



Editorial: Frontiers in Maritime Transport Chains: Digital and Organizational Innovations in Maritime Transport and Port Operations

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Editorial on the Research Topic

Frontiers in Maritime Transport Chains: Digital and organizational innovations in maritime transport and port operations

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INTRODUCTION

The services offered in and by ports are faced with both the challenges and the benefits of increasing digitization. On the one hand, digitization will allow optimization of the services, decrease the impact created and reduce waiting time of cargo and passengers. On the other hand, despite the availability of technology, investments are large and results are uncertain. Especially where cooperation of multiple parties is required. This special issue is the result of a successful WCTRS (World Conference on Transport Research Society) Special Interest group A2, ports and maritime conference held in May 2021 in Antwerp (online), where such issues were discussed. For your convenience we have grouped them into three themes, one relates the potential to passenger service integration, the next discusses port call optimization and the last one is the system development by port communities.

Digital Services for Passenger Transport

Papaioannou et al. researched the potential of Mobility as a Service in maritime passenger transport for Greece. In this research, the integration of maritime passenger services with land mobility into a single mobility service delivered through a unique platform for planning, booking, ticketing, and payment is evaluated. This user-centric platform (Maritime MaaS) could improve the accessibility of (Greek) island regions, which not only benefits residents but also tourists and the development of economic activities, due to the convenience it offers relative to planning and payment for travelling to, from, and between islands. This increase in service could attract more tourists and increase maritime transport connections, rather than air transport options.

Digital and Organizational Port Call Optimization

In his research, Heaver focuses on how the developments in digitization and the need to reduce carbon emissions have increased attention on port call optimization. He studies both the bulk trade in Vancouver Canada and Newcastle Australia. Newcastle has improved the anchorage allocation by monitoring vessels up to 14 days prior to their arrival and by improving the collaborative relationship of all parties in the logistical chain. Whereas Vancouver still struggles with the regular 24 h' notice.

Based on his research, Heaver concluded that the major obstacles to port call optimization lie in maritime logistics' organizational and behavioural aspects, not in digitization technology, so technology is not the main bottleneck for implementing Just-In-Time approaches.

Eisen et al. researched the best approach for a berth allocation problem at the port of IJmuiden. Due to a new sea lock at IJmuiden from 2022, larger and more ships will be calling at the port. To facilitate this a new port call procedure is considered, using AIS and ETA data to optimise berth allocation. Although not optimal, the current first come first served approach would still work reliable in the future. Efficiency could be improved by scheduling ahead of the arrival time, although it may appear unreasonable to allow ships to arrive ahead of schedule. This emphasizes the significance of having a solid ETA: the more reliable a vessel's ETA is, the more reliable the allocation model is. Similarly, establishing a solid real-time allocation model requires a strong prediction of the length of stay.

Digital Port Community System Developments

Emerging technologies (Internet of Things, Big Data, Blockchain, Artificial intelligence, and Digital Twins) have been identified as a new pillar to define the competitive position of a port by Russo and Mosolino. In the past, each decision-maker adopted individual ICT solutions. However, the introduction of shared developing ICT among decision-makers inside ports brings with it new benefits and challenges. In the research, a theoretical formulation and a test case built with parameters that reflect the time reduction in real observed cases have been made to test the applicability of the emerging technologies. The analysis revealed the role of PCSs (updated by emerging ICT) in increasing utilities (or reducing times). The PCS can be considered a neutral system that permits different waves of technology to be introduced without providing an economic advantage for any decision-maker. As a result, the effectiveness and efficiency of ports are determined by how decision-makers communicate with one another.

Also, Carlan and Vanelander have researched the development and implementation of digital solutions in contemporary logistics businesses. The authors set pioneering steps regarding Artificial intelligence technologies suitable for

data entry tasks replacing human labour. They have also shown the fundamentals of business models that can be further applied to put forward the port users' perspective on implementing Artificial intelligence or machine learning-based applications for the automatic handling of data. Although the willingness to share data and the techniques are promising, the reservations towards investments are hindering the progress at the moment and implementing these solutions on a large scale is happening at a slow pace.

CONCLUSION

Each paper contributes to our knowledge on the potential of digitization for services offered in and by ports. Although digitization offers many possibilities for optimization, the potential can be severely limited due to a lack of investments, as outcomes are uncertain. The failing cooperation, willingness to share data and distrust are key human elements that hold back the innovation of these services. Technology is the key, but we will need to turn it, to open the door.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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