The Australian Maritime Logistics Research Network (AMLRN) 2021 Symposium

Thursday, 2 December 2021

Hosted by

National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania

Institute of Transport and Logistics Studies, Business School, The University of Sydney

School of Accounting, Information Systems & Supply Chain, RMIT University

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WELCOME FROM THE AMLRN 2021 SYMPOSIUM CHAIR

Chair of the AMLRN 2021 Symposium
Associate Professor Peggy Shu-Ling Chen

National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia

Co-Chair of the AMLRN 2021 Symposium
Professor Michael Bell

Institute of Transport and Logistics, Sydney Business School, University of Sydney, Australia

On behalf of the Organising Committee, we would like to warmly welcome all academic and industry participants, founding members of the AMLRN, distinguished guest speakers, industry discussion panellists, and paper presenters to the Australian Maritime Logistics Research Network (AMLRN) 2021 Symposium.

The AMLRN was launched in 2019 aiming to connect academics in the field of maritime logistics, as well as with industry professionals and organisations that have an interest in maritime logistics research and related activities to achieve the synergy in research grant applications, advocacy and advice to Government dealing with maritime logistics policy issues, joint conduct of research and industry projects and others. The annual symposium of AMLRN is one of the important platforms to achieve the objectives. Following the successful inaugural and second Symposiums hosted by RMIT in 2019 and 2020, it is the great pleasure of the Australian Maritime College and the Institute of Transport and Logistics Studies, University of Sydney to co-host the third Symposium.

The theme of the AMLRN 2021 Symposium is '***Maritime Logistics in the Post-Pandemic Era'.*** Global recovery of economy and trade from the COVID-19 impact has been seen as a result of the rollout of vaccination and governments' stimulus packages. The global recovery and positive outlook of trade has further driven the demand for maritime logistics and supply chain services, but there are various challenges facing industries, such as global container shortage, port congestion, increasing fuel price and decarbonisation, maritime digitalisation and cybersecurity, and workforce. Therefore, how to build sustainable and resilient maritime logistics and supply chains in the post-pandemic era is an important topic to research, and the research results will contribute to better understanding the role of maritime logistics and supply chains in promoting economic recovery, resilience and prosperity in the post-pandemic era. The Symposium provides an excellent opportunity for AMLRN members and other prospective participants to get together and exchange practical experience, research results, ideas, commentary, feedback on this topic.

We appreciate that the Symposium features presentations from academics and practitioners not only from Australia but also other countries including Singapore, Oman, Vietnam, Sri Lanka, and the United Kingdom. The AMLRN 2021 Symposium is still organised online owing that travel restrictions are not completely lifted. We would like to express our deep appreciation to the Australian Maritime College of the University of Tasmania for the great support. We hope you enjoy the online symposium and look forward to seeing you again in the AMLRN 2022 Symposium.

SYMPOSIUM ORGANISING COMMITTEE

- **Symposium Chair**
  - Associate Professor Peggy Shu-Ling Chen, Australian Maritime College, University of Tasmania
  - Professor Michael Bell, Institute of Transport and Logistics, Sydney Business School, University of Sydney

- **Members of Symposium Organising Committee**
  - Associate Professor Peggy Shu-Ling Chen, Australia Maritime College, University of Tasmania
  - Professor Michael Bell, Institute of Transport and Logistics, Sydney Business School, University of Sydney
  - Associate Professor Vinh Thai, School of Accounting, Information Systems and Supply Chain, RMIT University
  - Dr Wenming (Wendy) Shi, Australian Maritime College, University of Tasmania
  - Dr Sean Asian, La Trobe University
  - Dr Hadi Ghaderi, Swinburne University of Technology
  - Dr Yong Wu, Griffith University
  - Professor Victor Gekara, School of Accounting, Information Systems and Supply Chain, RMIT University
- **AMLRN Secretariat**
  - Associate Professor Vinh Thai, School of Accounting, Information Systems and Supply Chain, RMIT University
  - Dr Thuy Nguyen, School of Accounting, Information Systems and Supply Chain, RMIT University
  - Dr Aswini Yadlapalli, School of Accounting, Information Systems and Supply Chain, RMIT University
  - Dr Priyabrata Chowdhury, School of Accounting, Information Systems and Supply Chain, RMIT University

THE AUSTRALIAN MARITIME LOGISTICS RESEARCH NETWORK (AMLRN) 2021 SYMPOSIUM PROGRAM

AGENDA

10:00 – 10:15	**Opening Ceremony**
	Zoom host: Assoc Prof Peggy Chen Zoom link: https://utas.zoom.us/j/88634669282
	• **Opening and Acknowledgement of Country** Assoc Prof Peggy Chen, *National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia* • **Welcome** Mr Michael van Balen AO, *Principal, Australian Maritime College, University of Tasmania, Australia*
10:15 – 12:15	**Keynote presentations**
	Moderator: Prof Michael Bell, *Institute of Transport and Logistics Studies, University of Sydney, Australia*
	10:15 – 10:45 • **"Essential and Forgotten – Seafarers during Covid"** Prof Devinder Grewal, *CEO, Australian Institute of Shipping and Transport Logistics (AISTL)* **10:45 – 11:15** • **"Securing Modern Supply Chains: Cents, Scents, Sents and Sense"** Mr Jonathan Kempe, *CEO & Founder, VERIFAI* **11:15 – 11:45** • **"Sustainability in Australian ports and supply chain network"** Mr Bilal Ali Khan, *General Manager, New Markets, Geelong Port* **11:45 – 12:15** • **Q & A** Moderator: Prof Michael Bell, *Institute of Transport and Logistics Studies, University of Sydney, Australia*
12:15 – 13:00	**Break**

13:00 – 15:00	**Parallel paper presentation Session 1, Session 2, Session 3, Session 4**
15:00 – 15:15	**Break**
15:15 – 16:15	**Industry panel discussion**
	Moderator: Assoc Prof Vinh Thai, *School of Accounting, Information Systems and Supply Chains, RMIT University, Australia* Zoom host: Assoc Prof Peggy Chen Zoom Link: https://utas.zoom.us/j/83027451989
	Maritime Logistics in the Post-Pandemic Era Panel members • Mr Zoran Kostadinoski, *Head of Border and Biosecurity, International Forwarders & Customs Brokers Association of Australia Ltd.* • Capt. Rohit Sukumar, *National Manager Ships & Terminals, CMA CGM Group Agencies Australia* • Mr Mark Cooper, *Manager North, Tasmania Ports Corporation*
16:15 – 16:30	**Certificate Award and Closing**
	Chair: Assoc Prof Peggy Chen, *National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia*
	• **Award of Certificate of Appreciation and Certificate of Participation** Assoc Prof Peggy Chen, *National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia* • **Concluding remarks** Assoc Prof Peggy Chen, *National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia*

Presentation Schedule – Parallel Sessions

Session 1: Maritime dynamics	**Session 2: Supply chain management**	**Session 3: Port operations and management**	**Session 4: Workers in supply chains**
Chair: Dr Yong Wu (Griffith University)	**Chair: Dr Sean Asian (La Trobe University**	**Chair: Dr Hadi Ghaderi (Swinburne University of Technology)**	**Chair: Prof Victor Gekara (RMIT University)**
Zoom host: Wendy Shi **Zoom link:** https://utas.zoom.us/j/85682078104	**Zoom host: Hadi Rezaei Vandchali** **Zoom link:** https://utas.zoom.us/j/86315812723	**Zoom host: Peggy Chen** **Zoom link:** https://utas.zoom.us/j/83363620526	**Zoom host: Son Nguyen** **Zoom link:** https://utas.zoom.us/j/88676938092
13:00 – 13:30: Container shipping market movements during the pandemic explained by system dynamics *Ze Wang, Michael G H Bell, Shengda Zhu, Jyoti Bhattacharjya, Glenn Geers*	**13:00 – 13:30:** The Impact of Supplier Involvement on Supply Chain Performance Flexibility *Abdelsalam Adam Hamid, Buthaina Al Shammakhi & Noorul Shaiful Fitri Abdul Rahman*	**13:00 – 13:30:** Impact of shipping firms' anti-corruption policies and practices on cargo clearance at Seaports: An empirical evidence from Nigeria *Muhammad Dan-Asabe Abdulrahman, Nachiappan Subramanian, Jing Yu YANG*	**13:00 – 13:30:** Seafarers change and repatriation issue during COVID-19: an empirical study in Vietnam *Lam Canh Nguyen, Gia Huy Dinh, Hoang Duc Bui, Ngoc Kieu Oanh Nguyen, Ha Ly Le*
13:30 – 14:00: Development of collaborative spirit indices: The case of South Korea's maritime industry *Saeyeon Roh, Changsoo Kim, Youngjoon Seo*	**13:30 – 14:00:** Risk and Resilience in the Global Supply Chains, Maritime Transport, and Logistics *Yazan Al-Marzooqi, Fai AL-Musalami, Najoud AL-Maqbqli & Noorul Shaiful Fitri Abdul Rahman, Zouhaier Slimi*	**13:30 – 14:00:** Optimizing Gate Queueing at Container Terminals to Facilitate Green Operations *Heshan Abeysooriya, Buddhi A. Weerasinghe, & H. Niles Perera*	**13:30 – 14:00:** Managing Disruptions in the Maritime Industry – A Systematic Literature Review *Thanh-Thuy Nguyen, Dung Tran, Truong Ton Hien Duc, and Vinh V. Thai*

14:00 – 14:30: Identifying the operational process of a Ro-Ro terminal using a System Dynamic model *Amila Manatunga, Buddhi A. Weerasinghe, & H. Niles Perera*	**14:00 – 14:30:** A Dynamic Strategic Framework that Integrates the Industrial Revolution 4.0 and the Sultanate of Oman Logistics Strategy 2040 Perspectives: Oman Logistics Sector *Noorul Shaiful Fitri Abdul Rahman, Abdelsalam Adam Hamid, Khalid Al Kalbani, Kalthoom Mohammed Murad Al Balushi, Nur Hazwani Karim, Rudiah Md Hanafiah, Ahmed Moustafa Ahmed*	**14:00 – 14:30:** The Effects of Dry Port-Seaport Integration on Seaport's Performance in Vietnam *My T.N NGUYEN, Vinh V. THAI, Caroline CHAN, Kwok Hung LAU*	**14:00 – 14:30:** Future of Shipping Industry in the Age of Automation: The Case of Seafarer Training Challenges *Mehrangiz Shahbakhsh, Gholam Reza Emad, Stephen Cahoon*
14:30 – 15:00: Covid-19 impact: An application of system dynamics to the oil and tanker markets during 2020 *Ze Wang, Michael G H Bell, Shengda Zhu, Jyoti Bhattacharjya, Glenn Geers*	**14:30 – 15:00:** The Sustainability and Resilience of Supply Chain System In the Post Covid-19 Scenario *Dr Jai Acharya*	**14:30 – 15:00:** Determinants of total logistics cost in ports *Khandaker Rasel Hasan, Wei Zhang and Wenming Shi*	**14:30 – 15:00:** How critical is maritime security to seafarers? *Peter Cook*

Please be kindly noted that all indicated timeslots are <u>Australian Eastern Daylight Time (AEDT)</u>.

SYMPOSIUM KEYNOTE SPEAKERS

Prof Devinder Grewal

CEO, Australian Institute of Shipping and Transport Logistics (AISTL)

Biography

Devinder currently works through his consulting company, the Australian Institute of Shipping and Transport Logistics (AISTL). He consults internationally on strategic logistics projects. Earlier, he was

- The founding General Manager of Australian Industry Standards Global (AISG).
- Academic Director and Head of Logistics at the Australian Institute of Business.
- Chair Professor for Ports and Integrated Logistics at World Maritime University, a specialist institution of the United Nations.
- Head of Maritime Business and Logistics at the Australian Maritime College.
- Director Maritime Capability at the Office of Transport Security, Department of Transport, Canberra.
- General Manager of Esperance Port Authority.
- General Manager of Cashmere Iron.
- Executive Director of Business Development and Industry Engagement at the Canberra Institute of Technology.

Devinder has been an Adjunct Professor at the School of Management, University Canberra, the Centre for Customs and Excise Studies, and University of Central Queensland. He has been chairman of the Chartered Institute of Logistics and Transport Australia, Tasmania branch, and vice-chairman of the ACT branch.

While Devinder publishes as a normal academic, more of his work is government advisory and restricted to public access. He was instrumental in setting up a few research centres, among them the Seafarers' International Research Centre at the University of Cardiff with Professors Alastair Couper and Detlef Nielsen, and the Centre for Port Research within the Corporate Development Unit of Petronas.

Away from his mainstream work, he has developed concepts for educational and primary health support for the Aboriginal communities, including through the use of remote education and telemedicine.
For several years, Devinder was an invited member of the Board of Directors of the Transport and Logistics Skills

	Council (TLISC), which later became the Australia Industry Standards (AIS), and the Transport Research Consortium.
Keynote Overview	The consequences of the Covid-19 pandemic have been far-reaching. Organisations have had to make extensive changes to their way of working. While many of us have been working from home, seafarers have been forced to continue to live at work. This has created unusual challenges in an already unusual workplace. At the outbreak of the pandemic last year, seafarers were designated as keyworkers, given the fact that the shipping sector moves over 90% of all trade (close to 99% in the case of Australia because we share no land border with any country). Yet, despite the importance of shipping to the global economy, the importance given to these workers is secondary to that enjoyed by the population ashore. As international borders have closed, seafarers have been stranded onboard their own ships and concerns have been raised about their health, safety and well-being. The flip side of this coin is that many other seafarers are stuck at home, unable to join ships. Many of them are employed on contracts and get paid only when they are on board. While they are stuck at home with their families, they are living without any earning and professional practice. Often, they are ineligible for any job retention schemes that may be operating in their countries. This paper flags some of the issues faced by seafarers as a result of Covid.
	**Mr Jonathan Kempe** *CEO & Founder, VERIFAI*
Biography	Jonathan Kempe speaks, lectures, and actively contributes to a variety of industry forums and publications, regularly imparting unique insights on emerging technologies, IoT, biometrics, the protection of critical infrastructure and global supply-chain trends. Jonathan is a NSW Cybersecurity Ambassador, certified in Maritime Cybersecurity through Lloyds Academy, and was recently appointed to the VCARE Academy's supply-chain Education and Research Practitioners Board. Jonathan is Founder and CEO of Sydney-based technology company Verifai. Verifai deploys unique technologies that protect supply-chain assets at rest and in transit, through the deployment of physical Seals and Sensors, paired with a cloud-

	based data-analytics platform. Jonathan is also the host of the Let's Talk Supply Chain Asia Pacific podcast, where he has the privilege of engaging with practitioners and prominent industry voices from his local region and across the world.
Keynote Overview	We can clearly observe the state of chaos that currently exists in global supply chains. But how did we end up here? And more importantly, how can we evolve our supply chains – both in Australia and globally – so future events are less disruptive? Jonathan Kempe outlines how modern technologies can augment supply-chain processes and assist participants to operate more effectively and efficiently. Topics include: The global supply chain in our context; using IOT to enhance granular visibility; the role of low-earth orbit satellites to increase transparency; and how improved security outcomes impact you as a consumer.
	**Mr Bilal Ali Khan** *General Manager, New Markets, Geelong Port*
Biography	Bilal is a senior executive with over 20 years' experience in ports and supply chain focussed on value creation. In his role as General Manager, New Markets, Bilal is responsible for leading GeelongPort's growth in new and emerging markets. Working across geographies, Bilal has developed extensive people leadership skills and is a true believer of investing in people. Bilal's ability to communicate a compelling vision that is simple and relatable is of great importance in his role. Bilal's entrepreneurial approach to problem solving is a perfect match for the paradigm shift in existing and emerging markets. Challenging the status quo and pushing boundaries is what Bilal thrives on and is really excited about the leadership role in delivering growth opportunities for GeelongPort. Bilal holds a Master Mariner License, Executive MBA and Master of Applied Finance.
Keynote Overview	Last two years of the pandemic have showcased our collective resilience and knowingly or unknowingly, we are all accepting of the wicked problems we face and the need to play the infinite game. There is no linear solution to a wicked problem and arguably, there is no solving a wicked problem at a point in time. Tackling wicked problems requires a mindset of playing

	the infinite game where the purpose of playing is not to win but to keep playing. Ensuring sustainability of supply chains in Australia is an example of a wicked problem that needs to be solved through the mindset of playing the infinite game. The Victorian Government launched the Victorian Ports Review with a view to tackle the structural issues in sustainability of supply chain network and should be commended for their initiative. Key themes that have emerged from the Victorian Ports Review are focussed on augmentation of existing infrastructure which is extremely reassuring as this would ensure investment in port infrastructure is fit for purpose and does not result in stranded assets. At GeelongPort, we see sustainability as a journey where we are playing the infinite game and celebrate milestones as we pursue our ambition to be the most sustainable bulk port in Australia. We are extremely proud of the most recent milestone of being 100% carbon neutral as certified by Climate Active. GeelongPort made the decision to go carbon neutral as we as a business acknowledge that climate change is one of the major risks currently facing communities globally. We are incredibly proud to be the first port in Australia to have achieved this certification and to be able to demonstrate our strong commitment to environmental sustainability and climate change mitigation. With a clear focus on creating a sustainable future, private port operators should proactively engage with the government to deliver future focussed port infrastructure. Together, the government and port operators working with the key stakeholders can play the infinite game to tackle wicked problems.

SYMPOSIUM INDUSTRY PANELISTS

Mr Zoran Kostadinoski

Head of Border and Biosecurity, International Forwarders & Customs Brokers Association of Australia Ltd.

Biography

Zoran Kostadinoski is the Head of Border and Biosecurity at the International Forwarders and Customs Brokers Association of Australia (IFCBAA). The IFCBAA functions as a peak national industry association and the influential voice for customs brokers, international freight forwarders and other associated entities concerned with international trade.

Zoran has a diverse background in international trade logistics fulfilling management roles in import and export operations, international shipping, freight forwarding, barrier clearance, supply chain management and government liaison.

Improving the barrier clearance process, global and domestic supply chain efficacy and visibility is a passion for Zoran, who is an active participant at various national industry and government consultative committees.

Capt. Rohit Sukumar

National Manager Ships & Terminals, CMA CGM Group Agencies Australia

Biography

A Maritime and Shipping management professional with over 15 years of seafaring experience as a Captain of Container vessels as well as 5 years in Operations and Commercial Management for Container trades.

Currently with CMA CGM Australia as the National Manager Ships and Terminals with responsibilities covering Vessel Operations, Cargo Operations and Compliance across ports and terminals in Australia.
Holds a Master's in Business Administration from Melbourne Business School and a Diploma in Nautical Studies from Singapore Maritime Academy.

Mr Mark Cooper

Manager North, Tasmania Ports Corporation

Biography

Mark Cooper has over 35 years' experience in management roles encompassing marine port operations, national retail, industrial gas production and distribution, national & international logistics and Australian & international consulting (focusing on mining, logistics, business development, industrial gasses and vocational education within PNG and SE Asia).

In his current role, Mark manages marine ports focussing on landside operations. He has strong interests in maritime logistics, implementing lean processes to improve competitiveness, decarbonisation of ports and supporting Tasmanian renewable energy projects.

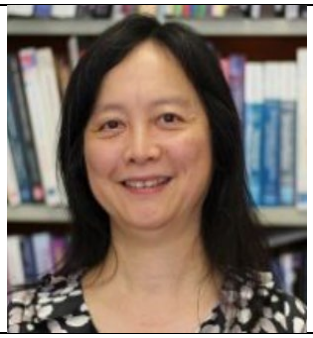
Graduating from the University of Tasmanian in 2005 with an MBA, Mark is a firm believer in lifelong education and holds qualifications in a diverse range of areas including project management, vocational education, education design, OH&S and is currently one assignment away from finishing a sustainability diploma. He actively participates in national debates around ports & asset management, renewable energy and freight logistics. He is a regular attendee at Australian and international energy conferences and writes occasional articles on a range of topics including renewable energy.

Panel Discussion - Maritime Logistics in the Post-Pandemic Era

1. There seem to be current supply chain disruptions globally as well as in Australia specifically with shipping delays and empty container shortage. What are the impacts of these disruptions on the Australian maritime industry, exporters/importers and consumers?
2. Could you please share with us the best practices so far which have been taken globally and in the Australian maritime industry context to mitigate these disruptions? In your view, could they have been done better?
3. In your opinion, how should the federal and state government, as well as various sectors of the industry, work with each other to better address these disruptions in the future?
4. Looking to the future, what impact do you think COP26 commitments have on the Australian maritime sector?
5. Looking into the future, what should be done, particularly concerning the academic and industry collaboration, to address these issues?

SYMPOSIUM MODERATORS

Symposium Chair/Opening and Acknowledgement of Country



Associate Professor Peggy Chen

National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia

Biography

Associate Professor Peggy Shu-Ling Chen is the Head of Maritime and Logistics Management, National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania. Peggy holds a PhD in Port Management (Cardiff University, UK), an MBA (Katholieke Universiteit Leuven, Belgium) and a Bachelor of Public Finance (National Cheng-Chi University, Taiwan). In her earlier career, she worked for different sectors in Taiwan, including Customs, banking and tertiary education.

Peggy's research interests and expertise is in the fields of maritime logistics, port management and supply chain management. Research areas include port governance, climate change impacts on ports, port sustainability, regional ports and regional development and dry ports management. She also undertook research in supply chain management related to perishable food industry and is involved in research projects within the Blue Economy CRC.

Peggy is active in international research networks. She is Council Member of the International of Assosciation of Maritime Economist (IAME) and member of the Port Performance Reserch Network (PPRN) and the International Forum of Climate Change and Adaptation Planning for Ports, Transport Infrastructures, and the Arctic (CCAPPTIA). She is Associate Editor of the Asian Journal of Shipping and Logistics.

Welcome Message

Mr Michael van Balen AO

Principal, Australian Maritime College, University of Tasmania, Australia

Biography

Michael is the Principal of Australian Maritime College, University of Tasmania. Prior to his current role, Michael served for the Royal Australian Navy. He graduated from the Royal Australian Naval College in 1982. Early career highlights included postings as the ASW Tactical Training Officer, Fleet ASW Training Centre Pacific, San Diego in 1992; and in 2003, Commanding Officer HMAS *Sydney* (FFG-03), where he deployed to the Persian Gulf for the war in Iraq, subsequently being awarded a Commendation for Distinguished Service in the 2005 Australia Day Honours List.

Staff appointments included Staff Officer to the Chief of Navy in 1998, Training Authority Maritime Warfare in 2006, Chief of Staff (COS) Navy Systems Command in 2008, and COS Fleet Headquarters and Commodore Support in 2010. Academically, Michael graduated from the University of New South Wales with a Masters' of Management Studies in 2003; and the United States Naval War College, Newport, Rhode Island in 2005.

In 2011, Michael was appointed as the Chief of Defence Force Liaison Officer to United States Central Command, Tampa, Florida, USA and Director, Coalition Coordination Centre. Awarded the United States Legion of Merit (Officer), Michael returned to Australia in 2013, assuming duties as the Deputy Chief of Navy. He was appointed an Officer of the Order of Australia (AO) in the 2015 Australia Day Honours list, retiring from active service in 2016. In 2019, Michael was appointed as the Principal of AMC.

Moderator of Keynote Presentations

Professor Michael Bell

Institute of Transport and Logistics, Sydney Business School, University of Sydney, Australia

Biography

Michael Bell is the Professor of Ports and Maritime Logistics in the Institute of Transport and Logistics, at the University of Sydney Business School. Prior to this, he was for 10 years the Professor of Transport Operations at Imperial College London and for the final 5 years at Imperial the Founding Director of the Port Operations Research and Technology Centre (PORTeC). He graduated from Cambridge University with a BA in Economics then obtained an MSc in Transportation and a PhD on Freight Distribution from Leeds University. His research and teaching interests span city logistics, ports and maritime logistics, transport network modelling, traffic engineering, and intelligent transport systems. Michael is the co-founder of the International Symposium on Transport Network Resilience (INSTR) in 2001 and is currently the convenor of its International Scientific Committee. He also serves on the International Advisory Committee of the International Symposium on Transport and Traffic Theory (ISTTT) and was its convenor from 2009 to 2015. Michael is the author of many papers and books (including Transportation Network Analysis, published in 1997). For 17 years he was an Associate Editor of Transportation Research B, the leading transport theory journal, and is now its Editorial Board Editor. He was also an Associate Editor of Maritime Policy & Management and is currently an Associate Editor of Transportmetrica A.

Moderator of Industry Discussion Panel

Associate Professor Vinh Thai

School of Accounting, Information Systems and Supply Chains, RMIT University, Australia

Biography

Dr Vinh Thai is an associate professor at the School of Accounting, Information Systems and Supply Chain of RMIT University. He is currently an Associate Editor of the *Asian Journal of Shipping and Logistics* (Q1 journal) and is known internationally for his research in logistics and supply chain management in general and maritime logistics in particular. He has so far published international peer-reviewed journal articles and conference papers, and several book chapters, in leading academic journals e.g., *Transportation Research Part E*, *Transportation Research Part A*, *International Journal of Physical Distribution and Logistics Management*, *International Journal of Logistics Management*, *International Journal of Shipping & Transport Logistics*, *Maritime Policy & Management*, *Maritime Economics & Logistics*, etc. His work has been widely cited in academic journals as well as in industry magazines, newspapers, radio etc., such as *Daily Cargo News*, *Science Daily*, *Safety & Health Magazine*, *ABC News Fact Check*, *Herald Sun*, *ABC Radio National*, *2CC Canberra Radio*, *2GB Sydney Radio*, *Yahoo News*, etc.

Vinh is the founder of the Australian Maritime Logistics Research Network (AMLRN), established in 2019, connecting maritime academics and industry professionals in Australia and overseas. He has also been a consultant in numerous consultancy projects, for example, for ASEAN Secretariat (ASEAN maritime transport development study), Japan International Cooperation Agency – JICA (Vietnam Transport Sector Study), World Bank in Vietnam (Northern Region Comprehensive Transport Strategy Study), Japan Bank for International Cooperation – JBIC (Study of the national transport development strategy for Vietnam), World Bank in Indonesia (Port Development Priority Projects and Value for Money Study). Prior to joining academia, he worked for various companies in the maritime logistics industry including Asian Pacific Shipping, P&O Nedlloyd Shipping Line, and Vietnam International Container Terminal (VICT).

ABSTRACTS OF PRESENTATIONS

Session 1: Maritime dynamics

Presentation 1: 13.00 – 13.30

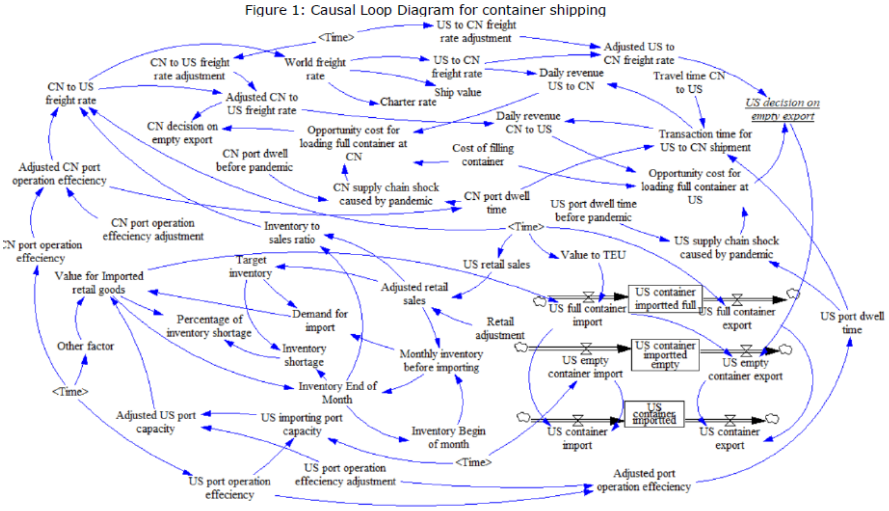
Title: Container shipping market movements during the pandemic explained by system dynamics **Authors:** Ze Wang*, Michael G H Bell, Shengda Zhu, Jyoti Bhattacharjya, Glenn Geers *Institute of Transport and Logistics Studies, Business School, Sydney University	**Abstract** The Covid-19 pandemic had a dramatic impact on global supply chains, and the shipping of containerised products in particular. The demand for goods decreased during the first half of 2020 then rebounded in the second half (Notteboom, Pallis and Rodrigue, 2021), driven by a combination of restocking and expenditure displaced from travel and leisure. At the same time, the container supply chains slowed down due to the impact of the pandemic on port productivity and consequent port congestion. For example, the average waiting time at Yantian International Container Terminal increased as a result of a local Covid-19 outbreak from 0.5 days to 16 days (Tan, 2021). At the same time, the reduced reliability of containerised supply chains led to yet more ordering 'just in case', further boosting the demand for container shipping. The slowing of containerised supply chains increased the demand for both containers and ships, leading to a huge increase in container carrier charter rates and the second hand prices of ships as well as to shortages of containers. Due to the container shortage in the second half of 2020, some shipping lines were returning empty containers immediately from North America to Asia, because the freight rate out of Asia was so much higher than the freight rate out of North America (Larocco, 2021). Thus North American bulk exports were effectively priced out of containers. Container shipping became extremely profitable, leading to a wave of vertical integration in containerised supply chains and, after overcoming regulatory uncertainty about future fuels, a wave of new ship orders. When the pandemic eventually subsides and container shipping returns to its normal pace, it remains an open question whether a resulting surplus of ship capacity and containers will lead to a collapse of freight and charter rates as well as asset values in shipping. Part of the answer depends on whether container shipping, boosted by consolidation of the lines into three mega alliances, is better able to 'manage capacity' than it has in the past. This paper reports on the development of a Vensim system dynamics model illustrated in Figure 1 to address this question. The model is calibrated to reproduce movements in freight rates, charter rates, ship values, port productivity and port congestion during 2020 before being applied to analyse post- pandemic scenarios. **Keywords**: container shipping; freight rates; charter rates; port productivity; the pandemic **References** Larocco, L. (2021) Shipping carriers rejected U.S. agricultural exports, sent empty containers to China, CNBC. Available at:

https://www.cnbc.com/2021/01/26/shipping-carriers-rejected-us-agricultural-exports- sent-empty-containers-to-china.html (Accessed: 6 August 2021).

Notteboom, T., Pallis, T. and Rodrigue, J. P. (2021) Disruptions and resilience in global container shipping and ports: the COVID-19 pandemic versus the 2008–2009 financial crisis, Maritime Economics and Logistics. Palgrave Macmillan UK. doi: 10.1057/s41278-020-00180-5.

Tan, W. (2021) China Covid cases causing higher shipping costs, delayed goods, CNBC. Available at: https://www.cnbc.com/2021/06/15/china-covid-cases-causing-higher-shipping-costs-delayed-goods.html (Accessed: 6 August 2021).

Figure 1: Causal Loop Diagram for container shipping



Presentation 2: 13.30 – 14.00

Title: Development of collaborative spirit indices: The case of South Korea's maritime industry **Authors:** Saeyeon Roh*, Changsoo Kim, Youngjoon Seo *Plymouth University, Devon, United Kingdom	**Abstract** This study aims to evaluate the extent of collaboration between shippers and shipping companies in South Korea. Bespoke cooperative and collaborative spirit indices (CCSIs) reflect the conceptual differentiation between cooperation and collaboration, as well as a more comprehensive conceptualisation. Shipping companies registered in South Korea returned 167 usable responses. CCSIs were developed through exploratory factor analysis weighting methods, and differences among CCSIs by vessel type and contract period were examined using multivariate analysis of variance. CCSIs indicate that powerful supply chain members resist two-way communication, mutuality, distributive fairness, and long-term relationships. This is one of the first studies to operationalise the key concepts of cooperation and collaboration in terms of the maritime industry, providing the basis for future research in other supply chains despite a single informant attribute. Based on the CCSI scores, managerial and political initiatives are discussed to reduce barriers to interaction and ameliorate the CCSI level between supply chain members. The research provides insights into the extent of cooperation and collaboration by initially establishing CCSIs in the maritime industry, which will support strategic approaches to supply chain members. **Keywords:** collaboration; cooperation; marine transport; empirical study; South Korea

Presentation 3: 14.00 – 14.30

Title: Identifying the operational process of a Ro-Ro terminal using a System Dynamic model

Author: Amila Manatunga, Buddhi A. Weerasinghe*, & H. Niles Perera

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Abstract

1. Introduction

The global vehicle manufacturing is expected to reach 111.2 million units by 2022 (Dkhil et al., 2021). Port terminals should improve their capabilities in handling the demand created by the distribution of vehicles from manufacturers to users across the globe. Roll on Roll off (Ro-Ro) shipping is used in commercial vehicle distribution. Ro-Ro vessels allow transporting large vehicle volumes. Current "neo panamax" Ro-Ro vessels can carry up to 8500 CEU (Car Equivalent Units). The vessel configuration with multiple decks allows high capacity of vehicles onboard, while the loading and unloading is conducted through ramps.

Ro-Ro transportation of cargo is an efficient and cost-effective method in commercial transportation of vehicles. In Ro-Ro transportation, additional handling equipment is not required. Automobile units are moved by drivers. Hence the location of storage yards should be conveniently assigned for the drivers to facilitate faster handling. Hence, yard allocations planning in Ro-Ro transportation is of immense importance (Chen et al., 2021).

Yard allocation for cargo units is studied from the perspective of container operations in some literature. However, the results cannot be directly applied in Ro-Ro shipping. Operational processes in cargo movements in Ro-Ro transport vary from container shipping. Being high-valued cargo, terminal operators minimize the relocations of automobiles within the terminal. According to Iannone et al., (2016) accepted levels of damages to vehicles in transshipment yards lies between 0.5%- 1%. The reduced relocations translate to high handling times in transportation to the yard. Hence, the assignment of the yard is crucial in reducing turnaround time of vessels. As stacking of cargo is not possible for automobiles, spatial requirement for storage is high. This results in higher transport costs in moving automobiles (Dkhil et al., 2021). In addition, transportation and waiting of vehicles results in emission costs which results in environmental concerns. Due to this reason, preliminary planning of yard assignments is crucial in Ro-Ro transportation. Ro-Ro operation is highly time sensitive and requires efficient planning of operational processes and other related factors. The impact of allocating yards and handling labour is crucial for an effective operation.

To improve overall planning efficiency of the Ro-Ro operation, it is required to identify the major actors and the processes involved. Since global vehicle distribution grew by 4% annually for the last decade, the Ro-Ro terminal operations have become demanding. However, academic studies in the area is limited compared to container operations (Chen et al., 2021;Schramm, 2020). The objective of this research is to identify the major processes of interest in the planning process of yard assignment of a Ro-Ro

terminal. The main actors in the Ro-Ro terminal operation process are identified and their interaction is studied. The study focuses on addressing the question of the major actors of Ro-Ro operation and determining major processes that impact the overall terminal efficiency.

2. Methodology

System Dynamics (SD) modelling is used to identify the causalities within the operational factors in the Ro-Ro terminal to identify delays and bottlenecks. SD is an analysis of non-linear dynamic systems using quantitative and qualitative techniques (Sterman, 2000). Modelling of any system using the SD approach can be presented under 5 major steps according to (Bayer, 2004) ; 1. Articulating the problem to be addressed, 2. Formulating a dynamic hypothesis concerning the causes of the problem, 3. Formulating a simulation model to test the dynamic hypothesis, 4. Testing the model until it is suitable for the purpose, and 5. Designing and evaluating policies for improvement.

Based on the above structure this study focuses on creating a dynamic model for a Ro-Ro terminal. The below procedure was followed in this study; 1. Problem identification, 2. System definition, 3. Causal loop diagram for a Ro-Ro terminal, 4. Creating stock and flow diagram, and 5. Identifying feedback loops within the process.

The inputs from the operational process of a major Ro-Ro terminal in the Asian region was considered in creating this conceptual model. Expert interviews and literature was used to determine the variables of the model. Using these inputs, the study covers the logical modelling phase of the process. The causal loop diagram covers the processes involved in the terminal.

3. Results and findings

The causal loop diagram represents the conceptual flow of vehcile units within a Ro terminal (Figure 1). Processes involved in berths and storage yards are considered therein.

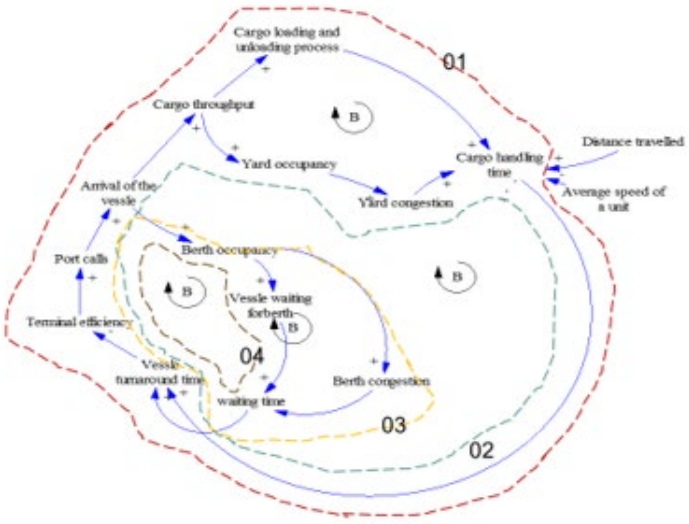

Figure 1 Causal loop diagram operation at a Ro-Ro terminal

Loop 01 identified in the above causal flow diagram refers to cargo throughput, Cargo loading and unloading process, Cargo handling time, Vessel turnaround time, Terminal efficiency, Port calls, Arrivals of vessel. The cargo loading and unloading process in a Ro-Ro terminal is affected by the average speed maintained in the operations distance travelled by a cargo unit. According to (Shen et al., 2021), the average speed maintained by the vehicles in loading and unloading operations is below 35 km/h maintaining a distance between 10-15 m. This is similar to the actual operation in Ro-Ro operation according to conducted expert interviews.

Ro-Ro yards cannot be operated beyond 1 tier in storing units. It results in increasing the distance between the berth and the assigned storage block by creating a positive polarity on cargo handling time. The industry practice in Ro-Ro operations is to transfer the unloaded cargo directly to the yard without assigning to temporary parking spaces closer to the berth. This eliminates relocations and reduces the risk of accidents. However, according to industry insights collected through interviews of professionals in Ro-Ro terminal operations, temporary parking can be arranged closer to berthing area during the loading process. This is more commonly practiced in instances where both loading and discharging volumes for a vessel are high. This facilitates reducing congestion in traffic paths.

Loop 02 refers to Cargo throughput, Yard occupancy, Yard congestion, Cargo handling time, Vessel turnaround time, Terminal efficiency, Port calls, and Arrival of vessels. The vehicle movements in the yard are positively affected by the overall cargo through =put of the terminal. As the cargo units are transported as a flow, management of traffic paths within a Ro-Ro terminal is important. Turning movements should be designed to minimize clash points. Crew members are allocated to indicate drivers regarding the location of the yard they should drive the vehicles to. Yard occupancy is positively affected by the cargo throughput of the yard. Congestion levels in the yard is affected as a result. For safety reasons, only one vehicle is allowed to utilize the ramp. The

positioning of the vehicle in the yard is completed once the driver is safely out of the vehicle. The next vehicle in line cannot park until this step is completed. These factors can increase congestion in the yard. This impact results in a proportional change in cargo handling time. Therefore, levels of congestion impact the overall handling time of the operation which impacts vessel turnaround time.

Loop 03 refers to Arrival of vessels, Berth occupancy, Berth congestion, Waiting time, Vessel turnaround time, Terminal efficiency, and Port calls. Loop 04 refers to the Arrival of vessels, Berth occupancy, Vessels waiting for berth, Waiting time, Vessel turnaround time, Terminal efficiency, and Port calls.

The occupancy of a berth is affected by the number of vessel arrivals in the port. There are two major types of vessels that call a Ro-Ro terminal, liner vessels and feeders. In industry practice, it is common to prioritize service for the liners due to high throughput volumes. High berth occupancy translates to high waiting times for vessels. This result in longer vessel turnaround times. The vessel turnaround time and the terminal efficiency have a negative polarity. Turnaround time of a vessel at a terminal is one of its key performance indicators. The shipping lines which require efficient service considers this as a key selection criterion. As a result, the turnaround time of vessels impact the number of calls made to the terminal.

The derived causalities are causing balancing loops. This suggests that variation of a variable proportional variation to the overall feedback loop. Based on this approach it is important to manage two main criteria in a Ro-Ro terminal for increased terminal efficiency: turnaround time vehicle handling time and waiting times.

4. Conclusion

This study focused on identifying the major processes that are affecting efficient operations in a Ro-Ro terminal. Inputs were derived from interviews from professionals in the industry and through available literature. System Dynamics was used to represent the operation. A causal loop diagram was developed, and the major feedback loops relating to terminal efficiency were identified. The identified feedback loops of the operation will be validated through a data collection to create stock and flow diagrams of the operation as a future extension of the study

Feedback loops derived provide the nature of interactivity between the yard allocation to the overall handling time and turnaround time and eventually the overall terminal efficiency. Handling time and waiting time were identified as two major components that impact vessel turnaround time. Due to high labour involvement and spatial requirements, Ro-Ro operations needs efficient planning to ensure optimum turnaround times for vessels.

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Presentation 4: 14.30 – 15.00

Title: Covid-19 impact: An application of system dynamics to the oil and tanker markets during 2020

Authors: Ze Wang[a], Michael G H Bell[a], Shengda Zhu[a], Jyoti Bhattacharjya[a], Glenn Geers[a]

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Abstract

During the Covid-19 pandemic, oil prices fell sharply, tankers were used for floating storage, and the tanker charter rate skyrocketed (Lee, 2020). The reduced demand for oil, both crude and refined, was not initially matched by reduced production causing a market shock (Qin, Zhang and Su, 2020; Bourghelle, Jawadi and Rozin, 2021). This paper explores in greater detail the oil and tanker market dynamics during 2020 using a Vensim system dynamics model developed for the purpose. The model includes key variables related to different stages of the pandemic. The early pandemic is defined as the period when oil production was not aligned with oil consumption and floating storage was deployed to store the surplus. The late pandemic is defined as the period when oil production was reduced and tankers returned to the market when they were no longer required for floating storage.

The key findings of our study are as follows: (1) Oil price movements reflected changes in demand and supply. The crude oil price correlates closely with the product oil price, and both prices collapsed as surpluses built up during the early pandemic. (2) Crude oil demand had a negative relationship with the VLCC charter rate, but the Handysize charter rate was not closely related to any factors in the model. (3) When the oil demand was at its lowest, surpluses built up. When tank farm capacity on land was exhausted, surplus oil was stored in tankers, causing the tanker charter rate to peak. However, the charter cost had to be covered by oil price falls with respect to the price for future delivery (a contango market). Consequently, the spot price for oil fell until the charter cost was covered. (4) The utilisation of VLCCs peaked later than crude oil inventory, indicating that VLCCs were still being sought when the need for floating storage was already in decline, indicating a shift of inventory from smaller ships to larger ships.

The system dynamics model (illustrated in Figure 1), once built and calibrated to reproduce 2020 market movements, was used to explore a number of potential mitigation strategies for future oil market shocks. Scenario analysis shows, perhaps not surprisingly, that both reducing the lag in oil supply adjustment to demand and increasing tank farm capacity are effective strategies. However, there were political obstacles to promptly adjusting oil supply to match reduced demand in 2020, which could materialise again in any future demand shock. Moreover, tank farm owners have little incentive to build capacity 'just in case' as VLCCs offer a more flexible storage option, provided the spot price for oil falls far enough relative to the price for future delivery to cover the increasing charter costs of in-demand VLCCs. The principal use for the systems dynamics model will be to predict the consequences of feasible mitigation strategies to any future demand shock.

Keywords: Oil market; tanker market; system dynamics; the pandemic

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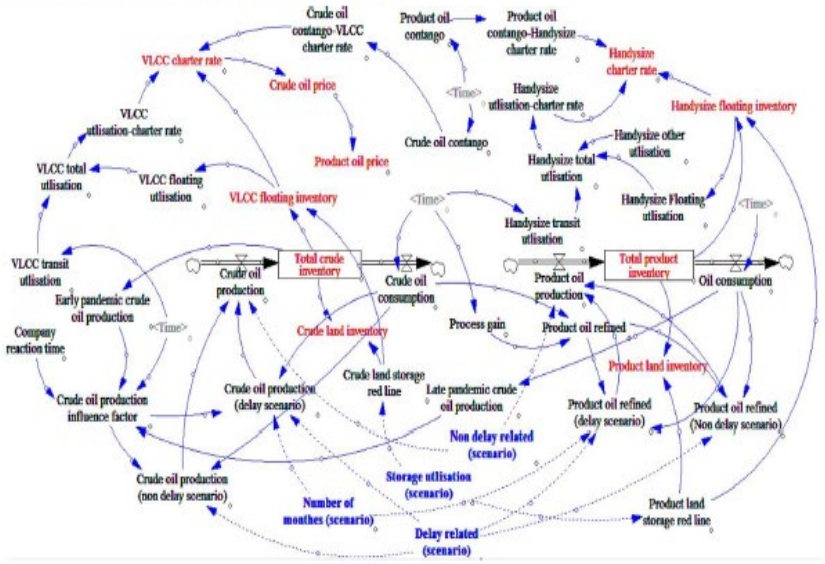
Figure 1: The Vensim model of the oil and tanker markets



Session 2: Supply chain management

Presentation 1: 13.00 – 13.30

Title: The Impact of Supplier Involvement on Supply Chain Performance Flexibility **Authors:** Abdelsalam Adam Hamid*, Buthaina Al Shammakhi & Noorul Shaiful Fitri Abdul Rahman *Department of Logistics Management, International Maritime College Oman, 322 Sohar, Sultanate of Oman.	**Abstract** The current study aims to test the effect of supplier involvement on supply chain performance flexibility. The attention of this research was drawn from the existence lack of studies on suppliers' involvement in the Sultanate of Oman. In addition to the general trend in previous studies which confirm the lack across the Arab region, this research applied the descriptive methodology based on a survey sent to industrial companies in Oman. The primary data of this study were collected from the nonprobability sample by distributing questionnaires to senior management in companies. Data analyzed using SPSS software where regression test has been conducted for hypotheses testing the results identified that supplier involvement (time of involvement and level of involvement) has a positive impact on supply chain performance flexibility. The study came up with theoretical and practical implications besides directions for future research based on the limitations of this study.

Presentation 2: 13.30 – 14.00

Title: Risk and Resilience in the Global Supply Chains, Maritime Transport, and Logistics **Authors:** Yazan Al-Marzooqi, Fai AL-Musalami, Najoud AL-Maqbqli & Noorul Shaiful Fitri Abdul Rahman, Zouhaier Slimi* *Department of Foundation, International Maritime College Oman, 322 Sohar, Oman	**Abstract** The pandemic COVID-19 has resulted in substantial changes in a number of disciplines. The global supply chain, maritime transportation, and logistics are all instances of one large picture. As a result, risk and resilience in the global supply chain, maritime transport, and logistics are becoming key research priorities throughout the world. Therefore, the goal of this research study is to identify the risk factors impacting global supply chains, maritime transportation, and logistics, as well as to examine the potential for resilience in a global context, and lastly, to propose a holistic and dynamic solution to the problem. The study incorporates a variety of qualitative methodologies throughout the research work, including focus groups, content analysis, and the Delphi method. The techniques indicated serve to establish the crucial factors that have recently occurred, notably in regard to post-pandemic, economic downturn, global recession, and technology advancement challenges. Furthermore, a group of global logistics and supply chain experts, as well as academics, will be selected using a purposive sampling approach to contribute insight to the aforementioned issue. The study's targeted findings include identifying risk factors impacting the global supply chain and addressing possible resilience from a global perspective. Finally, a comprehensive and dynamic recommendation will be proposed that incorporates both inputs from the subject matter experts.

	Keywords: Supply chain; Resilience; Risk management; Covid-19; Logistics; Maritime transport

Presentation 3: 14.00 – 14.30

Title: A Dynamic Strategic Framework that Integrates the Industrial Revolution 4.0 and the Sultanate of Oman Logistics Strategy 2040 Perspectives: Oman Logistics Sector **Authors:** Noorul Shaiful Fitri Abdul Rahman*, Abdelsalam Adam Hamid, Khalid Al Kalbani, Kalthoom Mohammed Murad Al Balushi, Nur Hazwani Karim, Rudiah Md Hanafiah, Ahmed Moustafa Ahmed * Department of Logistics Management, International Maritime College Oman, 322 Sohar, Oman	**Abstract** Oman is taking significant strides to strengthen its logistics sector, which is expected to become one of the nation's most important non-oil-based economic pillars in the future. In the Industry 4.0 phenomenon, components of cyber-physical systems will communicate with one another through the Internet of Things idea. The primary drivers of industries are dynamic leadership and technological innovations as today's business structure might unfit future changes. Thus, changes in industries and leadership are evolving as part of Industry 4.0 to immediately foresee the new competitions on the horizon. This study, therefore, aims to develop a dynamic strategic framework coupled between Industry 4.0 and the Sultanate of Oman Logistics Strategy (SOLS) 2040 in both government and industrial players. The optimal combination of grounded theory and ethnography was used in this study to create a highly effective research instrument. The ethnographic aspects assisted the researchers in comprehending Oman's logistics business, meanwhile the grounded theory elements offered a structural framework. The framework developed on two main levels, "External" to represent industry 4.0 and its adoption in the logistic industry in Oman and "Internal" specifically designed to achieve Oman logistic strategy (SOLS 2040). The internal framework address both the Operational perspective as well as the Human capital development. **Keywords**: Logistics; Industry 4.0; SOLS 2040; Grounded theory; Ethnographic; Human Capital

Presentation 4: 14.30 – 15.00

Title: The Sustainability and Resilience of Supply Chain System In the Post Covid-19 Scenario **Authors:** Dr Jai Acharya* *Principal Consultant – IMMC, Singapore; Adjunct Professor – University of Tehran	**Abstract** The supply chain today is more complex than ever and there have been numerous studies and research conducted in recent times on the complexity, impact of Covid-19 syndrome and the implications of a large-scale disruptions for the industry, relevant stakeholders and supply chain system. Though, the concept of a resilient supply chain system is not a new one, it's time to understand, act and adopt the changes befitting to the system and develop strategies for a more resilient supply chain system. A resilient supply chain is defined by its capacity for resistance and recovery. The techniques for building a resilient global supply chain to stay competitive include increased of inventory levels of raw material, continuity of ongoing work and the final product by strengthening the storage capacity and manufacturing surge capability. In the wake of Covid-19 and other fragile scenarios, the leaders of supply chain system have to balance resilience and efficiency to secure their networks with a robust approach. To build a resilient supply chain system, the three phases such as survive, recover, rebuild are focussed by addressing and taking priority task of the capacity, capability and competency building in order to emerge out successfully from each phase. The part of supply chain resilience is characterized by the stabilization phase after which a return to a steady-state of performance is achieved. Generally, companies take time to learn from its experience to make future planning and risk management strategy. In a rapid geopolitical scenario fluctuations occurring globally and appearance of trend toward nationalization, lately with the Covid-19 pandemic have changed the priorities of many of the supply chain leaders. They now need to balance the cost, performance and operational efficiency with a greater supply chain resilience. The most supply chain leaders recognize that becoming more resilient is a necessary in the current environment of fragile scenarios. In a recent Gartner survey, only 21% of respondents stated that they have a highly resilient network today, meaning good visibility and the agility to shift sourcing, manufacturing and distribution activities around fairly rapidly. The cost of retaining multiple supply locations must be seen more as a cost of doing business, rather than an inefficiency. It suggests that increasing resilience will be a priority for many as they emerge from the current crisis. More than half expect to be highly resilient within a period of two to three years. The first benefit of a resilient supply chain is the Availability. With the quality operating systems, one can access real-time inventory data and adapt to global constraints.

	There are three strategies for the building of resilience in the supply chain management, namely – To Diversify sources of raw materials, Build reserves to absorb the predicted and unpredicted shocks and Predict, Sense and Respond with Agility by Mapping out structural risk across the supply portfolio. It has been observed that during the severe impact of global pandemic, the importance for digitalisation of supply chain sector realised considerably and this was an opportunity to assess the operational performance of the overall value chain of system such as procurements (sourcing), planning (scheduling), warehousing (distribution centres) and retailers including maritime sector such as vessels, ports and logistics. The investment in new technologies took an interesting turn towards the digitalisation, operational technology (OT), Blockchain technology and application of artificial intelligence (AI). Many stakeholders and corporate business strategists, CEOs and CTOs have learnt from pandemic scenarios and do have plans in place for developing a resilient supply chain system and moving towards the adoption new technologies enabling them to enhance the service standards to their customers satisfaction. The risk assessment and management of supply chain security in the enhancement of building the supply chain resilience play an important role in the system. Along with a resilient supply chain system, a strong and resilient value chain system is equally important. A value chain takes the perspective all the way from where materials are mined or explored, the metals that are created, how they pass through the system including physical infrastructure, IT and human resources supports, land transportation, warehousing, maritime shipping and then finally how the end finished products get to the customers. So, a supply chain will be defined by a company, and it might include their first tier of suppliers. It might even include the suppliers of those suppliers. But very rarely do companies think of their supply chain all the way back to where do the raw materials come from and how they come together at each step. So when we say value chain, we mean that whole process, from mines to the end consumers. In summary, building a resilient supply chain should focus on three phases – survive, recover and rebuild by following the basic steps of understanding the risk, being open from the outset, taking a long-term view, conducing the risk analysis with due diligence and evolve through the lesson learnt. Managing lead times and inventory levels using series of agreements with multi-tier suppliers; maintaining transparency and visibility with suppliers and consumers is an essential part of a resilient supply chain. Supply chain industry leaders need to review and revise the major strategies to build greater resilience into their networks.

Session 3: Port operations and management
Presentation 1: 13.00 – 13.30

Title: Impact of shipping firms' anti-corruption policies and practices on cargo clearance at Seaports: An empirical evidence from Nigeria

Authors: Muhammad Dan-Asabe Abdulrahman, Nachiappan Subramanian*, Jing Yu YANG

*University of Sussex Business School, Brighton, UK

Abstract

This study investigates the moderating impact of shipping firms' anti-corruption risks policies and inclination towards corruption practices on cargo clearance costs in Nigeria, an emerging economy in West Africa. Underpinned by institutional theory and transaction cost economics (TCE), a conceptual model that relates two distinctive types of corruption (coercive vs. collusive) impact on shipping firms' clearance costs, and then examines whether and how shipping firms' anti-corruption inclination and practices may moderate the relationship. We found that the detrimental effects of both coercive and collusive corruption on clearance cost are weaker for shipping firms with a stronger inclination toward corruption.

Keywords: Corruption, seaports, shipping, cost of clearance, China-Nigeria

Introduction

Global supply chains face constant and increasing disruption risks and uncertainties and knowing how to adapt and strengthen business resilience has become a critical challenge for organizations. These challenges are even more critical for maritime transportation firms (i.e. shipping firms) utilising emerging markets' seaports due to increased exposure to corruption risks (UNGC, 2010; Sequeira, 2015; Dutt and Traca, 2010). In general, studies suggest corruption adds 10% or more to the cost of doing business internationally (Deloitte 2015; UNGC, 2010).

A major reason for the enormous scale of corruption in the maritime transportation and seaports is because of multiple parties are involved, leading to varying ethical standards across different seaports and nations, numerous pass-off points in the acquisition and transportation of goods, and a lack of complete visibility over the entire supply chain (Artz and Brush 2000; Dutt and Traca, 2010; Arnold et al., 2012; Kim et al., 2018). More disturbing is corruption risks at emerging markets seaports is ubiquitous due to weak governing institutions in emerging economies (Sequeira, 2015; Arnold et al., 2012).

This study investigates the impact of corruption on seaport cargo clearance cost in Nigeria, an emerging economy in West Africa. It developed a conceptual model that relates two distinctive types of port corruption (coercive vs. collusive) to shipping firms' clearance costs, and attempts to answer the following research question:

"Do shipping firms' attitude towards corruption and anti-corruption practices exacerbate or ameliorate the detrimental impact of seaport corruption on increasing seaport clearance cost?"

Theory and Methods

The study draws on institutional theory and transaction cost economics (TCE) and utilises 132 survey responses from China-Nigeria shipping firms using the Nigerian seaports for over 10 years.

Findings

We found that seaport corruption, especially the coercive corruption, increases clearance cost. In addition, we found the detrimental effects of both coercive and collusive corruption on increasing the port clearance cost are weaker for shipping firms with a stronger inclination toward corruption, while the detrimental effect of coercive corruption is stronger for shipping firms adopting more anti-corruption practices. Our findings highlight firm heterogeneities, especially firms' pro-corruption attitude and anti-corruption practices, in responding to port corruption, which in turn yield different firm outcomes in terms of final logistics costs.

Conclusion

This study examines the impacts of corruption and the consequences of shipping firm's response on the overall goods clearing costs at emerging market seaport. The study demonstrates the perception that full compliance with import and export regulations, coupled with firms' anti-corruption policies protects shipping firms from impact of corruption risk is not true. It indicates Nigerian seaport authorities need strategies to mitigate seaport corruption.

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Presentation 2: 13.30 – 14.00

Title:	Abstract
Optimizing Gate Queueing at Container Terminals to Facilitate Green Operations	
Authors:	
Heshan Abeysooriya, Buddhi A. Weerasinghe*, & H. Niles Perera *Department of Transport & Logistics Management, Faculty of Engineering, University of Moratuwa, Katubedda 10400, Sri Lanka	**Introduction** Seaborne trade is the key driver in international trade due to its cost advantage as well as its high loading capacity in long-distance carriages. For instance, 811.2 million TEUs were handled in container ports around the world and the international maritime trade grew by 1.1% in 2019 (United Nations, 2020). Economic and environmental sustainability in ports entails increasing port efficiency, productivity, security, and safety while remaining environmentally conscious (Davarzani et al., 2016). Container ports cause a potential impact on increasing air pollution and greenhouse gases (GHGs) and the life of people near the port area as well as on water bodies. Yu et al. (2017) and Fan et al. (2019) have stated that many container ports around the world have taken initiatives to reduce their environmental impact. Reducing noise and emission are some salient aspects of studies and energy consumption is also significant as a factor. Therefore, necessary actions must be taken to save energy since the highest proportion of the operational movements inside the container terminals utilize trucks or straddle carriers. According to the agreement at 47th session of the UN Statistical Commission held in March 2016, countries should focus on affording high priority towards sustainable development to improve the lives of people while protecting the Earth over the next 15 years (GSD Commission U N Statistical Group, 2016). Further, countries that signed the Paris agreement are responsible to limit global warming below 1.5 degrees Celsius and should aim to reduce GHG emissions as soon as possible (United Nations, 2015). Therefore, an initiative for green operations of truck arrivals in container terminals can be identified as a key problem to be resolved. Ye et al. (2019) and Facchini et al. (2017) stated that the waiting time along the queues and idling time are the main contributors to unnecessary fuel consumption and GHG emission in this context. Therefore, identifying patterns in truck arrivals at the gates and reducing the waiting time and queue time for trucks is identified as the key focus of this study. Even though automated gates are trending, in most cases locations for containers are allocated manually due to the presence of dynamic stacking conditions. Dynamic allocation is emerging as a practice that requires further developments (Gunawardhana et al., 2021). Therefore, even though the gate is automated still the output of this study can be applied to increase efficiency and optimize truck arrivals. Import, export, Inter-Terminal Transportation (ITT) receiving, and ITT delivery have been considered based on their type of operations in this study. The key objective of this study is to enhance operational efficiency while reducing fuel consumption and GHG emissions through the derived model. **Methodology** Data collection for this study was conducted at a leading transshipment seaport container terminal in Asia. Data points were collected at gatehouses in the container terminal. There are 4 gates in the in-gate operation which is the focus. The selected terminal operates an annual capacity that is twice its design capacity. At the same time, the overall

impact of the COVID-19 pandemic on their annual volumes is around 30% - 40%. Therefore, the port operation can be considered under the dynamic and complex environment throughout the data collection. However, the arrival of trucks cannot be identified prior since the terminal does not use a truck appointment system and truck arrivals are random. The analysis of this research examines the arrivals of either external or ITT trucks to be received or deliver containers within 24 hours. The time that the truck enters the main queue was considered when the truck is released from out-gate. Ma et al. (2019) and Jin et al. (2021) listed potential methods to analyze the gate operation and they are queue models, genetic algorithms, integer programming, linear programming, etc. For this study, a multiple server queuing theory within the scope of truck arrival optimization purposes has been employed.

Results and Findings

In the analysis identification of the truck, arrival patterns are crucial since the hourly arrivals of trucks at the terminal gates are not distributed uniformly across the time of the day. To minimize the waiting time at the queue to optimize the gate operations and increase the green aspect of the operation have been considered in two aspects. The first approach is by adding a service station to the gate and the other approach is to manage the truck movements by using existing infrastructure. The impact on the green operations at the gate has been considered by applying both strategies.

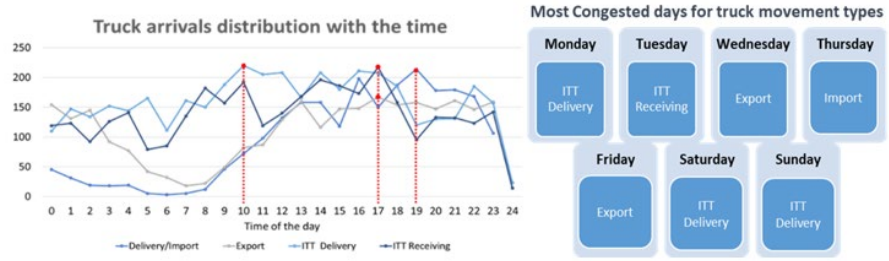

Figure 1:Truck arrivals at the gate - Weekly

We analyzed the truck arrivals and identified specific patterns throughout the week. According to the behavior of truck arrivals, it can be concluded that gates are getting busier on weekdays than on weekends. The mean service rates and the mean arrival rates, and the number of service stations are categorized based on the type of truck movements and arrivals. According to the interviews that we conducted with industry experts in the considered port and terminals, the weekly pattern of the operation is highlighted. The pattern is similar within weeks since liner shipping services are operated based on pre-defined windows on berthing schedules. Therefore, understanding the daily patterns of truck arrivals are significantly important to understand paths to be used in optimizing the gate operation.

Table 1:Truck arrival and service rate per minute at in-gate

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0.240	0.160	0.120	0.087	0.107	0.017	0.010	0.017	0.042	0.125	0.183	0.226	0.307	0.402	0.364	0.274	0.479	0.383	0.419	0.498	0.489	0.497	0.467	0.429
0.564	0.464	0.517	0.350	0.269	0.117	0.089	0.050	0.055	0.119	0.202	0.233	0.329	0.381	0.269	0.338	0.348	0.402	0.374	0.374	0.360	0.355	0.383	0.919
0.864	0.974	0.867	1.050	1.150	0.748	0.840	0.867	0.962	1.133	1.371	1.138	1.345	1.060	1.133	1.071	1.176	1.152	0.881	0.645	0.679	0.781	0.831	4.248

Service rates	Import/Delivery – 1.400	Export – 0.467	ITT Delivery – 1.828	ITT Receiving – 0.453

Using the collected data, the queuing model was solved for the different numbers of service stations and the behavior of the waiting times in the queues for the 4 different truck movements at in-gate are as follows. The waiting times are decreasing when increasing the number of service stations at in gate. However, constructing another service station leads to an issue when considering the financial benefit point of view within the aspect of feasibility. However, it shows that the considered method decreases the waiting time of queues and eliminates 3.48% of the total current fuel consumption of trucks. Waiting times for ITT can be decreased by 12% by adding a single additional service station.

Table 2: Fuel saving

No of stations	Arrival type	Arrival rate	Service rate	ρ	P_o	L_q	W_q	W_q in Seconds
4 Service stations	Import	0.264	1.400	0.092	0.828	0.006	0.022	1
	Export	0.327	0.467	0.038	0.492	0.100	0.304	18
	ITT delivery	2.665	1.828	1.218	0.359	0.271	0.102	6
	ITT receiving	2.285	0.453	0.259	0.010	0.726	0.318	19
5 Service stations	Import	0.264	1.400	0.074	0.828	0.006	0.022	1
	Export	0.327	0.467	0.031	0.495	0.100	0.306	18
	ITT delivery	2.665	1.828	0.974	0.265	0.200	0.075	5
	ITT receiving	2.285	0.453	0.207	0.009	0.664	0.291	17
Average fuel consumption for Truck in idling				0.0157	L/min			

P=Utilization factor, P_o=Probability of the system have no customers, L_q=Average number of trucks in the queue, W_q=Waiting time at the queue

Adding a new station to the system changes the waiting times for ITT. ITT movements are significant since it contributes to 65% of total truck movements in this transshipment-based terminal. This is applicable for any transshipment terminal and not only for this terminal. We identified special slots where ITT arrivals are not optimized. As we identified, the congestion can be reduced by scheduling ITT truck moves to the available alternative time slots. It is difficult to change in import or export truck operations and ITT operations can be changed through communication between terminals. Therefore, through further analysis, we identified specific time windows where the terminal can negotiate with other terminal operators in scheduling ITT trucks. That will distribute 58% of ITT arrivals that cause queues at the gate and that eliminates 1.42% of fuel consumption generate when trucks are waiting in queues while optimizing overall gate operation further. Simply this contributes three Sustainable Development Goals (SDG) directly; Goal 3: Good Health and Well-Being, Goal 12: Responsible Consumption and Production, and Goal 13: Climate Action. Our suggestions on gate operation reduce unnecessary fuel usage where it reduces GHG emission. It enhances responsible consumption within terminal operations as a sustainable industry practice.

Conclusion

In the context of container terminal gate operations, many container ports are now moving to sustainable approaches. It can be concluded that the effect of fuel consumption due to longer waiting times in the queues can be eliminated by adding new servers mainly aiming at ITT movements in transshipment terminals. However, the staff of these service stations are trained for handling every type of truck movement, and therefore increasing the number of service stations will solve the problem despite the type of truck movement. However, this solution may not be feasible due to its financial feasibility. Therefore, further studies of this area will lead to identifying the time windows which can be used as alternative time slots for the congested times to ease congestion. Scheduling ITT trucks for the low congested times will be an effective way to optimize

the gate queues and that will be a low-cost solution than building new infrastructure. We are working to extend this study into the yard-to-gate interface and moving the sustainability aspect into integrated planning. We aim to optimize the gate operation using integrated aspects as future research direction through this paper.

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Presentation 3: 14.00 – 14.30

Title: The Effects of Dry Port-Seaport Integration on Seaport's Performance in Vietnam **Authors:** My T.N NGUYEN*, Vinh V. THAI, Caroline CHAN, Kwok Hung LAU *School of Accounting, Information Systems and Supply Chain, RMIT University	**Abstract** In the current global environment where competition is more between supply chains than among individual firms, supply chain integration (SCI) becomes more critical than ever. Effective SCI helps remove unnecessary costs thereby improves the competitiveness of an organisation. Although many studies have found a positive relationship between SCI and operational performance of the focal firm, integration between dry port (DP) and seaport (SP) and the impact of this integration dyad on the seaport's performance has not been well explored. This research supplements such inadequacy by investigating the impact of DP-SP integration on seaports' operational performance as well as customer satisfaction, which in turn impacts the seaport's financial performance. Through a comprehensive literature review, a conceptual model was developed comprising the key relevant constructs examined in previous studies. Given the nature of the research problem, a combination of both inductive and deductive approaches using a sequential mixed method, combining both qualitative and quantitative approaches is employed to examine the relationship between dry port – seaport integration and its effects on seaport's performance specifically in terms of service quality, customer satisfaction, and financial performance. The qualitative phase explores the components of the dry port-seaport integration and its impacts on seaports' performance, in terms of port service quality, customer satisfaction, and financial performance through fourteen in-depth interviews with senior managers working in the maritime sector in Vietnam. In the quantitative phase, dry port – seaport integration is found to be a four-factor construct, and all four factors (information integration, operational integration, relationship integration, and geographical integration) were reliable and valid. However, in the context of the maritime sector in Vietnam, in line with the qualitative finding, the practices of dry port-seaport integration vary. Specifically, the most common practice of integration between dry ports and seaports is relationship integration, followed by that of operational, information and geographical integration. Quantitative findings also illustrated that dry port – seaport integration has a significant positive direct effect on port service quality and customer satisfaction. Besides, interestingly, port service quality has a significant positive direct effect on customer satisfaction and financial performance. Meanwhile, customer satisfaction does not have a direct effect on financial performance and also does not mediate the relationship between port service quality and financial performance. This research contributes to the literature in several ways. First, it is one of the first studies which quantitatively examines the integration of dry ports and seaports and its impact on seaport's performance in a developing country like Vietnam, thus contribute to enriching

	the integration literature in the maritime supply chain domain. Findings from this research also extend the application of the TCE and RV theories in maritime supply chain integration, particularly in the context of developing countries. Meanwhile, understanding how the integration of dry ports and seaports is measured and how it influences seaports' performance help policymakers, port authorities, and operators in Vietnam devise policies and strategies to improve their ports' competitiveness. Specifically, specific policies and strategies to increase the level of information integration, operational integration, and relationship integration can be formulated accordingly to help enhance seaports' service quality, customer satisfaction, and financial performance. Findings from this research can also be a useful reference for ports in other countries in advancing their seaport and dry port systems integration and performance. **Keywords**: Dry port, seaport, integration, port service quality, customer satisfaction, financial performance

Presentation 4: 14.30 – 15.00

Title: Determinants of total logistics cost in ports **Authors:** Khandaker Rasel Hasan*, Wei Zhang and Wenming Shi *Maritime and Logistics Management, National Centre for Ports and Shipping, Australian Maritime College, University of Tasmania, Australia	**Abstract** Port performance has been strongly identified by an extensive number of literature as important determinant of maritime trading cost. As enhancing the port performance can reduce both the direct and indirect costs in ports, which can impact the cost of maritime trading. The port costs is also indicated as important determinant for port choice. However, there is no such example of examining the cost in ports taking into account all the direct and indirect cost in ports and understanding their determinants. To fill this gap, this paper first calculates the total logistics cost in ports according to the total cost approach from business logistics. The total logistics cost function in ports is formulated including all the possible direct and indirect cost in ports. Following the TLC function the total logistics cost are calculated for 39 sample ports based on the best available data. It is important to mention that data for all the cost elements in ports is difficult to find. However, to examine the best available data represents all the possible data, PCA is run which indicates a significant correlation among the different cost components. Later, the influence of different determinants on the total logistics cost are examined through regression analysis. The findings help the users to understand the actual cost of using ports and facilitate both the users and port service providers to understand the areas where improvements are needed to reduce the total logistics cost in ports.

Session 4: Workers in supply chains
Presentation 1: 13.00 – 13.30

Title: Seafarers change and repatriation issue during COVID-19: an empirical study in Vietnam

Authors: Lam Canh Nguyen*, Gia Huy Dinh, Hoang Duc Bui, Ngoc Kieu Oanh Nguyen, Ha Ly Le

*School of Business & Management, RMIT University Vietnam

Abstract

The outbreak of COVID-19 pandemic has substantially influenced the global maritime industry, in which the seafarers are severely suffering as the frontline workers. Among all negative effects to maritime labour, the problem of crew change is the most noticeable due to the seaport closures and international flight restriction. A few studies demonstrated that COVID-19 pandemic caused a humanitarian crew change crisis at sea (De Beukelaer, 2021, Luchenko and Georgiievskyi, 2021). International organizations have actively called for early actions to deal with this issue, including International Maritime Organization (IMO, 2020a, IMO, 2020b, IMO, 2020c), International Labor Organization (ILO, 2020d, ILO, 2020b, ILO, 2020a, ILO, 2020c), the International Transport Workers' Federation (ITF, 2020) and the International Chamber of Shipping (ICS, 2020b, ICS, 2020a). It was estimated that 250,000 seafarers are currently stranded on ships and the equal number of seafarers are stuck at home, unable to go onboard for their work by July 2020 (IMO, 2021). As a result, the number of crew members expiring contract was raised from 8.8% to 9.0% last month and the seafarers staying over 11 months onboard was increased from 1.0% to 1.3% (Forum, 2021). The crew change crisis also led to other negative effects on the seafarers' mental and physical health (Hebbar and Mukesh, 2020), thus influence their welfare and shipping operation activities. Nevertheless, there is not yet a universally accepted solution and each maritime countries have different experience in dealing with the crew change problem.

This paper aims at examining and analyzing the seafarers change problem due to COVID-19 based on an empirical study in Vietnam. From the interviews with relevant stakeholders, i.e., seafarers, shipping companies and maritime administrations, we discover the current practice of crew change and repatriation of Vietnamese seafarers during the COVID-19 pandemic and discuss their impacts into their welfare, the shipping operation and crew supply for international vessels. Solutions for crew change and crew supply in the post-pandemic period are also put into scope and assessed in this study accordingly.

Key words: crew, crew change, Vietnam, COVID-19, interview, post-pandemic

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Presentation 2: 13.30 – 14.00

Title: Managing Disruptions in the Maritime Industry – A Systematic Literature Review **Authors:** Thanh-Thuy Nguyen*, Dung Tran, Truong Ton Hien Duc, and Vinh V. Thai *School of Accounting, Information Systems & Supply Chain, RMIT University	**Abstract** **Purpose:** This paper presents a systematic review of the literature in the domain of maritime disruption management, upon which future research framework and agenda are proposed. Two review questions i.e. the measures that are employed to manage disruptions, and how these contribute to resilience performance, were pursued. **Design/methodology/approach**: The systematic literature review procedure was strictly followed, including identification and planning, execution, selection, and synthesis and analysis. A review protocol was developed, including scope, databases and criteria guiding the review. Following this, 47 articles were eventually extracted for the systematic review to identify themes for not only addressing the review questions but also highlighting future research opportunities. **Findings**: It was found that earlier studies mainly focussed on measures, which are designed using mathematical models, management frameworks and other technical support systems, to analyse and evaluate risks, and their impacts on maritime players at the levels of organisation, transport system and region in which the organisation is embedded. There is, however, a lack of research that empirically examines how these measures would contribute to enhancing the resilience performance of maritime firms and their organisational performance as a whole. Subsequently, a Digitally Embedded and Technically Support Maritime Disruption Management (DEST-MDM) model is proposed. **Key Words**: disruption management, maritime industry, maritime supply chain, systematic literature review

Presentation 3: 14.00 – 14.30

Title:	Abstract
Future of Shipping Industry in the Age of Automation: The Case of Seafarer Training Challenges	**Background** Industry 4.0, through digitalisation and automation, has already started to disrupt the supply chain and logistics system, including its maritime transport (Emad, Enshaei, & Ghosh, 2021). The rapid and significant developments in autonomous transport and delivery is one of the nine supply chain technology clusters reshaping the future of the maritime transport (Alicke, Hoberg, & Rachor, 2018). Already, autonomous shipping is applying advanced technologies such as cyber physical systems, the internet of things, artificial intelligence, and cloud computing to increase safety, efficiency, and sustainability in maritime domain (Emad, Khabir, & Shahbakhsh, 2020). Recently, the emergent COVID-19 disruption is adding another layer of challenges to supply chains, further emphasising the need for preparedness of the shipping industry by embracing autonomy to meet these challenges (Emad, 2021; Khanna, 2021; Zaman, Pazouki, Norman, Younessi, & Coleman, 2017). Autonomous shipping technology could evolve in unpredictable ways and bring many benefits and equally concerns, especially for its human elements (Ferrantino & Koten, 2019), who are still likely to be a crucial element of the autonomous systems however, the new roles will bring their own challenges (Shahbakhsh, Emad, & Cahoon, 2021). In this respect, it is timely to address the potential challenges for seafarers as a main driver of the future shipping industry. Previously, changes in the maritime domain, including the introduction of new technology, have resulted in the need for the training of the new skills and competencies for seafarers (Emad et al., 2020). Although the research regarding the introduction and development of autonomous technology is maturing, there is little research about the role of humans in autonomous shipping. Thus, there is a gap and a critical need to investigate competency development and reskilling challenges that prepares seafarers for the autonomous future of shipping. **Method** Although, past and current research on autonomous shipping tends to focus on technological development, there appears to be insufficient research on the human role (Karvonen & Martio, 2018; Mallam, Nazir, & Sharma, 2020). Therefore, this study conducted an in-depth systematic literature review (SLR) to consolidate and analyse the current research output in this field and identify knowledge gaps. By collecting reliable data through systematic procedures and protocols, there is a valuable opportunity to evaluate, analyse, and synthesise the existing data on autonomous shipping and in particular, what is known in the autonomous shipping field from the human element perspective. More specifically, the focus of this study is on the human element in autonomous shipping from the perspective of new roles, responsibilities, training challenges, and reskilling processes of future seafarers. **Results** The outcomes of the SLR highlight a myriad of research undertaken in the technology used in the autonomous systems, in relation to for example, navigation, deep learning, and decision-making systems. The study also reaffirmed little research on the human element and the role of future system operators where the human role is likely to gradually move through different stages, from onboard to Shore Control Centers (SCC). A potential impact then
Authors: Mehrangiz Shahbakhsh *, Gholam Reza Emad, Stephen Cahoon *Australian Maritime College, University of Tasmania	

is that seafarers who are licenced through current training standards are unlikely to be qualified to fill the new positions. A recommendation of this study is that existing and future seafarers should be retrained and upskilled through new education and training standards to ensure readiness for their new roles and responsibilities. The study concludes with suggestions for future research including the critical need predict the new set of skills and competencies, new training facilities and structures, and the qualification requirements for future trainers.

Keywords: Human element; Autonomous shipping; Industry 4.0; Seafarer Training

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Presentation 4: 14.30 – 15.00

Title: How critical is maritime security to seafarers? **Authors:** Peter Cook* *Director, PCA Maritime (Australia)	**Abstract** The commercial shipping industry provides the skeletal structure of the global trading network, moving over 80% of all trade across the world. The two principal elements of the shipping industry are the ships that carry the billions of tons of cargo and the seafarers who carefully and skilfully move them across the oceans of the planet from port to port. The core function of maritime security is to protect and safeguard the trading networks supporting the global economy. Critical to this perpetual process is protection and safe being of seafarers. This presentation will highlight some of the threat's seafarers are exposed to and how maritime security protects them.