Maritime Informatics for a high performing maritime industry

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Maritime informatics

- Balancing capital productivity and energy efficiency
- Responds to organisational, global, and humanitarian concerns
- Three focus areas:
  - Digital Collaboration
  - Digital Data Sharing and Decision-Making
  - Data Analytics

The application of information systems to increase the efficiency, safety, ecological sustainability, and resilience of the world’s shipping industry
The maritime ecosystem is unique

- Oldest and largest sharing economy
- Global
- Flat
- Self-organized
- Federated and democratic governance
- Asset intensive with high demands on optimized resource utilization
- Not allowing for one owner
- Episodic interactions

Shipping is a self-organising ecosystem

- No single keystone organisation
- Distributed control
- Loosely coupled organizations adapting autonomously and organic
What is the need?

- Connecting what happens @ sea with what happens @ shore
- Enhanced predictability of movements and operations
- Increased information transparency with direct and indirect stakeholders
- Seamless integration with the multimodal transport chain
- Engaged scholars and reflective practitioners joining the same discourse - maritime informatics
- Upgrade of human capabilities in digitalisation

Applicational areas of maritime informatics

- Foundational viewpoint
  - Information sharing communities
  - Standardization
- Appointment economy
- Collaborative alignment
- Smart operations
  - Sustainable and smart ports
  - Smart ships
  - Intelligent cargo
- Smart operations
- Data analytics
  - Data fusion / Machine learning
  - Digital twins

Maritime transports as a self-organized ecosystem
Balancing environmental sustainability and capital productivity
Processes for collaborative alignment

- Empowered situational awareness
- Pieces of information needs to be brought together
- No one sits on the whole truth

A foundation to move from coordinating based on physical presence to virtual coordination
The need: to enhance predictability

...which requires data analytics based on AI techniques

The maritime appointment economy

- A self-organised ecosystem implies distributed coordination
- Just-in-time shipping, (elastic) slot management, virtual arrival clause (BIMCO) and virtual queue tickets is high on the agenda
- Market places for trading appointments??
Emerging situation in the Asia – Pacific Route
Emerging situation in the Asia – Pacific Route

Container vessels above 10 kts or being stationary (<1 knot) outside ports - 1st Jan 2021 to 14 Nov 2021
(7 days moving average based on 6 hourly statistics)

Challenging just-in-time arrival

Example for Today’s Operation: hurry up and wait

Example for Just In Time Operation

A. When ideal steering speed possible
   - Optimal speed to destination
   - Optimal speed to destination
   - Optimal speed to destination

B. When delayed from previous port
   - Optimal speed to destination (in relation to case A)
   - Optimal speed to destination (in relation to case A)
   - Optimal speed to destination (in relation to case A)

C. When part of destination is constrained
   - Optimal speed to destination
   - Optimal speed to destination
   - Optimal speed to destination

Ideal scenario with optimal speed to destination

Delay from previous port but no delay in port of destination
Delay from previous port and moved old time port of destination

Extended slot time at previous port waiting for when it would be ideal to depart
Extended slot time at previous port waiting for when it would be ideal to depart

Anchor at intermediate location on the way to port of destination
THE MARITIME SECTOR IS TRANSFORMING …

From

<table>
<thead>
<tr>
<th>Fragmented situational awareness</th>
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<tbody>
<tr>
<td>Low information quality</td>
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<td>Lacking planning horizons</td>
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<td>Unstructured information exchange</td>
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<td>Sub optimized operations</td>
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<td>Unnecessary waiting times</td>
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<td>Low IT maturity</td>
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To

<table>
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<th>Common situational awareness</th>
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<td>High and reliable information quality</td>
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<td>Predictable operations</td>
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<td>Standardised data exchange</td>
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<td>Mature collaboration culture</td>
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<td>Just-in-time operations</td>
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<td>Enhanced IT-systems and third-party innovation opportunities</td>
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What is at focus and desired – Maritime Informatics enablers and effects

Phase 1: Standardising

1. Standardisation of digital data sharing

Phase 2: Collaborative Alignment

2. Synchronised and coordinated operations
3. Empowered decision-making

Phase 3: Intelligently integrated planning and execution

4. Multimodal integration

Phase 4: Capital productivity gains

5. Efficiency
6. Resilience
7. Safety
8. Sustainability
Concluding remarks (1)

Maritime Informatics
- An applied science for the maritime industry
- Engages both practitioners and researchers for a common goal
- Promotes standardized digital data sharing throughout the cargo chain
- Supports enhanced efficiency, safety, security, resilience, and sustainability in maritime transport
- Enables understanding, predicting, advising and improving maritime activity
- Enables seamless integration to the larger transport system

*Maritime Informatics is the key to the future of maritime transport*

Concluding remarks (2)

- Maritime Informatics:
  - A Science for change
  - Requires Engaged Scholarship AND reflective practitioners
  - Don’t pave the cow paths
  - A driver for MET of the future

**Focus Areas of Maritime Informatics**
- Digital Collaboration
- Digital Data Sharing and Decision-Making
- Data Analytics
Voices

"The COVID-19 crisis has given a further push to maritime informatics and the digitalization of logistics....", Jan Hoffmann.

I am excited to see that several years of industry engagement has resulted in a consolidated international Maritime Informatics initiative.", Lars Mathiassen

"Global trade and shipping industry have been advancing their business capability by adopting Maritime Informatics", Phanthian Zuesongdham

"... Maritime Informatics could be the force that bring it all together to achieve facilitation and harmonization for the information exchange required when a ship is calling a port somewhere in the world", Mikael Renz

MARITIME INFORMATICS concerns MANY

"By the discipline of Maritime Informatics, we can now join forces in securing a sustainable world.", Mikael Lind

"Maritime Informatics provides great opportunities to bring simplification to a sector that is conceived as very complex.", André Simha

For more voices visit www.maritimeinformatics.org

Thank you!

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