



The Australian Maritime Logistics Research Network (AMLRN)

2024 Symposium

Thursday, 5 December 2024

Hosted by



School of Accounting, Information System, and Supply Chain

College of Business & Law

RMIT University

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WELCOME FROM THE AMLRN 2024 SYMPOSIUM CHAIRS



Professor Vinh Thai **Chair, AMLRN 2024 Symposium**

*School of Accounting, Information Systems, and Supply Chain
College of Business and Law
RMIT University*

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) 2024 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 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 past symposiums, it is an honour to welcome you back to Australia's south coast city, Melbourne. We have an abundance of maritime activity in this region and are delighted to share our experiences with you.

The theme of the AMLRN 2024 Symposium is "Future of Global Maritime Logistics in Evolving Supply Chains". Maritime logistics and the associated supply chains are heavily impacted by uncertainties. Such uncertainties include climate change, geopolitical factors, and trade and industry actions, to name a few. These uncertainties can have significant consequences for the efficiency and effectiveness of maritime logistics operations, leading to supply chain disruptions, increased costs, sustainability risks, and reduced competitiveness. These, in turn, will negatively impact world trade and the global economy, eventually affecting our daily life given that more than 80% of world trade in terms of volume is transported by sea.

The past few years post the COVID-19 pandemic have witnessed these ongoing uncertainties. On the one hand, the maritime industry is in the accelerating mode of decarbonisation toward Net Zero while balancing other aspects of sustainability. On the other, geopolitical events such as the Houthi attacks in the Red Sea have put sea freight on a roller coaster, while others such as cyberattacks and industrial actions have also led to significant disruptions. As a result, it is imperative for both industry and academia to investigate how to address these uncertainties for maritime logistics and supply chains to boost economic recovery, resilience, and prosperity in an emerging multi-polar world.

We appreciate that the Symposium features presentations from academics and practitioners not only from Australia but also other countries including Singapore, Taiwan, Vietnam, and India. We would like to express our deep appreciation to the Department of Supply Chain and Logistics, School of Accounting, Information Systems and Supply Chain, as well as RMIT's Global Business Innovation (GBI) Enabling Impact Platform for their great support! We hope you enjoy the symposium and look forward to seeing you again at the AMLRN 2025 Symposium.

SYMPOSIUM ORGANISING COMMITTEE

Symposium Chair

- Professor Vinh Thai, RMIT University

Members of Symposium Organising Committee

- Professor Vinh Thai, RMIT University
- Associate Professor Peggy Shu-Ling Chen, University of Tasmania
- Professor Michael Bell, University of Sydney
- Associate Professor Sean Asian, La Trobe University
- Professor Hadi Ghaderi, Swinburne University of Technology
- Associate Professor Yong Wu, Griffith University
- Associate Professor Paul Bergey, University of Western Australia
- Associate Professor Ferry Jie, Edith Cowan University
- Associate Professor Richard Oloruntoba, Curtin University

AMLRN Secretariat Team

- Dr Thuy Nguyen, RMIT University
- Dr Aswini Yadlapalli, RMIT University
- Dr Priyabrata Chowdhury, RMIT University

THE AUSTRALIAN MARITIME LOGISTICS RESEARCH NETWORK (AMLRN) 2024 SYMPOSIUM PROGRAM

AGENDA

Thursday, 5 December, 2024

08.30 – 09.00	Registration
09.00 – 09.15	Opening Ceremony
	<p>Master of Ceremony: Dr Aswini Yadlapalli, <i>School of Accounting, Information Systems and Supply Chains, RMIT University, Australia</i></p> <p><i>RMIT Building 80, Level 10, Room 17</i> <i>Microsoft Teams link: Click here to join the session</i></p>
	<ul style="list-style-type: none"> • Welcome and Acknowledgement of Country Professor Babak Abbasi, <i>Deputy Dean of Research & Innovation, School of Accounting, Information Systems & Supply Chain, RMIT University</i> • Opening statement of AMLRN Prof Vinh Thai, <i>School of Accounting, Information Systems and Supply Chains, RMIT University, Australia</i>
09.15 – 10.30	Keynote presentations
	<p>Moderator: Assoc Prof Peggy Chen, <i>Director, Centre for Maritime and Logistics Management, Australian Maritime College, University of Tasmania, Australia</i></p> <p><i>RMIT Building 80, Level 10, Room 17</i> <i>Teams link: Click here to join the session</i></p>
09.15 – 09.45	<ul style="list-style-type: none"> • Cyber Resilience and the Maritime Sector Professor Matthew Warren, <i>Director, Centre of Cybersecurity Research & Innovation, RMIT University</i>
09.45 – 10.15	<ul style="list-style-type: none"> • Australia is a Maritime Nation with big challenges in a time of opportunity Ms Angela Gillham, <i>CEO, Maritime Industry Australia Limited (MIAL)</i>
10.15 – 10.30	<ul style="list-style-type: none"> • Q & A
10.30 – 10.45	Morning tea
10:45 – 12:45	Parallel paper presentation Session 1, Session 2, Session 3, Session 4
12:45 – 13:15	Lunch

13:15 – 14:15	Industry panel discussion
	<p>Moderator: Prof Michael Bell, <i>Chair of Ports and Maritime Logistics, Institute of Transport and Logistics Studies (ITLS), University of Sydney Business School</i></p> <p>RMIT Building 80, Level 10, Room 17 Teams Link: Click here to join the session</p>
	<p>The Quest for Decarbonisation and Net Zero in the Maritime Industry</p> <p><u>Panel members</u></p> <p>Mr Andrew Newman, <i>Director Policy and Strategy, Freight Victoria, Department of Transport and Planning</i></p> <p>Mr Tim Dornom, <i>Senior Sustainability Manager, Port of Melbourne</i></p> <p>Mr Aadil Machiwala, <i>Trade Manager Northeast Asia, Australian National Line</i></p>
14.15 – 14.30	Certificate Award and Closing
	<p>Moderator: Prof Vinh Thai, <i>School of Accounting, Information Systems and Supply Chains, RMIT University, Australia</i></p> <p>RMIT Building 80, Level 10, Room 17 Teams Link: Click here to join the session</p>
	<ul style="list-style-type: none"> • Award of Certificate of Appreciation and Certificate of Participation Prof Vinh Thai, <i>School of Accounting, Information Systems and Supply Chains, RMIT University, Australia and Symposium Chair</i> • Concluding remarks Prof Paul Childerhouse, <i>Head of Department of Supply Chain and Logistics Management, School of Accounting, Information Systems and Supply Chains, RMIT University</i>

* Please note that all indicated timeslots are [Australian Eastern Daylight Time \(AEDT\)](#).

Presentation Schedule – Parallel Sessions

Session 1 Port Sustainability	Session 2 Shipping Sustainability	Session 3 Maritime Connectivity and Technology	Session 4 Maritime Complexity and Resilience
Chair: A/Prof Muhammad Abdulrahman (RMIT)	Chair: Charles Lau (RMIT University)	Chair: Prof Hadi Ghaderi (Swinburne University)	Chair: Assoc Prof Yong Wu (Griffith University)
<i>RMIT Building 80, Level 10, Room 13 Teams link: Click here to join the session Teams host: Dr Aswini Yadlapalli (RMIT)</i>	<i>RMIT Building 80, Level 10, Room 14 Teams link: Click here to join the session Teams host: Prof Vinh Thai (RMIT)</i>	<i>RMIT Building 80, Level 10, Room 15 Teams link: Click here to join the session Teams host: Dr My Nguyen (RMIT)</i>	<i>RMIT Building 80, Level 10, Room 16 Teams link: Click here to join the session Teams host: Dr Priyabrata Chowdhury (RMIT)</i>
10.45 – 11.15: Transitioning Coal Ports to Circular Economy Precincts: A Case Study of the Port of Newcastle <i>Veronica Schulz, Michael GH Bell, John Rose, Glenn Geers</i>	10.45 – 11.15: Green Liner and Feeder Shipping Network Design <i>Jzolanda Tsavalista Burhani, Michael G.H. Bell, Jyotirmoyee Bhattacharjya, Glenn Geers</i>	10.45 – 11.15: Collaboration in the Maritime Industry: Managing Partitioning and Transitivity <i>Richard T. Watson</i>	10.45 – 11.15: Ripple effect of ammonia supply disruption on the ammonia bunker supply chain <i>Mengyao Yang, Jasmine Siu Lee Lam</i>
11.15 – 11.45: Identifying a comprehensive set of sustainable port management practices <i>Mohammed Mojahid Hossain Chowdhury, Wenming Shi, Vera Zhang</i>	11.15 – 11.45: Facilitating Carbon credits and offsets for the Ship-recycling and Shipbreaking Industry: The case of India <i>Mayank Mishra, Shishir Shrotriya</i>	11.15 – 11.45: Market effect on collaboration mechanisms in container shipping <i>Mosleh Amiri</i>	11.15 – 11.45: Multiple yard crane scheduling with variable crane handling time <i>Yong Wu</i>
11.45 – 12.15: Competency Framework of Port Workers at the Operational Level in the New Era of Supply Chain Management: A Mixed Method Approach <i>Vinh V. Thai</i>	11.45 – 12.15: Green Shipping Corridors: Charting Zero-Emission Maritime Trade <i>Shishir Shrotriya*, Mayank Mishra</i>	11.45 – 12.15: An Acceptance Model of Maritime Autonomous Surface Ship (MASS) in the Shipping Industry in Taiwan <i>Chin-Shan Lu , Yi-Pei Liu</i>	11.45 – 12.15: Evaluating the Impact of Circular Supply Chain Management on Port Resilience During Disruptions <i>Jiarong Chen, Sunho Bang, Kwangsup Shin, Minho Ha, Vinh V. Thai</i>
12.15 – 12.45: Evaluating the Impact of Smart Technologies on Port Sustainability: A Systematic Literature Review	12.15 – 12.45: Developing Strategy for Australian Ports Integrating in the Global Hydrogen Supply Chains Using	12.15 – 12.45: Examining Applications of 4.0 Technologies in the Maritime Industry: A Bibliometric Analysis	12.15 – 12.45: Maritime Logistics Resilience Capabilities: A Comprehensive Framework through Systematic Literature Review

<i>Hiep Tuan Nguyen , Lam Canh Nguyen , Huy Gia Dinh, Minh Cong Tran and Ngan Thi Dang</i>	<i>Sustainable Balanced Scorecard Approach Oktaviani Turbaningsih, Peggy Shu-Ling Chen, Hossein Enshaei, and Mark Cooper</i>	<i>Cong Minh Tran , Minh Binh Chu , Lam Canh Nguyen , Viet Anh Pham , Trang Le Thuy</i>	<i>Thi Minh Hang Hoang</i>
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Microsoft Teams Meeting Links

Morning Session: Welcome, Opening Statement & Keynote Speakers	Join the meeting now Meeting ID: 429 154 665 994 Passcode: 45Lbrm
	Dial in by phone +61 3 9067 5001,646078238# Australia, Melbourne Find a local number Phone conference ID: 646 078 238# For organisers: Meeting options Reset dial-in PIN
Parallel Research Papers: Session 1: Port Sustainability	Join the meeting now Meeting ID: 496 095 240 231 Passcode: Cb8qgs
	Dial in by phone +61 3 9067 5001, 448191495# Australia, Melbourne Find a local number Phone conference ID: 448 191 495# For organisers: Meeting options Reset dial-in PIN
Parallel Research Papers: Session 2: Shipping Sustainability	Join the meeting now Meeting ID: 488 725 061 238 Passcode: YQjPRk
	Dial in by phone +61 3 9067 5001, 870282399# Australia, Melbourne Find a local number Phone conference ID: 870 282 399# For organisers: Meeting options Reset dial-in PIN
Parallel Research Papers: Session 3: Maritime Connectivity and Technology	Join the meeting now Meeting ID: 439 335 838 474 Passcode: jH5mdh
	Dial in by phone +61 3 9067 5001, 320620483# Australia, Melbourne Find a local number Phone conference ID: 320 620 483# For organizers: Meeting options Reset dial-in PIN

<p>Parallel Research Papers:</p> <p>Session 4: Maritime Complexity and Resilience</p>	<p>Join the meeting now Meeting ID: 490 308 175 58 Passcode: tkRA3r</p> <hr/> <p>Dial in by phone +61 3 9067 5001, 560084361# Australia, Melbourne Find a local number Phone conference ID: 560 084 361# For organisers: Meeting options Reset dial-in PIN</p>
<p>Afternoon Session:</p> <p>Industry panel discussion and closing</p>	<p>Join the meeting now Meeting ID: 496 182 381 463 Passcode: nKqEpp</p> <hr/> <p>Dial in by phone +61 3 9067 5001, 978192223# Australia, Melbourne Find a local number Phone conference ID: 978 192 223# For organisers: Meeting options Reset dial-in PIN</p>

SYMPOSIUM OPENING STATEMENT



Professor Vinh Thai

AMLRN Founder


*School of Accounting, Information Systems and Supply Chains
College of Business and Law
RMIT University
Australia*


Biography


Dr Vinh Thai is a 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).


SYMPOSIUM KEYNOTE SPEAKERS

	<p style="text-align: center;">Professor Babak Abbasi Deputy Dean of Research</p> <p style="text-align: center;"><i>School of Accounting, Information Systems, and Supply Chain College of Business and Law RMIT University Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Professor Babak's teaching and research is in the area of Business Analytics, Decision Sciences, Operations Research, Machine Learning, Operations Management and Optimisation.</p> <p>His research investigates leveraging the broader context in mathematical modelling, machine learning and stochastic optimisation to improve decisions making in the businesses and not-for-profit organisations. He has advanced optimisation models and solution algorithms for practical problems such as inventory decisions in blood management, resource allocation in hospital including intensive care units (ICUs) and emergency departments, inventory transshipment decisions, resource allocation for emergency responses, allocation and scheduling of caregivers for home healthcare systems, and donor communication decisions in charities and not-for-profit organisations.</p> <p>Professor Babak's research has been published in reputable journals such as Decision Sciences, European Journal of Operational Research and INFORMS Journal of Applied Analytics. He is currently an associate editor for Decision Sciences journal.</p>
<p style="text-align: center;">Keynote Overview</p>	<p>Welcome and Acknowledgement of Country</p>

	<p style="text-align: center;">Professor Matthew Warren Director</p> <p style="text-align: center;"><i>Centre of Cybersecurity Research & Innovation RMIT University Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Matt Warren is the Director of the RMIT Centre of Cyber Security Research and Innovation and a Professor of Cyber Security at RMIT University. Professor Warren is an award winning researcher in the areas of Cyber Security and Computer Ethics and has received numerous grants and awards from national and international funding bodies. Under Matt's leadership, he has strategically driven the direction of the centre to focus on cyber security beyond the technical lens, to intersect with the human and organisational aspects, both nationally and globally, bringing together a strong membership base of 50+ researchers from across the university.</p>
<p style="text-align: center;">Keynote Overview</p>	<p>Title: Cyber Resilience and the Maritime Sector</p> <p>Astract:</p> <p>Cyber resilience in the maritime domain is crucial for safeguarding Australia's global trade and maritime operations against cyber threats.</p> <p>The presentation will explore the importance of cyber resilience in a maritime context; by exploring a number of real-life examples and steps needed to implement cyber resilience. The government proposes a number of approaches that the Australian maritime sector can adopt to increase cyber resilience. The steps to improving Cyber resilience takes the form of comprehensive risk assessments, continuous monitoring, and incident response strategies to mitigate cyber risks but it can be hard to implement in complex situations.</p> <p>The presentation will also discuss some of the key operational and cyber issues that have a direct impact on the implementation of cyber resilience.</p>

	<p style="text-align: center;">Ms Angela Gillham CEO</p> <p style="text-align: center;"><i>Maritime Industry Australia Limited (MIAL)</i> <i>Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Angela Gillham is the Chief Executive Officer of Maritime Industry Australia Ltd. Leading the MIAL Secretariat team Angela is responsible for the strategic direction, key projects, and policy settings advocated on behalf of MIAL members – a diverse range of businesses operating maritime assets to, from and within Australia. Angela is an accomplished leader who has successfully executed an ambitious program to advance the interests and growth of the Australian maritime industry. Angela’s team delivers projects relating to international engagement, industry policy and government affairs, events, media and communications, as well as sector-specific initiatives designed to address the challenges faced by Australian maritime businesses, including fiscal settings and competitiveness, maritime skills development and decarbonisation and the energy transition. Angela is a member of several critical government/industry liaison committees and is committed to an apolitical approach, collaborating with all relevant stakeholders towards the common goal of safeguarding Australia’s sovereignty, economy and security by creating a strong, sustainable maritime nation.</p>
<p style="text-align: center;">Keynote Overview</p>	<p>Title: Australia is a Maritime Nation with big challenges in a time of opportunity</p> <p>Abstract: Australia’s maritime interests are unparalleled. We are a large island at the end of the global supply chain and are highly dependent on shipping to underpin our economy and way of life. Yet Australia has been left vulnerable by decades of neglect of the maritime industry which has resulted in our near total reliance on foreign interests to deliver our broader maritime task. This makes Australia vulnerable to supply chain shocks with limited capability to respond to natural disasters that require maritime assistance and has diminished our ability to produce the strategic skills we need to run a maritime nation. With the fifth largest shipping task, and vast renewable energy potential, Australia has the potential to produce the fuels that will help to decarbonise hard to abate sectors globally, including international shipping. Meeting these challenges and leveraging opportunities will require a long term, stable policy approach at the Commonwealth level. While the Government is signalling progress in these areas through the Maritime Strategic Fleet Policy and the Transport and Infrastructure Net Zero Road Map, much more is needed.</p>

SYMPOSIUM CONCLUDING REMARK

	<p style="text-align: center;">Professor Paul Childerhouse Head, Department of Supply Chain Management & Logistics <i>School of Accounting, Information Systems and Supply Chains</i> <i>College of Business and Law</i> <i>RMIT University</i> <i>Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Paul heads up the supply chain and logistics department at RMIT University. His current research focusses on supply chain network resilience and sustainability. Supply chain sustainability has become a major area of focus with several studies into the transformation of food supply chains in Southeast Asian and New Zealand. Paul has published over 60 peer reviewed articles in a multitude of journals.</p> <p>https://orcid.org/0000-0003-1090-9990</p>

MODERATOR OF KEYNOTE PRESENTATION



Associate Professor Peggy Shu-Ling Chen

Director

*Centre for Maritime and Logistics Management,
Australian Maritime College
University of Tasmania
Australia*

Biography

Associate Professor Chen is the Director of Centre for Maritime and Logistics Management at the Australian Maritime College (AMC), University of Tasmania. She joined AMC as an academic in 2004. Prior to AMC, she worked in different sectors in Taiwan, including Customs, banking, and tertiary education. She holds a PhD in Port Management from Cardiff University UK and has great interest in the sustainable development of maritime sectors through research and education. Her research expertise and publications are in the field of maritime logistics management covering port management from various aspects including governance, climate change impacts and adaption strategy, social performance and digitalisation, and risk management in maritime supply chains. Associate Professor Chen currently undertakes research in the area of maritime decarbonisation such as port-focused hydrogen supply chains, hydrogen powering vessels, and port decarbonisation. She is also involved in research projects within the Australian Government funded Blue Economy Collaborative Research Centre in relation to logistics and supply chain management for different sectors including offshore wind and aquaculture. She is an editorial board member of Maritime Economics & Logistics and WMU Journal of Maritime Affairs, and Associate Editor of The Asian Journal of Shipping and Logistics (AJSL).

<https://discover.utas.edu.au/P.Chen>

MODERATOR OF INDUSTRY PANEL DISCUSSION



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 since 2012. Prior to this, he was for 10 years the Professor of Transport Operations at Imperial College London where he established the Port Operations Research and Technology Centre. 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 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 an Editorial Board Editor. He was also an Associate Editor of *Maritime Policy & Management* and is currently an Associate Editor of *Transportmetrica A*.

INDUSTRY PANEL DISCUSSION: PANELISTS



Mr Andrew Newma

Director

*Ports, Freight and Intermodal Freight Victoria
Department of Transport & Planning
Level 19, 1 Spring Street, Melbourne VIC 3000*

Biography

Andrew Newman was appointed Director, Policy and Strategy, Freight Victoria in August 2021 and having previously filled the role of Director Ports, Freight and Intermodal.

Andrew is well known in freight circles from his time previously as part of the Freight portfolio in the Department under its various guises.

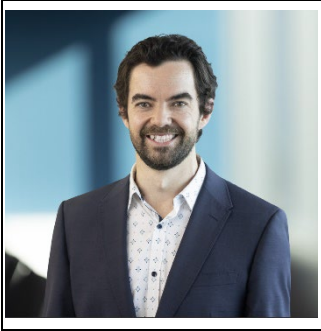

Andrew is passionate about freight and port policy and he is excited to be part of Freight Victoria and to work with the Freight Victoria team as it delivers its role in Department of Transport, and particularly the Victorian Freight Plan, Delivering the Goods.

He has extensive policy and transport industry experience and has led engagement with the commercial ports sector on a number of complex and priority issues for Victoria including the recently completed review of the Victorian Ports Sector and progressing delivery of the Port Rail Shuttle Network.

Before his current role, Andrew was the Director, Policy and Integrated Planning for two years where he led the policy function within the Office of Suburban Development. Before that he was a Transport and Public Policy Principal at consulting firm Jacobs for close to two years where he led urban planning and transportation planning functions.

Andrew has also held senior executive roles in transport network planning and the previous freight logistics and marine in the Victorian Government.

Andrew holds a Masters of Public Policy and Management from the University of Melbourne as well as Degrees in Arts and Commerce.

	<p style="text-align: center;">Mr Tim Dornom Senior Sustainability Manager</p> <p style="text-align: center;"><i>Port of Melbourne Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Tim Dornom leads the Port of Melbourne’s Sustainability function. The Port of Melbourne is Australia’s largest general cargo and container port, facilitating more than one third of the nation’s container trade. The port has a Net Zero emissions target for its own operations by 2030, and a commitment to engage with port stakeholders to facilitate decarbonisation across the port supply chain. This includes preparing for the future energy needs and port infrastructure requirements of the maritime, road and rail sectors that intersect at the port.</p>
	<p style="text-align: center;">Mr Aadil Machiwala Trade Manager NEA</p> <p style="text-align: center;"><i>ANL Container Line Pty Ltd 11/30 Convention Centre Place, South Wharf Melbourne VIC Australia 3006</i></p>
<p style="text-align: center;">Biography</p>	<p>With a Master’s in Supply Chain & Logistics and a Bachelor’s in IT from RMIT University, Aadil has built a strong technical and analytical foundation in the shipping and logistics industry, further highlighted by his recognition as a David Hay Scholarship recipient. Throughout his career, Aadil has honed essential skills—such as communication, empathy, and adaptability—that contribute to his effectiveness in fast-paced environments. Known for his problem-solving abilities and positive “can-do” attitude, Aadil thrives in collaborative settings and views challenges as opportunities for growth, making him well-suited to the dynamic demands of trade management and customer relations.</p>

CHAIRS OF SYMPOSIUM SESSIONS

	<p style="text-align: center;">Associate Professor Muhammad Abdulrahman</p> <p style="text-align: center;"><i>School of Accounting, Information Systems and Supply Chains College of Business and Law RMIT University Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Dr Muhammad is currently an Associate Professor and Program Manager, Master of Supply Chain and Logistics Management at RMIT University. He is a Senior Fellow of the Higher Education Academy (SFHEA) with over 20 years of experience in teaching and research in strategic operations, supply chain management and reverse logistics. Muhammad has been involved in interdisciplinary research in areas of supply chain sustainability, green supply chain management, reverse logistics and remanufacturing. He has published in top ranking journals, and he is on the Editorial Board of International Journal of Production and Operations Management (IJPOM).</p> <p>Further details on: ORCID and Google Scholar.</p>
	<p style="text-align: center;">Professor Hadi Ghaderi</p> <p style="text-align: center;"><i>Swinburne Business School Swinburne University Australia</i></p>
<p style="text-align: center;">Biography</p>	<p>Dr Hadi Ghaderi is a Professor and the Major Discipline Coordinator for Logistics and Supply Chain Management at Swinburne Business School. In 2023 and 2024, Hadi was recognised in the Stanford University Top 2% most-cited scientists list. Hadi is also the Lead for Supply Chain Decarbonisation at Swinburne. Through a unique transdisciplinary approach, the program delivers industry and government end-to-end bespoke solutions to decarbonise supply chains. Hadi is also associated with Swinburne Smart City Research Institute by leading a research stream on Disruptive mobility. Hadi has led a number of industry-engaged research projects in the area of Supply Chain Digitalisation and Transformation. His research interest is focused around supply chain digitalisation, supply chain optimisation, operations management, business logistics, intelligent transport systems, ports and maritime economics.</p>



Associate Professor Charles Lau

*Department of Supply Chain and Logistics
School of Accounting, Information Systems and Supply Chain
RMIT University, Australia*

Biography

Dr. Charles Lau is an Associate Professor and Deputy Head of the Department of Supply Chain and Logistics in the School of Accounting, Information Systems and Supply Chain at RMIT University in Australia. With over 30 years of experience across the private sector, government, and academia, his research focuses on supply chain optimization, collaboration, simulation, and design. His work has been published in leading journals such as Transportation Research Part E, International Journal of Production Economics, Supply Chain Management: An International Journal, International Journal of Physical Distribution and Logistics Management, and International Journal of Logistics Management.



Associate Professor Yong Wu

*Department of Business Strategy and Innovation
Griffith Business School
Griffith University
Australia*

Biography

Dr Yong Wu is an Associate Professor at the Department of Business Strategy and Innovation, Griffith University. Yong holds a PhD in Operations Research from Nanyang Technological University, Singapore. Prior to joining Griffith University in 2010, he had worked for The Logistics Institute - Asia Pacific, a joint venture between National University of Singapore and Georgia Institute of Technology (2005-2008), and the Institute for Logistics and Supply Chain Management, Victoria University, Australia (2008-2010). He is a Senior Member of the Institute for Operations Research and Management Sciences (INFORMS), and a Senior Fellow of the HEA (SFHEA). His research interests are in logistics and supply chain management, operations research, supply chain modelling, optimisation and simulation to improve logistics activities and supply chain performance.

ABSTRACTS OF PRESENTATIONS

Session 1: Port Sustainability 10:45 am – 12:45 pm

Transitioning Coal Ports to Circular Economy Precincts: A Case Study of the Port of Newcastle

Veronica Schulz, Michael GH Bell, John Rose, Glenn Geers

Abstract

The global transition from traditional coal-based economies to sustainable circular ecosystems is both an imperative environmental challenge and a strategic economic opportunity. This study focuses on diversifying the Port of Newcastle, the world's largest coal port and a significant player in Australia's coal economy, which is at risk of becoming a stranded asset if diversification is not achieved. The purpose of this research is to explore strategies for diversifying the port's economic base through the development of circular economy precinct. Such precincts leverage the principles of industrial symbiosis, where waste and by-products from one process become valuable inputs for another, enhancing the overall efficiency and sustainability across the precinct.

This research uses system dynamics to model the economic feasibility and outcomes of a circular economy precinct at the Port of Newcastle. System dynamics is chosen for its capability to analyse complex, dynamic systems with feedback loops and time delays, making it suitable for modelling synergistic relationships between circular economy activities. The model, developed using PowerSim software, integrates data on material flows and economic factors to simulate the potential benefits of the diversification strategy.

Green steel production emerges as a potential circular economy strategy. Characterised by using green hydrogen or other low-emission technologies to reduce iron ore, it offers a viable pathway to significantly lower the carbon footprint of steel manufacturing. The Port of Newcastle, with its existing infrastructure and strategic location, is uniquely positioned to capitalise on this opportunity. Integrating green steel production with existing circular economy processes at the port, such as ship recycling and biowaste conversion, can yield substantial synergies. For instance, using scrap steel from ship recycling offers logistical and operational advantages due to proximity. Similarly, biowaste conversion processes can generate biomass pellets, serving as the carbon element in the production process, further maximising the precinct's resource efficiency. The utilisation of offshore wind energy from planned wind farms off the coast of Newcastle can also power the green steel facility. Thus, the co-location of several circular economy processes in one precinct can drive the steel production process.

Moreover, establishing a circular economy precinct at the port aligns with broader regional and national goals of economic diversification and decarbonisation. It can create new jobs, stimulate local innovation, and enhance the port's competitiveness in a rapidly evolving global market. By fostering a closed-loop industrial ecosystem, the Port of Newcastle can serve as a model for sustainable industrial development, illustrating how traditional fossil fuel-based industries can reinvent themselves to meet contemporary environmental challenges. Various policy levers can further improve the profitability and longevity of the project, such as a reformed Australian Carbon Credit Unit Scheme that is mandatory and initiatives for governments to de-risk major investments for early adopters. Ultimately, this study highlights the transformative potential of circular economy precincts in reshaping traditional coal ports into sustainable, innovation hubs.

Identifying a comprehensive set of sustainable port management practices

Mohammed Mojahid Hossain Chowdhury, Wenming Shi, Vera Zhang

Abstract

Background: Ports are the crucial components of both international and domestic trade and logistics network, serving as key hubs that facilitate the global movement of goods and commodities. Ensuring sustainability in port operations promotes environmental, social and economic development of a country. Hence, it is crucial to identify a comprehensive set of sustainable port management practices (SPMPs).

Objectives: Keeping in mind the aforementioned background, this study aims to comprehensively identify SPMPs, considering the triple bottom lines (TBL) of sustainability which encompasses environmental, social, and economic aspects.

Methodology: The study explores SPMPs from both academic documents and industry practices. A total of 179 articles from Scopus and Web of Science databases have been reviewed, and 26 SPMPs have been identified. Furthermore, 302 sustainable projects available on World Port Sustainability Program (WPSP) database have been reviewed, and 25 more SPMPs have been identified.

Findings: A total of 51 SPMPs have been identified and categorized across three dimensions: environmental, social, and economic. The comprehensive SPMPs are shown in the following table:

TBL		Practices
Environmental (20)	Energy management practices	Onshore power supply/ cold ironing
		Low/ zero carbon port microgrid
		Alternative energy integration
		LED lighting
	Waste treatment practices	Port's reception facilities for waste disposal
		Waste recycling/ effluent treatment facilities
		Circular disposal of dredged material
		Stormwater treatment facilities
	Carbon emission management practices	Carbon capture, usage, and storage (CCUS)
		Calculation of carbon footprint/ emission inventories
	Monitoring and reward mechanism	Scientific monitoring
		Biosecurity control and monitoring
		Port environmental review and certification
Protection of biodiversity and marine ecosystem	Incentives and rewards to port users	
	Ecosystem and biodiversity conservation	
Sustainable building and infrastructure developments	Marine ecosystem cleaning up campaign	
	Environmentally friendly infrastructure development	
Air, water and noise pollution reduction	Sustainable layout of port's buildings and offices	
	Air pollution reduction measures	
Social (12)	Community development practices	Sustainable ground water management
		Employment creation/ job opportunities
		Cultural heritage preservation
		Local communities' participation in port's activities
		Funding and collaboration with academic institutes
		Port community development initiatives
		Exhibition of port and port's function
	Internal social sustainability practices	Community impact mitigation initiatives
		Occupational health & safety measures
		Gender equality
		Sustainability awareness initiatives
		Formulating sustainability action plan
		Sustainable sourcing and contracts

Economic (19)	Sustained operational efficiency practices	Integrated berth allocation and quay crane assignment
		Robust yard template planning and equipment deployment
		Automatic guided vehicle (AGV) charging and operation scheduling
		Adoption of electrically driven port equipment
		Measurement of customer satisfaction and feedback
		Calamities and uncertainty handling practices
		Surveillance and security measures
	Digitalization and smart port technologies	Integrated port community systems
		AI & big data driven port operation
		Enhanced cyber security practices
		Blockchain & IoT based port logistic operation
		Hosting/collaborating innovation campaign
		Automation and robotic applications in port operations
		Integrated terminal management systems
	Sustainable hinterland & foreland connectivity	Integration of advanced digital infrastructure technologies
		Optimized channel/waterway management
	Wealth maximization practices	Sustainable freight transport mode connectivity
		Strategic port pricing
		Green port marketing

Implication of the study: Identifying a comprehensive set of SPMPs will help ports worldwide focus on sustainable operations across environmental, social, and economic dimensions. Additionally, port sustainability advocacy platforms and governments can use this as a benchmark to establish sustainable port operations in many countries.

Competency Framework of Port Workers at the Operational Level in the New Era of Supply Chain Management: A Mixed Method Approach

Vinh V. Thai

Abstract

Purpose: This paper deep dives into the topical question of what competencies port workers at the operational level need to possess for successful job performance in the new era, taking into consideration the change drivers e.g. the changing role of seaports in global supply chains, the impact of Industry 4.0 technologies on port operations, and the trend of port sustainable development.

Design/methodology/approach: The sequential mixed method research design was adopted to empirically examine the competency profile of port workers in the new era of supply chain management. Data were collected through in-depth interviews and a survey conducted with senior port management in Vietnam.

Findings: It was revealed that the competence framework of knowledge (generalist and specialist), skills (specialist), attitudes and abilities (generalist) with 40 competencies are valid and important to the job performance of port workers at the operational level in Vietnam, in which transferrable and safety related competencies were perceived as more important than others. Besides, the current possession level of these competencies is lower than their perceived importance. An Importance-Possession Strategy Matrix (IPSM) of port competence was charted as a tool for both theoretical and managerial applications.

Research limitations/implications: This research's reliability and validity would benefit from further research in other contexts e.g. countries and ports.

Practical Implications: Findings from this research provide senior port management with insights in various manners. In the context of Vietnam, it is paramount that the possession level of required competencies for port workers be enhanced across competency groups through relevant internal and external education and training programs, both on the job and at vocational and higher institutions. Senior port management can also use the IPSM as a management tool for the appraisal and education and training of their workers, focusing on the competencies whose significant gaps exist between their expectation and possession level.

Originality/value: This research introduced and empirically validated a competency framework that has not been previously explored. Given that ports are integrated components of the global logistics and supply chains, and their workforce is essential to their performance success, this competency framework contributes to enhancing knowledge development in the field. The IPSM developed in this study can be used for further theory development i.e. categorising and prioritising competencies, especially in conjunction with the VRIO framework.

Key Words: Port workers, competency profile, competency development, maritime supply chain, Vietnam

Evaluating the Impact of Smart Technologies on Port Sustainability: A Systematic Literature Review

Hiep Tuan Nguyen , Lam Canh Nguyen , Huy Gia Dinh, Minh Cong Tran and Ngan Thi Dang

Abstract

Introduction:

The rapid advancement of smart technologies, as known as Industry 4.0 technologies has been recognized as a pivotal trend in numerous business sectors, including maritime logistics. Technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Cloud Computing (IoT) have been contributed to enhance operational efficiency and environmental management in port systems around the world. This study aims to evaluate the impact of smart technologies on port sustainability, focusing on economic, environmental, and social dimensions. The significance of this research resides in its potential to transform port operations, promoting a more sustainable, efficient, and socially responsible management.

Methodology:

This research will employ a comprehensive search for relevant papers on Scopus databases, using keywords related to digitalization, smart technologies, ports, and sustainability. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement will be adopted for further steps. Initial filtering is expected to build a collection of 64 relevant studies, followed by a thorough review of abstracts and conclusions to refine the selection. The study will utilize structured literature review or bibliometric analysis to systematically analyze the selected papers. Both quantitative and qualitative research that demonstrates the impact of digitalization or specific technologies on the seaport sustainability will be included. The adaption of technologies will be identified and analyzed, followed by revealing research themes and future trends in this field.

Main Findings:

While data collection and analysis are ongoing, the study is expected to reveal several critical insights concerning the impact of smart technologies on port sustainability. These technologies are expected to enhance operational efficiency, reduce environmental impacts, and improve social sustainability.

Additionally, the study will likely identify key research themes and future trends, providing a comprehensive understanding of how these technologies influence various aspects of port sustainability.

Discussion:

The study is expected to widely discuss several challenges in implementing smart technologies in ports worldwide, such as high initial investment costs, lack of skilled personnel, and the need for improved coordination among stakeholders. The discussion will emphasize the importance of policy support and strategic planning to overcome these obstacles and ensure successful technology integration.

Conclusion:

This study seeks to offer a comprehensive perspective of smart technologies impact on port sustainability, offering general strategies to address challenges and encourage further adoptions. Upcoming research directions will involve experimental implementation and long-term data collection to assess the sustained effects of these technologies. Ultimately, this study aims to contribute to the development of more efficient, sustainable, and socially responsible port operations worldwide.

Session 2: Shipping Sustainability 10:45am – 12:45pm

Green Liner and Feeder Shipping Network Design

Jzolanda Tsavalista Burhani, Michael G.H. Bell, Jyotirmoyee Bhattacharjya, Glenn Geers

Abstract

Container liner shipping serves as the fundamental pillar of global commerce. In the year 2021, the international transportation of goods involved the shipment of 165 million twenty-foot equivalent units (TEUs) across the world. Liner shipping is widely recognised as a highly energy-efficient mode of transportation. Nevertheless, it is worth noting that even the more recent mega-vessels still release approximately 3 grammes of carbon dioxide (CO₂) per kilometre travelled and per metric tonne of cargo transported. The global environmental impact of maritime transportation remains significant, owing to the substantial size of the industry. In the year 2017, the shipping industry accounted for approximately 3.5 million barrels of bunker fuel consumption per day, representing half of the total global demand for fuel oil. Based on the findings of the fourth International Maritime Organisation (IMO) greenhouse gas (GHG) study, it is observed that the shipping sector contributed approximately 1.076 million tonnes of GHG emissions in 2018, accounting for approximately 2.89% of the total global anthropogenic emissions.

In response to this occurrence, the IMO has established a new GHG policy accepted by the Marine Environment Protection Committee (MEPC) 80 that the ultimate objective of the strategy is to achieve net-zero emissions, approximately around the year 2050. In order to achieve this objective and effectively transition towards carbon neutrality, the industry must undergo a transformation that entails a reduction in freight rates, albeit from their currently elevated levels. This transition is imperative in response to the requirements set forth by numerous national jurisdictions. The process of evolution encompasses various aspects, ranging from novel business models for liner shipping to advancements in ship and navigation technologies, such as weather routing, air lubrication, and wind assistance. The utilisation of analytical tools plays a significant role in the optimisation of operations within this process. The primary objective of this research is to construct a model that can optimise the efficiency of liner and feeder networks in order to facilitate the process of decarbonising the shipping industry. The proposed model considers various factors

such as climate change, the shift towards carbon-neutral fuels, the development of alternative fuel supply chains, and the implementation of more energy-efficient ship designs.

Facilitating Carbon credits and offsets for the Ship-recycling and Shipbreaking Industry: The case of India

Mayank Mishra, Shishir Shrotriya

Abstract

The ship recycling industry has immense potential as a beneficial sector for any country. A ‘progressive’ greening of this industry will help position a country (including India) as an attractive destination for the breaking and recycling of ships, and will add to its overall efforts towards climate-related commitments. The significance of ship-recycling and shipbreaking in the circular (or ‘blue’) economy - and the substantial emission reductions and energy savings associated with the recycling of metals and other materials in ships – has been noted widely.

Accordingly, this article is written to argue for the institutional facilitation of ship-recycling activities by enabling accrual of carbon credits/offsets thereto. Inclusion of these green activities into national carbon market(s) and their corresponding structures, frameworks, and processes will lead to a progressive ‘greenification’ of the ship-recycling and shipbreaking industry, and facilitate overall the ‘blueing’ of a country’s economy. Unsurprisingly, the European Union in December 2022 did add the maritime shipping industry as a component of its carbon market.

Taking India as a case study, the article explores the potential of ship-recycling/shipbreaking activities as possible earners of carbon credits and carbon offsets for associated actors and stakeholders. It attempts to quantify the energy savings involved, and examines India’s legal and regulatory landscape for the gaps, opportunities and challenges therein. The focus on India notwithstanding, the findings of the article – and in particular its recommended directions for further research - are relevant for actors and stakeholders in other countries as well.

Green Shipping Corridors: Charting Zero-Emission Maritime Trade

Shishir Shrotriya, Mayank Mishra

Abstract

Green Shipping Corridors (GSC) are emerging as a strategic solution to decarbonize the maritime industry, which currently contributes to 2.8% of global greenhouse gas emissions. These designated trade routes prioritize low or zero-emission fuels and technologies, fostering collaboration among stakeholders to create a sustainable shipping ecosystem.

The drivers behind green corridors extend beyond emission reduction. They accelerate the development and adoption of clean energy technologies, stimulate infrastructure development for alternative fuels, and encourage collaboration among governments, ports, shipping companies, and technology providers. Green corridors also offer economic benefits by stimulating growth, creating jobs, and improving trade competitiveness.

International initiatives like the Clydebank Declaration and the Getting to Zero Coalition highlight the global commitment to establishing green corridors. The International Maritime Organization's revised Green House

Gas (GHG) strategy and the European Union's emission trading scheme extension to maritime transport, further demonstrate the growing policy support for green shipping.

Countries' motivations for engaging in green corridors vary based on their maritime significance, climate goals, energy dependence, and trade partnerships. Chile's Green Corridors Network exemplifies a proactive approach to decarbonizing the maritime sector, while Singapore's Green and Digital Shipping Corridor initiative focuses on both sustainability and efficiency.

India's Maritime Amrit Kaal Vision (MAKV) 2047, outlines a clear vision for decarbonizing its shipping sector, with potential green corridor routes identified along its western and eastern coasts, as well as international routes with Norway and Singapore. The government is actively promoting green shipping through initiatives like the Decarbonisation Cell, the Centre of Excellence for Sustainable Maritime Transport, and the National Centre of Excellence for Green Port & Shipping.

Assessing the effectiveness of green corridors involves evaluating stakeholder engagement, the viability of fuel pathways, market demand, and policy support. Key criteria include emissions reduction, cost-effectiveness, scalability, and replicability.

The future of green shipping corridors looks promising, with advancements in sustainable fuels, energy sources, propulsion systems, and cargo handling expected to play a crucial role. Commitment across the value chain, including collaboration among all stakeholders, is essential for the success of these initiatives.

In this paper we discuss, the various international initiatives, case studies, drivers and country motivations and the aspects of stakeholder integration to realize the effectiveness of the GSC.

In conclusion, green shipping corridors represent a transformative solution to decarbonize the maritime industry and contribute to global efforts to combat climate change. By fostering collaboration, innovation, and investment in green technologies, these corridors can create a cleaner, greener, and more prosperous future for shipping, ensuring a sustainable and environmentally friendly maritime sector for generations to come.

Developing Strategy for Australian Ports Integrating in the Global Hydrogen Supply Chains Using Sustainable Balanced Scorecard Approach

Oktaviani Turbaningsih, Peggy Shu-Ling Chen, Hossein Enshaei, and Mark Cooper

Abstract

This research examines the use of sustainable balanced scorecards (SBSC) in developing strategies in Australian ports transitioning to hydrogen supply chains. By analysing financial, customer, internal process, growth, and environmental perspectives, SBSC provides a comprehensive framework for port strategy development. The findings emphasise the importance of a holistic approach, systems thinking, and the potential of SBSC as a strategic tool. However, further empirical research is required to validate and refine these strategies.

Keywords: hydrogen economy, balance scorecard, Australian ports, hydrogen supply chain, port strategy

Introduction: Australia's abundant renewable energy resources position it as a potential major exporter in global hydrogen economy. Ports, as critical interfaces between supply and demand, need to evolve from traditional roles to multifaceted roles as trade facilitators, infrastructure and logistics providers while upholding social responsibility. A comprehensive strategic approach, incorporating financial, customer,

internal processes, growth, and environmental dimensions, is essential for port success in the hydrogen economy [1,2]. A SBSC can serve as a valuable tool for this transformation.

Method: This study employs desk research to assess the suitability of SBSC for developing port strategies in Australia's hydrogen economy. A comprehensive literature review (2013-2024) identifies relevant academic and industry sources, forming the basis for strategic management tailored to the unique challenges and opportunities.

Literature Review: A holistic strategy is imperative for ports integrating the global hydrogen supply chain. Chen et al. highlight the importance of infrastructure readiness, risk management and training for this transition[3,4]. A SBSC reflecting economic, environmental, and social dimension can enhance internal processes and strategic management. Adopting a system perspective helps ports to navigate complexities, understand decision impacts, and develop adaptive strategies [5].

Result and Discussion: Ports in the hydrogen economy need to balance financial opportunities with commercial sustainability. Expanding to new commodities, such as ammonia, methanol, and liquid hydrogen, requires effective stakeholder and understanding hydrogen hazards. This impacts the internal processes, necessitating new infrastructure, upgrades, risk management, and optimal resource allocation. Leadership and human capital development are crucial for ports to adapt and thrive in this dynamic landscape.

Conclusion and Future Research: The SBSC provides a comprehensive tool for port managers to track performance and align operations with organisation goals. Key findings include a holistic framework that encompasses both traditional financial metrics and sustainability indicators, facilitating the alignment of port activities with long term strategic objectives. Future research should focus on empirical validation through interviews with Australian port experts to refine and validate these strategies, which enhancing SBSC practical applicability to sustainable port management practices.

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Session 3: Maritime Connectivity and Technology 10:45am – 12:45pm

Collaboration in the Maritime Industry: Managing Partitioning and Transitivity

Richard T. Watson, Kevin Desouza

Abstract

Shipping is a self-organizing ecosystem (SOE) (Watson et al., 2020) in which manifold participants collaborate to create capital by moving products from a producer to a consumer through a chain of collaborative couplings, such as a ship being towed to a berth. In today's world, an SOE is a network of

digital objects communicating via digital data exchange. Collaboration in an SOE is particularly challenging because there is usually no central player who can directly coordinate action by internal fiat.

Two critical challenges for the maritime SOE are:

- How does it efficiently partition collaboration across the ecosystem?
- How does it manage transitivity risk?

In an SEO, the necessary value-creating systems are spread across many parties, and collaboration is necessary for effective and efficient capital creation. In a digital world, these parties are objects, which are independent entities of capital and systems. Collaboration occurs when one object requests capital (e.g., a pilot to guide a ship into a harbour—human capital) or systems (e.g., the towing of a ship—a system of production) from another object via the exchange of electronic messages.

In an SEO, capital and systems are partitioned (Schoener, 1974) across different organisations. Consequently, in the maritime industry, collaboration is split across many hierarchies, each with a distinct specialisation based on its capital, systems, and complementary interaction. Every participant needs to continually evaluate its partitioning strategy. For example, should a shipping company own terminals in some ports, or should a port authority incorporate stevedoring?

Market effect on collaboration mechanisms in container shipping

Mosleh Amiri, Professor Michael Bell, Dr Jyotirmoyee Bhattacharjya

Abstract

International container shipping is the primary form of transporting cargo. Huge investment and administrative costs of assets (Agarwal & Ergun, 2010) coupled with high market volatility compelled liner companies to seek strategies to maintain their competitiveness constantly. One of the approaches that has gained attention in recent decades is horizontal collaboration with other carriers in the market. Since globalization, shipping companies developed various forms of collaboration mechanisms. (Cariou, 2008) Agreements on chartering capacities are simple mechanisms (Chen & Zhen, 2009; Shi et al., 2020; Zhang et al., 2022; Zheng et al., 2022) whereas forming complex strategic alliances is a more widely used form of collaboration in this sector. (Chen et al., 2021; Chun et al., 2017)

When a liner company cooperates with other liner companies in a market to increase its profitability, it relies on its competitors to conduct a part of its shipping operations. Each player decides on the extent of collaboration with other players, which defines the dynamics of the players' interactions. When a player cooperates with its competitors in this market, its performance depends on the cooperators' reliability in conducting operations. As a player increases its reliance on others to deliver cargo through increasing cooperation, the prospect of increasing profit through delivering more cargo involves increasing the probability of loss due to the increase in their shipping network's uncertainty. Dealing with a more complex shipping network, intertwined with several other partners, increases the likelihood of delay and rescheduling, which might decrease the players' level of service and market share.

The main ways that liner shipping companies, as the shipping market players, can form strategic alliances are through chartering space and joint delivery. Chartering space from other players is a temporary collaboration as it requires less reliance on other players' service and needs lower coordination between parties. Joint delivery is a deeper form of cooperation among players, which requires higher trust, reliance, and shipping network integration among partners.

The current study aimed to explain the effect of the market on the relationships among container liner shipping companies and the evolution of liner shipping alliances. Changes in the market over time affect the players' strategies that define the dynamics of the interactions among these companies and their motivation to form a strategic alliance. Due to the container shipping market's volatility and the significant role of this market on the companies' profitability, shipping alliances constantly form and collapse. This research aims to answer the following questions:

- How does the market affect the stability of the liner shipping companies' alliances?
- How does the cooperative relationship of shipping companies shift among various cooperation mechanisms over time?
- How is the motivation of the liner shipping companies to cooperate affected by market conditions?

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An Acceptance Model of Maritime Autonomous Surface Ship (MASS) in the Shipping Industry in Taiwan

Chin-Shan Lu , Yi-Pei Liu

Abstract

This study examines the factors influencing the adoption of MASS in Taiwan's shipping industry. Digital technology and unmanned vehicle advancements have enhanced efficiency and reduced environmental impact in the shipping industry. The IMO has set regulations to promote low-carbon emissions and autonomous ship technology. Using the TOE framework and DOI theory, a research model was constructed, and data from 132 Taiwanese shipping companies were collected via a questionnaire survey. A structural equation modeling (SEM) was conducted to examine the relationships between variables. Results show that technological and environmental factors significantly influence operators' attitudes toward MASS, while organizational factors impact their willingness to adopt. Enhancing technological support, internal resource allocation, top management support, and cost management are crucial for promoting adoption. This study identifies key factors and provides recommendations for adopting autonomous ships in Taiwan's shipping industry.

Keywords: MASS, Technology-Organization-Environment (TOE), Diffusion of Innovations Theory (DOI), Shipping Industry

Examining Applications of 4.0 Technologies in the Maritime Industry: A Bibliometric Analysis

Cong Minh Tran , Minh Binh Chu , Lam Canh Nguyen , Viet Anh Pham , Trang Le Thuy

Abstract

This research conducts a structured literature review of Industry 4.0 applications in the maritime sector. Maritime transport is the backbone of the global supply chain and logistics, facilitating the movement of goods on an unprecedented scale, especially under the impact of Industry 4.0. In this paper, a systematic literature review was conducted to explore the application of the fourth industrial revolution to maritime. The investigation period started in 2011 when Industry 4.0 began to 2024. The group of authors found a total of 2715 published articles in English in SCOPUS journals for further analysis. This collection was described in groups of authors, universities, countries of publications, etc. It was found that artificial intelligence, the Internet of Things, and big data are the main keywords of Industry 4.0 that received the most attention from professionals and academia in the maritime industry. Other sectors, such as robotics, virtual reality, cloud computing, blockchain, edge computing, and 3D printing are experiencing a significant increase in the number of published papers, despite being quite new to the industry. Unmanned shipping and e-navigation, automation, and energy solutions are the main applications of technology in the maritime industry. Then, the paper is followed by an exploration investigation to identify the relationship between technologies and applications, as well as those with the demographic of the collection. Then, a trending discussion is proposed about the progress of previous research, limitations, and future suggestions in examining industry 4.0 technologies regarding the maritime.

Session 4: Maritime Complexity and Resilience 10:45 m – 12:45pm

Ripple effect of ammonia supply disruption on the ammonia bunker supply chain

Mengyao Yang, Jasmine Siu Lee Lam

Abstract

Maritime transportation is important for international trade and the global economy. There is a growing demand for sustainability in the maritime industry, driven by public policy and commerce. The International Maritime Organization (IMO) has adopted a strategy aiming at achieving net zero greenhouse gas (GHG) emissions from international shipping by 2050 (IMO, 2023). Given the huge amount of energy consumed by ships, maritime stakeholders are working towards an energy transition using alternative marine fuels, including hydrogen, ammonia, methanol, biofuels, etc. (Bilgili, 2023).

As a carbon-free fuel, ammonia has received attention for sustainable shipping. The ammonia bunker supply chain (ABSC) includes ammonia production, storage, transportation, bunkering and fuel consumption processes (Yang and Lam, 2023). The major challenges for general supply chain management are uncertainty and dynamics, which can cause a bullwhip effect and ripple effect (Ivanov et al., 2014). Unlike the bullwhip effect, which explains the amplification of demand variations in the upstream supply chain, the ripple effect shows the propagation of disruptions and changes in supply chain structural dynamics due to low-frequency

and high-impact disruptions (Dolgui et al., 2020). In global supply chain networks, the causes of these disruptions include weather anomalies, military conflicts, nautical accidents, vessel groundings, etc. In addition, port and shipping are the most uncertain components within the supply chain (Sanchez-Rodriguez et al., 2010). There is a pressing need for a more comprehensive understanding of ammonia bunker fuel at ports.

This study aims to develop a framework for evaluating the ripple effect of ammonia supply disruptions on the ammonia bunker supply chain, considering ammonia bunker demand dynamics. A simulation method can estimate the direct and indirect impacts of a disruption along a supply chain. Due to the dynamic behaviour associated with risks, we built a Coloured Petri Nets (CPN) model to assess the impact of the disruption on the system performance.

To demonstrate the model, Gladstone, Australia and Singapore ports were selected as the green ammonia export port and green ammonia import and bunkering port, respectively. This study uses the CPN model's stepwise process and characteristics of an efficient environment to simulate ammonia flows along the supply chain. Bunkering operational cost, bunkering service time and GHG emission reduction are the indicators for system performance evaluation. One result shows that the ripple effect can increase by around 50% when ammonia bunker demand rises from 20% to 100% at a bunkering port when the bunkering service time is the performance indicator.

This study fills the gaps in the uncertainty and dynamics of the ammonia bunker supply chain. The results provide implications for researchers to know about the relationships between ammonia supply uncertainty and ammonia bunker demand dynamics. Moreover, analysing how events propagate throughout the supply chain and their impact on individual components allows maritime industry practitioners to focus on vulnerable areas and discover more effective mitigation actions.

Multiple yard crane scheduling with variable crane handling time

Yong Wu

Abstract

Container terminals, which are an essential part of container ports, play an important role in global maritime shipping industry by serving as a multi-modal transportation interface. A container terminal yard is basically a place for temporary storage of incoming and outgoing containers to facilitate the container flow. Normally, a yard is divided into multiple sectors called yard blocks. There are different types of equipment employed at a container terminal such as quay cranes and yard cranes. Yard cranes, which are responsible for storing and retrieving containers into and out of container yard blocks, are often deployed in multiples within a container yard block, especially when the workload is heavy.

Container yard performance heavily depends on the efficient operations of yard cranes. This paper investigates the multiple yard crane scheduling problem with variable crane handling time. Here the variable crane handling time refers to the variable time of handling each individual container. While there is a rich body of literature addresses the multiple yard crane scheduling problem in a deterministic operational context, there is a paucity of research incorporating the uncertain factors.

An efficient and adaptive approach is proposed to address the problem under investigation. The approach takes into account the uncertain factors, the crane operational constraints (e.g. safety distance to avoid inter-crane interference), and the realistic crane travelling time. The overall objective is to provide a robust, while

efficient, schedule to guide terminal operations. Numerical experiments and simulation studies are conducted to demonstrate the performance of the proposed approach.

Assessing Key Factors Influencing Port Resilience Under Disruptions: Insights from Circular Supply Chain Management

Jiarong Chen, Sunho Bang, Kwangsup Shin, Minho Ha, Vinh V. Thai

Abstract

This paper explores the impact of Circular Supply Chain Management (CSCM) practices on enhancing port resilience during various disruptions, including natural disasters, economic crises, and pandemics. As critical hubs in global supply chains, ports are highly vulnerable to such disruptions, which can lead to significant operational delays, economic losses, and ripple effects across the supply chain network. Traditionally, linear supply chains often lack the required flexibility and sustainability to mitigate these impacts effectively. CSCM, with its emphasis on resource optimization, waste reduction, product lifecycle extension, and closed-loop systems, offers a promising approach to enhancing port resilience. This study utilizes a mixed-methods approach, integrating quantitative analysis of port performance during past disruptions with qualitative insights from case studies of ports that have implemented CSCM strategies. This research deepens the understanding of how sustainability, as operationalized through CSCM practices, contributes to resilience in supply chains. Specifically, it illustrates how adopting CSCM practices—such as resource optimization, waste reduction, and product lifecycle extension—not only improves environmental sustainability but also enhances a port's ability to absorb, recover from, and adapt to various disruptions.

By demonstrating the synergistic effects of sustainability and resilience, this study advances theoretical discussions in supply chain management by highlighting the dual benefits of CSCM. It shows that sustainability and resilience are not merely compatible goals but are mutually reinforcing when integrated into supply chain strategies, providing a more comprehensive framework for evaluating and improving the resilience of critical infrastructure. The results indicate that ports adopting CSCM practices not only experience shorter recovery times but also demonstrate increased agility and adaptability when facing disruptions. Key strategies such as reverse logistics, recycling, and renewable resource utilization are identified as crucial to building resilience. The paper concludes with policy recommendations for port authorities and stakeholders on embedding CSCM principles into port operations, thereby strengthening the overall resilience of global supply chains. This research contributes to the broader discourse on sustainable supply chain management and its vital role in fortifying critical infrastructure.

Keywords: Circular Supply Chain Management, Port Resilience, Supply Chain Disruptions, Sustainable Supply Chains, Port Operations.

Maritime Logistics Resilience Capabilities: A Comprehensive Framework through Systematic Literature Review

Thi Minh Hang Hoang

Abstract

Maritime logistics are pivotal to global trade, yet they are continually challenged by unpredictable events such as natural disasters, piracy, economic fluctuations, and pandemics. These challenges necessitate a robust and adaptable approach to managing maritime logistics, highlighting resilience as a critical component.

Purpose: The primary aim of this study is to develop a thorough framework for understanding and measuring the resilience of maritime logistics. This framework integrates various resilience capabilities, providing a comprehensive view of the factors that contribute to a resilient maritime logistics. It is designed to guide both academic research and practical applications, assisting industry professionals in enhancing the resilience of their operations.

Methodology Approach: The research employs a Systematic Literature Review (SLR) methodology, adhering to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. This approach ensures a detailed and unbiased synthesis of existing research, systematically identifying, selecting, and appraising relevant studies. The methodology also includes content analysis to examine the literature in depth, providing a structured framework for integrating findings from various sources. This combined approach minimizes individual study biases and enhances the robustness of the framework developed.

Practical Implications: The findings of this study offer significant practical implications for the maritime industry. By providing a detailed understanding of the factors that contribute to maritime logistics resilience, the research offers valuable insights for shipping companies, port operators, supply chain managers, and policymakers. The framework developed can be utilised to assess and enhance the resilience of maritime logistics, thereby mitigating the impact of disruptions on global trade.

Originality: This research contributes to the existing body of knowledge on maritime logistics resilience by offering a novel framework that comprehensively integrates resilience capabilities. The study's originality lies in its systematic approach to literature review and its focus on developing a practical, applicable framework for industry practitioners. It fills a significant gap in the literature by addressing the relatively underexplored area of maritime transport resilience, providing a holistic perspective that encompasses both port and shipping network aspects.

Note: All indicated timeslots are Australian Eastern Daylight Time (AEDT).