channels. Market demand is additively correlated with freight spot rate. Each of the optimality and equilibrium of the scenarios is analytically derived, and the existence and uniqueness are proved. The coordination solution for the carrier and shipper is designed. Insights are obtained through both modeling analysis and numerical experiments, with main takeaways, among others, as follows: (i) risk-aversion reduces the shipment capacity procurement of the shipper, which protects the shipper but jeopardizes the carrier's and the channel's performance; (ii) though spot market is not favorable for the carrier, it will increase both the shipper's utility and the overall performance of the channel; (iii) the correlation of market demand and freight spot rate brings more fluctuations and uncertainties for the shipper but grants more leverage for the carrier; (iv) the fluctuation of market demand and freight spot rate have different (even opposite) impacts on the carrier and shipper; (v) the coordination initiated by the carrier for the shipper could improve the channel performance substantially, but full coordination is not feasible due to the risk-aversion of the shipper.

Keywords: liner shipping, freight rate, spot market, risk-aversion, Stackelberg games

Paper code 019

Shipping companies' resilience: The influence of modularity and response diversity

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Abstract

The notion of organizational resilience provides a way to conceptualize desirable organizational performance when a shipping company is confronted by unexpected and unforeseen disruptions to its business. Due to uncertainty and surprise created by complex interactions among entities that constitute a shipping company and its environment, it may be difficult to foresee, and therefore prepare the company to withstand, all types of possible disruptions. Literature pertaining to complex adaptive systems (CAS) suggests that the extent of modularity and response diversity present in a system may influence the scale of impact of disruption on the system. However, there is paucity of empirical evidence to suggest how, and if, the concepts of modularity and response diversity can be applied to shipping companies. Based upon 30 interviews of senior managers of shipping companies operating in Australia, this study suggests that shipping companies with less modularity are more vulnerable to disruptions than those with greater modularity. Similarly, a high response diversity means that a shipping company has more choices in the way it responds to a disruption - potentially avoiding or limiting the impact. However, both modularity and response diversity are contextual; that is, a shipping company may exhibit different levels of modularity and response diversity under different circumstances.

Keywords: Organizational resilience, unforeseen disruptions, shipping company, modularity, response diversity

Paper code 020

A Comparative Analysis of Green Port Policies between China's and South East Asian Sea Ports under Belt and Road Initiative

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Abstract

The ever-increasing rigorous environmental requirements in the maritime transport motivate more and more port authorities to pay a great attention to "Green Port" policies. A green port policy may be differentiated from others with regard to what pollutants it cares about, from those aiming to achieve a comprehensive green port policy to one focusing only on low carbon emission policies. This research carries a comparative analysis of green port policies implemented in the Eastern Asian ports, mainly in China, Malaysia, Singapore, Thailand, and Vietnam. This research attempts to focus on a comprehensive review of five Asian Ports' green port policies, highlight potential challenges for other ports, and offer some policy recommendations, which may be of relevance to other developing ports. The target of this comparison is not restricted to the nations but also identify a representative port in each of these countries. Among these countries, it is found that China, Malaysia, Singapore, and Thailand have adopted the green port policy while both China and Singapore are currently implementing a variant of green port criteria as compared to the other three countries. Moreover, one big effort that both China and Singapore have made for green port policies is building automatic container terminals.

Keywords: Green Port, Port Policy, Eco-Port, Marine Transport Management, Belt and Road Initiative

Paper code 021

Optimizing Empty Container Management by Integrating Empty Container Reposition and Container Leasing Strategies

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Abstract

The scale of global trade imbalances has increased over the years, which has resulted in accumulation of empty containers in empty container surplus port areas and container shortage in empty container deficit port regions. For container liner shipping companies, empty container repositioning is a costly and inevitable operation. As mentioned in Song and Dong (2014), there are different solutions to the empty container repositioning problems such as organizational, intra-channel, inter-channel, and technological solutions. Internal organizational solutions turn out to be the focus of most literature on the empty container repositioning. It is worth noting that container leasing is one of the most important organizational solutions to the empty container repositioning problems. So far, there are several studies developing container leasing strategies to tackle empty container repositioning problems. Shen and Khoong (1995) propose a decision support system to optimize container repositioning and leasing decisions across ports. Cheung and Chen (1998) deal with a dynamic empty container allocation problem. Their goal is to help liner operators meet their customers' demand over time by repositioning empty containers and determining the number of leased containers. They first formulate this problem as a two-stage stochastic network, and then propose a stochastic quasi-gradient method and a stochastic hybrid approximation procedure to solve the problem. Moon et al. (2010) seek to help shipping companies optimize their short-term container leasing and purchasing strategies. In their research, they consider the long-term leased containers as the ones owned by the company. In practice, except for leasing containers from leasing companies, liner shipping companies may take empty containers from the spot markets with very limited number empty containers to deal with urgent demand. The members in the spot market including all other container providers and operators, such as leasing companies and other logistics companies. It is noted that empty containers must be returned back to the spot markets before the specified dates. In addition, the leased empty containers need to be returned to their original owners. That is, we need to keep track the paths of the leased empty containers from the start to the end. Actually, horizontal integration is quite popular in container shipping industry (Song and Dong, 2014). Carriers collaborate to achieve effectiveness of container operations and reduce costs. In addition, there are internet-based platforms that help shippers, forwarders, and shipping lines to share containers. Sanders et al. (2015) mention that Boston Consulting Group has

developed a global interchange marketplace (xChange) for empty containers. The company expects an annual savings of approximately $350 million to $700 million, and an annual savings of up to $4.5 billion if the xChange is applied to the top 100 liner shipping companies. That is, liner shipping companies, leasing companies, container traders and non-vessel operating common carriers (NVOCCs) together use limited number of containers, and are thus the stakeholders of empty container management. In practice, the liner shipping companies need to keep the inventory level of containers at each port high enough to meet the export demand, but not too high to incur high storage costs. Therefore, empty container management imposes a great burden on liner shipping companies. This research thus aims at helping liner shipping companies optimally manage their empty containers, which involves repositioning empty containers, purchasing and selling own empty containers, and leasing-in and leasing-out spot market empty containers. To tackle this challenging problem, this research mathematically models this empty container management problem that is defined on a time-space network. The objective of the problem is to minimize the total cost including transportation cost, storage cost, container rental and depreciation costs. The resulting mixed-integer linear program is solved by using commercial optimization software. Finally, experiments are conducted to exam the performance of the proposed model.

Keywords: Empty Container Management, Empty Container Repositioning, Container Leasing Strategy

Paper code 022

Tanker Loading and Unloading volumes Estimation by AIS and Maritime Open Data

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Abstract

Traditionally, the tanker loading and unloading volumes are important information in many aspects of shipping. However, this important information is not generally available. In this study, we propose a method to estimate tanker loading and unloading volumes in real-time by using Automatic Identification System (AIS) and maritime open data. First, we estimate AIS coverage by comparing the ships' AIS data with record of Communication Dispatch Center Master Plan. Then, we estimate the loading and unloading volumes of each tanker, by considering the AIS coverage, ship's berthing time, dead weight tonnage (DWT), length, width, required draught and oil arm efficiency, as extracted from various maritime data sources. Finally, we take real-world data of two petrochemical terminals in Guangzhou Port as a case to evaluate the proposed method. Evaluation results confirm the proposed method makes an accurate estimation.

Keywords: AIS, Maritime Open Data, Tanker loading and unloading volumes estimation, hazardous materials

Paper code 023

Decision-making of Port Enterprise Safety Investment Based on ALARP Risk Level

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Abstract

Port operation is susceptible to be affected by such factors as season, environment and trade. *etc*, which are occasional, uncertain, diversified and complicated disaster drivers. The interaction between the safety investment and risk level of port operation was explored systematically in order to make the port enterprise manage and control the high ranked hazards clear, using limited safety investment to make the risk level of ports operation as low as reasonably practicable (ALARP). By analyzing the key factors affecting port operation and their causal relationship with in man-machine-environment-management system, a decision-making model of port enterprise under ALARP was established by system dynamics. An illustration example and a sensitivity analysis were carried out to justify and validate the proposed model. The results show that increasing the total safety investment of port enterprises, improving the safety management investment of personnel and strengthening the implementation effect of investment can improve the degree of port security to a certain extent.

The strength of the proposed work is its practical applicability and the ability to provide direct reference for port enterprises to formulate safety investment strategy.

Keywords: Port enterprises, Safety investment, Decision-making, SD model, ALARP

Paper code 024

Risk assessment of bauxite import maritime supply chain using the combination of FMEA and FBN

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Abstract

An importing bauxite maritime supply chain (MSC) is forming from the mineral in the West Africa to China's ultimate customers. Based on the analyzing all processes involved in the bauxite import cargo flow and its value-added services, the external and internal influencing factors were explored and analyzed involved in the bauxite import MSC. A conceptual framework of risk assessing methodology for the bauxite import MSC was developed by the combination of Failure Modes and Effect Analysis (FMEA) and Fuzzy Bayesian Network (FBN). FMEA was adopted to identify the potential failure modes, analyze its causes and consequences. And then a Bayesian network was built based on a casual loop diagram. A triangular fuzzy number was used to deal with the uncertainties of the identified risk factors and get the parameters of each nodes. Finally, a sensitivity analysis was conducted to get the final prioritization of identified risk factors and assessment of the risk level. The research shows that the human errors in the navigation and port, goods fluidized easily, and strikes by local workers in Boke ports are in the priority of the risk factors, which could give the theory support of risk control measures.

Keywords: Bauxite import MSC, Maritime Silk Road, Risk assessment, FMEA, Fuzzy Bayesian Network

Paper code 025

Ports Competition Optimization Strategy and Maritime Transport Chain Configuration Decision along the Maritime Silk Road

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Abstract

Under the Belt and Road Initiative (BRI), the countries along the Maritime Silk Road are engaging to promote international trade and maritime transportation. Identifying new managerial and optimal competitive strategies creates opportunities and challenges for shipping companies and the port industry. Taking a maritime transport chain perspective, including deep sea hub ports, feeder services, and inland transportations, this paper established a game theoretical approach for a maritime transportation system with one container carrier (a liner company or one shipping alliance) and two hub ports in the region. Considering that the carrier and ports' profit are mainly affected by the revenues obtained from deep-sea shipment, hinterland shipment, and transshipment, the costs associated with the above activities are port operation, infrastructure investment, terminal congestion, and environmental impact on inland traffic. We developed a two-stage game structure to model the configuration performance of the maritime transport chain with possible vertical integration of ports as upstream players and the shipping carrier as the downstream player. Four scenarios were conducted to reflect configurations of maritime transport chain in reality along the Maritime Silk Road: (1) non-cooperative competitive model, (2) duopoly ports cooperative model, (3) the alignment of the carrier with one port, and (4) social optimum model. With backward induction, at the first stage, the non-cooperative port made pricing decisions to maximize profit. At the second stage, the carrier made the port-of-call decision. The optimal decision and managerial strategies were compared among the four proposed scenarios. First, we found that internalized port price enhances the coordination within the maritime transport chain to achieve profit maximization. Second, there are threshold effects in the process of port strategy optimization. Only when the hinterland shipment or transshipment level reach to a given threshold, port prices will increase. Third, when the service quality of carrier is improved in order to reduce possible congestion, we observed high port prices accordingly. Finally, when the port invests in physical infrastructure or digitalization, its profit will be reduced while the container carrier has a higher profit. Thus, the feasible incentive mechanism and subsidy policy are needed to encourage seaport investment.

Keywords: Maritime Silk Road, Maritime Transport Chain, Game Theory, Regional Hub Ports

Paper code 026

Maritime Logistics Perspectives on Short Sea Shipping Sustainable Solutions to Road Congestions under Belt and Road Initiative

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Abstract

The paper provides the Belt and Road Initiative (BRI)'s approach to promote the advantages of Short Sea Shipping (SSS) as efficient and sustainable alternative solution to the global issues of road congestion. SSS is expected to demonstrate multi-dimensional influence on global supply chain routes and maritime connectivity in the ASEAN region. SSS acts a significant role in fulfilling the objectives of the BRI Transport Policy, as it can help control the predicted considerable expand in heavy goods vehicle traffic, bypass land bottlenecks, and rebalance the modal shares. In the paper, we discuss the roles of SSS in BRI and the measures employed by the BRI so as to better encourage the use of this mode. The study provides insights into SSS require to be created within an integrated and participatory approach, with the reliable involvement of stakeholders from the entire sector in order to fulfill its economic, social and environmental roles.

Keywords: Intermodal Transport, Bottlenecks, European Transport Policy

Paper code 027

Competitiveness and Growth Diagnosis of Maritime Transportation in Alexandria Port – Egypt

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Abstract

This paper examines opportunities and undertakes growth diagnostics of maritime transportation in Alexandria port. The paper assesses existing opportunities for Maritime Transportation and proposes the best approach to rip such opportunities. Paper findings are that port inefficiency depicted by longer container dwell time, delays in vessel traffic clearance, lengthy documentation processing, lesser container per crane hour as one of the critical binding constraints. The other binding constraint of maritime growth is inefficient rail and road networks in the form of low speed and unreliability (Railways), insecurity, congestion, delays in checkpoints, diversions due to frequent maintenance.

In order to adopt a Growth Diagnostic methodology proposed by Ricardo Hausman, Dani Rodrick and Andres Velasco (HRV) to identify constraints that impede development of the Maritime transport focusing on a wide range of aspects within transportation corridors that are most critical and binding constraints to development of maritime transportation. The study expected result is call for holistic and integrated approach, policies and institutional arrangement for effective Maritime Transportation.

Keywords: Maritime, Transportation, Alexandria Port, Growth Diagnostic

Paper code 028

The Impact of BRI on the Countries in Bay of Bengal Area

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Abstract

Along with the China's preliminary announcement in 2013 about renovating the Silk Road and now known as BRI (Belt and Road Initiative), the huge project which will have impact on 70% of the world population and 62% of the world's GDP has started. The aims of this study is to explore the socio-economic impact of BRI on the countries in the Bay of Bengal Area and to find out how the multimodal transport connectivity create multilateral trade and economic growth in the countries across BRI. This study use SPSS (Statistical Package for Social Science) to analyze the influencing factor for the economic growth of the countries. Secondary data source is used to analyze the selected independent variables, multimodal transport connectivity factors to find out the impact on the economic growth, dependent variables. The quantitative data is used for descriptive and linear regression analysis in SPSS. This study expects to find out either the multimodal transport connectivity and inclusive infrastructure can facilitate the trade expansion, increase in FDI (Foreign Direct Investment) and enhance the industrialization process. The implications of this study is to prove that the impact of BRI results in pronounce increase of intra-regional trade.

Keywords: BRI, Impact, Transport Connectivity, Economic Growth, Intra-regional Trade.

Paper code 029

Extended Logistics Performance Index: In-depth Analysis

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Abstract

Since the first ranking of countries done by World Bank in 2007, Logistics Performance Index (LPI) has been the benchmarking tool to measure logistics performance in terms of both international and domestic perspectives. LPI has been using to measure and compare among countries by policy makers. This helps each country to identify their weakness, opportunity and challenges they are facing and what should they do to improve their performance on trade logistics. Combining six core indicators, namely, customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness, the overall score of each country is calculated by using arithmetic mean. Then the ranking of countries in LPI is revealed. Although the LPI score is the efficient index to show how well each country can operate logistics and supply chain, there is a lack of study to deeply analyze the results. For example, clustering countries into groups, i.e., high, moderate, and poor performance, then analyze the characteristics of each group. This research aims to fill this gap. In this paper, the result of LPI index will be deeply studied and analyzed by using statistical tools to reveal characteristics between each cluster, e.g., continent, developing and developed country. The findings from this research provide insightful information for policy makers and each country on how to improve their performance in a more efficient way.

Keywords: Logistics Performance Index, Clustering, Logistics Policy

Paper code 030

Assessment of Terminal Efficiency and Productivity in West Africa

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Abstract

Port terminals continue to play significant roles in the global supply chain network and they remain indispensable within intermodal transport framework. As a major trade facilitator, a port terminal should be managed and operated in a way that maximizes efficiency. Thus, the adequate allocation of limited economic resources remains a crucial factor to its stakeholders. The objective of this study is to assess the operating efficiency and productivity of six ports terminals located within potential hub ports in West Africa. Data Envelopment Analysis (DEA) Malmquist productivity index was applied to empirically analyse the change in productivity and its decomposition in selected port terminals using a panel data from 2010-2017.

The geometric mean of the chained Malmquist productivity indices is 0.988, which implies that port terminal productivity declined by 1.2% from 2010~2017 due to a regression in technical efficiency among potential hub ports. However, total factor productivity increases by 7.1% due to technical changes. The result also shows no significant correlation between terminal size and efficiency thus, efficiency is determined from appropriate allocation of resources by terminal operators and not by size of terminals. Finally, this paper does not only evaluate different terminal productivities and identify their main causes but it also contribute to the literature on port terminal efficiency especially in the sub Saharan Africa

Keywords: DEA-Malmquist Productivity index, Terminal efficiency/productivity, West Africa

Paper code 031

Factor Effecting the Internet of Things Technology Adoption in Supply Chain

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Abstract

In respective to Thailand, the industry is in an early engage in Internet of Things technology adoption, many institution and firms has invested to established their support on the upcoming IoT trend. However there are challenges that we've seen from other countries who are adopting of Internet of Things such as Security and Privacy, Compatibility, Risks, Support, Trust, Complexity, Integration, Standards, Benefits and Value proposition to the users. This makes it challenging to make informed decisions as regards IoT adoption. In order for Thailand to be in pace with the technology and able to gain benefits from the IoT technology, a deeper understanding of these benefits and challenges is essential for academic and management to consider in order to improving their success in adopting when design and deploying the IoT services and to accelerate Thailand economy in the 4.0 era. This paper provide the consolidated view on the factors that effecting the adoption of Internet of Things technology in Supply Chain through the systematic review from multiple technology adoption practices.

Keywords: Internet of Things Adoption, Technology Adoption, Belt and Road Initiative

Paper code 032

Evaluating the effects of Gang-Zhu-Ao Bridge on Connecting China to Southeast Asia: A Case Study of Air-Bridge-Air Path Linked by Hong Kong-Zhuhai Airport

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Abstract

To consolidate the position as the busiest Chinese hub to Southeast Asia, Hong Kong airport collaborates with Zhuhai airport through the "Gang-Zhu-Ao" bridge to establish an "air-bridge-air" path, which can potentially improve its air service markets in Northwestern China. In order to predict the increased demand attracted by this path, this paper proposes a path choice model using a nested logit model which incorporates the intermodal transfers on a time-space network. The proposed model was estimated based on the data collected from a stated choice experiment and was applied to forecast the geographical distribution of air passenger flow. As per the predicted results, the "air-bridge-air" path has a positive effect on improving the connection and travel efficiency between Northwestern China and Southeast Asia, indicating its contribution to develop the One Belt and One Road initiative. Meanwhile, some strategies about developing the flight network of Zhuhai airport are proposed where a starting up new air route from Xining to Zhuhai is recognized as the best option according to the results of scenario analysis.

Keywords: Belt and Road (B&R) initiative, "air-bridge-air" path, time-space- network, passenger flow distribution

Paper code 033

Space pattern and location characteristics of logistics nodes and enterprises based on points of interest (POI): A case study of Shanghai and Wuhan

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Abstract

As an emerging service industry, the logistics industry organically integrates the logistics resources and functions of the industry to exert the synergistic effect of "1+1>2". Its network structure and location characteristics are of great significance for optimization of urban planning layout and rational allocation of resources. In recent years, China has planned three major regional development strategies, namely the Yangtze River Economic Belt, the "One Belt, One Road" initiative and the coordinated development of Beijing-Tianjin-Hebei. Both as the important logistics hub in the Yangtze River Economic Belt, and the inland node cities in the "Belt and Road", the logistics industry of Shanghai and Wuhan has ushered in tremendous opportunities and challenges. How to use geographical advantages to promote its logistics influence has great strategic significance for coordinating economic development and industrial structure upgrading in various regions of the Yangtze River Basin. At present, domestic research on the logistics industry mostly has less sample data and lack of empirical analysis. Compared with traditional data collecting resource from enterprise yellow pages and questionnaires, the logistics POI (Point of Interest) data has the advantages of large sample size and complete geographic information. Taking Shanghai and Wuhan as research object, collecting their logistics POI data based on Baidu Map API Platform, and using the methods of concentration evaluation and logistics nuclear density analysis, this paper compares and analyzes the logistics activities of the said two cities, finds out the identity and difference of their spatial pattern and location feature, to provide relevant reference for the professional development of the logistics industry.

Keywords: logistics network, spatial pattern, logistics node, logistics enterprise, agglomeration effect

Paper code 034

Multiport Cooperative Location Model with a Safe-Corridors Setting in the Context of the Belt and Road Initiative

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Abstract

This paper develops a mathematical program with equilibrium constraints for decision-making regarding a multihub port location in West Africa. With an aim to respect the high security risks associated with inland areas of West Africa and the poor reliability of inland transportation systems, this model takes the lowest regional generalized transportation cost as the optimization goal and simultaneously optimizes three features: the choice of ports in which to invest, the port expansion plans and the necessary inland safe-corridors (railway lines) design. By introducing a few complementary conditions, the model can reasonably portray the influence of a large number of shippers' noncooperative game relationships on the location of the hub ports. To solve this model, a hybrid active set algorithm embedded with the Frank-Wolfe method is proposed. Using the above model and algorithm, we studied the Chinese government's optimal investment quota-setting and investment plan design for the construction of West African hub ports.

Keywords: Belt and Road Initiative, Hub Port, Security Risk, Container Shipping, User Equilibrium

2019 BRI Conference Papers (Extended Abstracts)

Paper code 035

Facility Location and Capacity Planning with Consideration of Policy Guidance and Uncertain Demand under One Belt One Road Initiative

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Abstract

China government aggressively promotes the "One Belt and One Road (OBOR) Initiative" the second session of the 13th National People's Congress in March 2019, which aims to improve and reconfigure logistics and transportation networks along the OBOR trade corridors and connectivity among the countries. By employing these infrastructure facilities, a great many of goods are delivered to many regions and then assigned to their customers. Hence, facility location and capacity planning become a key issue in construing the logistics and transportation network. Nevertheless, under OBOR initiative, this problem is greatly affected by government policy guidance and uncertain demand. In this study, we aim to establish a facility location and capacity planning model with consideration of government policy guidance and uncertain demand, and then present a simulation-based optimization approach to deal with it.

Keywords: Facility location and capacity planning, Policy guidance, Simulation optimization, Optimal computing budget allocation

Paper code 036

New Silk Road and Trans-Asian Railway: Analysis with the Focus on the European Hinterland and the Case of the Czech Republic

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Abstract

By conducting the research project, the authors seeks to challenge the very relevance of the Belt and Road Initiative (BRI) framework and its New Silk Road (NSR) corridor for the overseas trade dynamics and routes for the Czech Republic containerized goods including the imports from Far East Asia. The authors question if and to what extend there is a linkage between the emerging importance of digitalization in the economy as the application of logistics 4.0 and the BRI framework based mostly on transport infrastructure projects. For feasible, sustainable and functioning of any transport infrastructure project, the efficient employment and ongoing development of ICT including the digitization and digitalization is a must.

Keywords: Container shipping, Belt and Road Initiative, New Silk Road, service reliability, transport costs

Paper code 037

Terminal location and sharing problem in a competitive environment

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Abstract

Due to the intense competition among express delivery companies, the small and medium-sized express delivery companies are suffering from their low demand and under-utilized terminals. This study investigates collaboration among the small and medium-sized express delivery companies. To help the small and medium-sized express delivery companies compete with giant express delivery companies, a collaborative strategy, sharing cross-docking terminals, is proposed for the small and medium-sized express delivery companies.

Keywords: Tournament-based Variable Neighborhood Search, Sharing Terminal, Logistics Companies, Pure Nash Equilibria, Coopetition game

Paper code 038

Belt and Road Initiative: Opportunities and Challenges for China in the Middle East

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Abstract

The aim of this paper is to explore the opportunities and challenges that China would be faced through Implementing the Chinese Belt and Road Initiative (BRI) in the Middle East.

The Implement of the China BRI in the Middle East would provide Beijing with opportunities that the initiative offers yet, it also led the country to face with inherent risks and challenges.

China would benefit from the Middle East in the framework of Belt and Road project generally through three main aspects:

1- Energy resources: the Middle East as a place of huge energy resources provides more than half of China's crude oil imports, through this project Beijing can secure its energy needs.
2- Great Market: The Middle East is a home for more than 400 million populations who needs Chinese goods, productions and technologies and China is a largest trade partner of the region's countries.
3- A Route for China towards Europe and Africa: In terms of strategic location, the Middle East serves as the central hub connecting three continents – Asia, Africa and Europe and this would help China for shipping its products to African and European markets through the Middle East.

In short, the Belt and Road Initiative is highly likely to become China's most significant contribution to the Middle East economic development as it will provide the economic solution for the region needs and peace process as well. Since 2013, this project has offered a solution to many issues in the Middle East involving development through investment, transfer of technology, industry and trade. Although, it would offer the opportunities for China national interests and companies at the same time it would provide challenges to Beijing presence in the region.

Keywords: Belt and Road Initiative, China, the Middle East, Silk Road, Energy and Trade.

Paper code 039

Impacts of High-speed Trains on International Tourist Arrival to China

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Abstract

In the last decades, the development of high-speed trains (HST) has been a crucial innovation of transport infrastructure from the traditional railway due to its impact on its time saving, convenience and cost-effectiveness (Ardun and Ni, 2005). Nowadays, the high-speed train system is perceiving as has become one of important policies in many developing countries including China. Furthermore, it is an important component of the One Belt One Road policy of Chinese government. Therefore, this paper aims to testify the importance of CRH in determining the China inbound tourism attractiveness of destinations.

Keywords: China, Gravity Model, High-Speed Train, Tourism Economy

Paper code 040

The Influence of Belt and Road Initiative on the New Suez Canal

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Abstract

Nowadays trade and transport corridors are key routes that facilitate the movement of cargo and goods between both regions and countries. Regional corridors are particularly essential to land locked countries where they are necessarily for economic salvations in which frequently providing the only overland routes to regional and international markets. Furthermore, these corridors offer high capacity transport system and service that reduces trade transport cost by creating economics of scale.

The implementation of block chain technology in maritime industry has the potential to cut administrative and operational cost. Although, smart bills of lading could be replaced with the traditional paper bill of lading. These will lead to lowering costs while making data transfers more accurate, efficient, and secure and more reliable. The main objective is to demonstrate the significance of One Belt One Road Initiatives (BRI) trade corridors between regional and international markets. This reveals to identify the trade volume in Suez Canal and its impact on the efficiency and reliability of logistics services. This diagnostic requires both quantitative and qualitative data be collected and measures the outcome to reduce cost associated with goods and cargo movements and enhancing the performance of trade corridors used by land linked countries.

This research aims to investigating the role of block chain maritime transport effect on Suez Canal and to show the integration trade corridors on New Silk Road development potentials trade routes to Europe from Asia across the Strait of Malacca and Suez Canal. Thus, Egypt can play a main role in China's Belt and Road initiatives due to its strategic geographic location. Furthermore, this will result in enhancing Egyptian economy and reveals the sustainability trade corridors routs multimodal by using Block Chain and Maritime on Suez Canal traffic volume.

Keywords: *New Suez Canal, Block Chain, One Belt One Road, New Silk Road.*

Paper code 041

The coordinated development of China's inland ports based on the matching of logistics capability and demand along the Belt and Road

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Abstract

Under the background of "the Belt and the Road Initiative (BRI)", the inland ports which are playing an increasingly important role in connecting the inland regions and the international logistics network along "the Belt and the Road (B&R)" have been rapidly expansion and construction. However, there are some problems in the effective operation of inland ports, such as no division of labor and cooperation among them. This paper aims to propose an analytical method for establishing an efficient and coordinated operation of inland port system. To achieve this objective, this paper takes 40 inland ports of China's government planning as an example. Firstly, the complex network analysis method and mean-shift clustering method is carried out to obtain the cargo flow structure of the inland ports and the other countries along B&R. Secondly, the concept of "logistics capability" is formalized and an index evaluation system of it is built to evaluate the logistics capability of inland ports by Multi-Criteria Decision Analysis (MCDA). At the same time, a model is proposed to evaluate the matching degree of logistics capability and logistics demand of inland ports, and then the spatial structure characteristics of the matching degree of inland ports are analyzed based on the spatial clustering method. Finally, on the basis of findings of the characteristics of cargo flow structure and the spatial characteristics of matching degree between logistics capacity and demand, this paper puts forward some suggestions on the recognition and classification of core hub inland ports and main and branch inland ports, as well as suggestions on the selection of suitable inland ports to establish cooperative operations groups of inland ports. It provides meaningful decision support for the healthy development of inland ports.

Paper code 042

Policy Implications of BRI by Text Mining Approach

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Abstract

Using the methodologies of Text Ming, this paper aims to examine hidden meanings of U.S. and China's policies on the Belt and Road Initiatives and bilateral trade. Large number of official speeches from the U.S, and China's political leaders on the issues of trade and BRI are collected, and examines different notions about the word 'BRI' and 'trade' from its political leaders. Also this paper tries to examine differences of semantic networks of BRI related words between U.S. and China's political leaders.

Keywords: Belt and Road Initiatives Text Mining Analysis, LDA (Latent Dirichlet Allocation), TF-IDF (Term Frequency-Inverse Document Frequency), Semantic Networks of BRI

Paper code 043

Valuation of Revenue Bond for Port Investment

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Abstract

Infrastructures are perceived as primary tools to implement economic policies, and to support a nation's economic growth. Especially, transportation infrastructures, e.g. sea ports, air ports, rail ways and high ways have been playing key roles for development of real economy. It will not change in the future. In addition, the capacity of an infrastructure is important from many viewpoints. Intuitively, the larger capacity is less likely to cause congestion problems, and brings more social welfare.

However, it is difficult to secure financial resources for infrastructures in low GDP growth rate and fiscal deficit countries, for example Japan. For such countries, a way to finance which does not increase the government debt is required in infrastructure investment. Here, one of the solutions might be a revenue bond issued by a utility company managing transportation infrastructures. In principle, the payability of revenue bond depends on the cash flows generated by the corresponding infrastructure, and there is no government guarantee. Then the debt is exposed to credit risk. The credit spread of the revenue bond is affected by both the scale of infrastructure project and future economic conditions, especially, future demand for the service supplied by it.

Thus, our research aims to investigate relations among the scale of infrastructure that is capacity, social welfare, and credit spread (financing cost). To address this issue, we develop a model to price a revenue bond for an infrastructure project.

Actually, there are many previous studies deriving valuation formulae for defaultable bonds. They are largely divided into 2 categories. One is called as structural approach, which starts from Black and Scholes (1973) and Merton (1974). The other is called as reduced-form or intensity-based approach. Jarrow and Turnbull (1995) and Jarrow et al. (1997) build the core of reduced-form approach.

Though the previous researches assess financial condition of a firm in order to price defaultable bonds, they do not pay attention to social welfare which is generated by the firm products or services. Therefore, it is not appropriate to apply these approaches directly to valuation of a revenue bond for transportation infrastructure projects. Furthermore, debt volume does not essentially affect the credit spread in existing researches. On the other hand, an amount of borrowed money to invest is influential on the credit risk in an infrastructure project. Considering these facts, we develop a pricing model to analyse nexus among the capacity of infrastructure, social welfare, and credit spread.

We roughly explain our model to discuss a case of port investment in a capacity level. It is assumed that a port issues a revenue bond for its facility investment to increase port service demand. At the maturity date, the port must repay both the interests and principal to the bond holder. Here, the port is assumed to be operated by a private company.

Since we assume uncertainty fluctuation of demand for the port service over the period, the revenue of the port is also exposed to risk. There will be no financial aid or subsidies by a government even if the port would be in financial distress at the expiration. That is, the revenue bond holder is exposed to credit risk, and requires some credit spread to the issuer.

On the other hand, the port is needed to play a role of public facility. Then, the port tries to increase the consumer surplus (social welfare) of port service. The larger the size of investment makes both the social welfare and default risk greater. Thus, the port is assumed to decide both the project size and the port charge to maximize the expected total social welfare over the period, under some constraints such that its default probability is less than a certain level, e.g. 0.01.

Under these conditions, we examine a non-cooperative game between the port, that is the issuer of the revenue bond, and the creditor. Then a derived credit spread gives us a revenue bond price at the Nash equilibrium.

After deriving the equilibrium revenue bond price, we analyse effects of both the credit risk generated by the demand fluctuation and the project size on the market performance, e.g. the revenue bond price, the port charge, and the expected social welfare.

Here, we should refer the existing literature of port policies, for example, recent representative papers are Dong et al. (2018) and Balliauw et al. (2019). In those studies, the main context is relation among neighbor ports, but financing for investment is not considered. The detailed results are presented at the conference.

Keywords: Social welfare, Capacity Investment, Credit Risk

Paper code 044

Design of Berth Allocation Problem Visual Model: Case Study Indonesian Port of Tanjung Priok

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Abstract

Almost 70 percent of World Trade occurs in the Asia Pacific, and 75 percent of that trade is shipped through the Indonesian territorial water. So, there is no doubt that container terminals are an essential part of improving the national economy. Berth allocation problem is one of the critical factors of container terminal operation. By visual simulation, terminal operator and shipping lines will understand system behavior of container terminal easier. Therefore, this research uses a visual model as a tool to evaluate berth allocation methods, namely first come first served (FCFS), berth closest to stack policy (BCSP), and service priority (SP). The simulation results show that the FCFS method gives the shortest average service time. On the other hand, for berth productivity parameter, BCSP method resulting in the highest number of movements while the SP method will effectively decrease service time of prioritized vessel type.

Keywords: berth allocation, berth closest to stack policy, container terminal, first come first served, service priority

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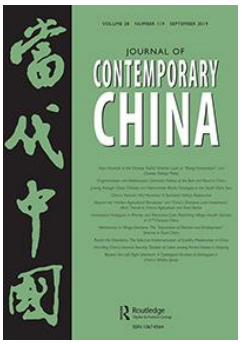

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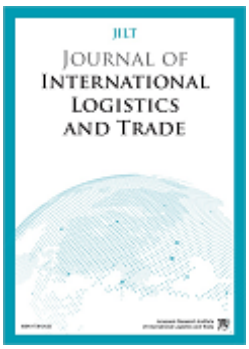

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