Port Collaborative Decision Making

– FROM STM Validation to global implementation

Mikael Lind
Research Institutes of Sweden (RISE)
Associate professor Maritime Informatics

(Mikael.Lind@ri.se)
The STORY of PortCDM from IDEA to a SUSTAINABLE INNOVATION
POINT OF DEPARTURES

- Present operations and digitization as a mean
- Digitizing the business logic giving rise to revised practice
- Transformation requires enabling components
- Present situation providing insights of the needs of the enablers
- Vision simulated through the PortCDM testbeds
- Continual validation and revision of the enablers in the vision
- The definition of the PortCDM concept required validation of each of the enablers in the existing ecosystem
The STORY of PortCDM from IDEA to a SUSTAINABLE INNOVATION

PortCDM V 0.1

2005 --

2013 -2019

PortCDM V 1.0
TRANSFORMATION from AS-IS to Vision of PortCDM

AS - IS

Actor A
Actor B
Actor C
Actor D
Actor E
Actor ...

THE VISION OF PortCDM

Actor 1
Actor 2
Actor 3

PortCDM SHARING PLATFORM

TRANSFORMATION
PortCDM Testbeds in the STM validation project

- 9 ports participating in the testbed
- The use of demonstrator realizing the design principles of PortCDM
- Establishment of PortCDM council
- Exploration of Developer Zone

- Actor collaboration in LivingLabs
- Data sharing utilizing emerging port call message standard
- 33 Interviews and 37 Questionnaires
- ~1.7 million Shared port call messages

In the project enabling components has been incrementally defined and validated in a future vision to ensure capabilities to implement the vision.
AS-IS AS CHARACTERISTICS

ISOLATED ISLANDS
- SILOS
- Sub Optimization
- Small Clusters of Collaboration if any

UNSTRUCTURED INFORMATION SHARING
- Low Information Quality
- Inefficient Communication
- Insufficient IT System
- Low IT Maturity
- Administrative Burden

NO SHARED SITUATIONAL AWARENESS
- Unnecessary Idle Time
- Non Optimal Resource Utilization
- Low Visibility of Actors Intentions
- Short Planning Horizon
- Low Predictability

LACK OF HIGH LEVEL COLLABORATION
- Lack of Standards for Communication
AS-IS: Uniqueness in port calls, with decreasing predictability rate

Predictability throughout the port call process

- Arrival
- Traffic Area
- Arrival Berth
- Departure
- Berth
- Departure
- Traffic Area

Arrivals (SP 22, EMP 21), chronologically during Q3 + Q4 2017

Time spent at berth for two frequently visiting Container ships

Time spent at berth for two frequently visiting Tanker ships

Time spent at berth for a frequently visiting Ro-Ro ship

Co-financed by the European Union
Connecting Europe Facility
AS-IS IN FIGURES

Unproductive time in port visits
- operating time / time at berth is to low
- time at berth / total turnaround time is to low

Lower predictability in the latter phases of the port call process

Biggest challenges to planning and realising a port call

Predictability of core states in the port call process derived from 43 976 port calls in 9 ports
(out of 1 696 115 port call messages)
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PortCDM
COMPONENTS FOR SUSTAINABLE TRANSFORMATION

PROJECT LEVEL

- Standard for data sharing (PCMF)
- PortCall Process Ontology and Metro Map
- Living Lab Approach for Actor Collaboration
- Digital Services for Situational Awareness

SUSTAINABILITY LEVEL

- Standard For data Sharing (S-211)
- PortCDM Maturity Model
- International Governance (IPCDMC)
- Low Barriers for 3rd party Innovation
- Principles for Collaboration
STANDARD FOR DATA SHARING FOR SUSTAINABLE INNOVATION

PROJECT LEVEL

Standard for data sharing (PCMF)

<table>
<thead>
<tr>
<th>Port Calls Per Ship Type</th>
<th>7943</th>
<th>2334</th>
<th>13407</th>
<th>6501</th>
<th>1756</th>
<th>9206</th>
<th>2829</th>
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<tbody>
<tr>
<td>CONTAINER</td>
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<td>PASSENGER</td>
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<td>BULK CARRIER</td>
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<tr>
<td>OFFSHORE</td>
<td>7943</td>
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<tr>
<td>RO-RO</td>
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<td>2334</td>
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<tr>
<td>TANKER</td>
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<td></td>
<td>1756</td>
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<tr>
<td>OTHER</td>
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<td></td>
<td></td>
<td>9206</td>
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</tr>
</tbody>
</table>

Total number of port calls: 43976
Total number of port call messages: 1,696,115

COMMERCIAL LEVEL

Standard for data sharing (S-211)
PortCDM will create a greater awareness of different actors’ intentions

- fully agree: 48%
- agree at a great extent: 36%
- agree to some extent: 12%
- agree to a small extent: 4%
- don’t agree: 0%

**Most revolutionary PortCDM feature**
- Physical collaboration: 2%
- Port call synchronization: 4%
- Increased information transparency: 9%
- Increased predictability: 13%
- Information transparency: 14%
- Port-to-Port collaboration: 14%
- Digital collaboration: 21%
- Common situational awareness: 23%

Living Lab Approach for Actor Collaboration

STATISTICS (based on 8 ports)

- Involved actors: 99
- Automatics connectors: 48
- Manual data providers: 28
- Conducted LL meetings: 86
- Organizations engaged: 87

Value of living lab meetings

- Very satisfied: 13%
- More than satisfied: 73%
- Satisfied: 13%
- Partly satisfied
- Not at all satisfied
Digital Services for Situational Awareness

PortCDM will contribute to a shared situational awareness

- fully agree: 48%
- agree at a great extent: 36%
- agree to some extent: 16%
- agree to a small extent: 0%
- don’t agree: 0%

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Connecting Europe Facility
PortCDM Maturity Model

ENABLING THE PORT TO:

- set ambitions and evaluate conditions for the Port to implement PortCDM.
- identify and communicate what internal and external actors can expect.
- elicit requirements for System System Providers.

1. Individual capabilities to share timestamps using PCMF
2. PCMF sharing platform established for all to share
3. PCMF data shared among core port call actors
4. PCMF data shared among all port call actors
5. PCMF data shared with outside actors
6. Port Collaborative Decision Making Principles utilized
7. Continuous Improvement processes implemented

During the project, the engaged ports in the PortCDM testbeds developed PortCDM maturity on all levels

International Governance IPCDMC

- The IPCDMC vision has been validated in discussion with key stakeholders.
- ~20 stakeholders initially agreed to join and refine the vision.
- When clear ToR had been developed more stakeholders agreed to the development.
- Now 33 active participant organizations and 32 observer have joined IPCDMC.

Join us in joining forces in global harmonization – www.ipcdmc.org
Low Barriers for 3rd Party Innovation

Rapid development of PortCDM empowered applications

- 140 Novel developers engaged for 5 weeks to generate mobile applications
- Using PortCDM API:s and Port Call Message Format
- Building upon requirements from port actors
- Applications brought to the testbeds
- Requirements put upon PortCDM for lowering barriers of 3rd party engagement for eco system innovation
Principles for Collaboration

PortCDM KPIs
- Punctuality
- Duration time
- Predictability
- Capacity Utilization
- Berth Productivity
- Waiting times
PortCDM enables the transformation ...

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmented situational awareness</td>
<td>Common situational awareness</td>
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<tr>
<td>Low information quality</td>
<td>High and reliable information quality</td>
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<tr>
<td>Lacking planning horizons</td>
<td>Predictable operations</td>
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<tr>
<td>Unstructured information exchange</td>
<td>Standardised data exchange</td>
</tr>
<tr>
<td>Sub optimized operations</td>
<td>Mature collaboration culture</td>
</tr>
<tr>
<td>Unnecessary waiting times</td>
<td>Just-in-time operations</td>
</tr>
<tr>
<td>Low IT maturity</td>
<td>Enhanced IT-systems and third-party innovation opportunities</td>
</tr>
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</table>
PortCDM: The SUSTAINABLE INNOVATION

PortCDM will enable an enhanced basis for making better estimates
- fully agree: 62.5%
- agree at a great extent: 25.0%
- agree to some extent: 12.5%
- agree to a small extent: 0.0%
- don't agree: 0.0%

PortCDM will enable better access to reliable information
- fully agree: 56%
- agree at a great extent: 20%
- agree to some extent: 12%
- agree to a small extent: 12%
- don't agree: 0%
Giving rise to …

- Reduced turn-around times
- Just-in-time departures, arrivals, and operations
- Reduced chasing
- Optimized resource utilization
Next step

- Put S-211 into use
- Establish data sharing capabilities within ports
- Connect ports using S-211
- Invite 3rd parties to contribute with innovations
- Empower International PortCDM Council as a centre of gravity for harmonizing port call operations
- Put the PortCDM maturity model into use to ensure continual development of data sharing capabilities
- Use means to develop the collaborative culture of ports

Practical steps for engaged actors:
- ensure interoperability with S-211
- discuss mutual benefits of PortCDM with collaboration partners and other actors
- help to establish a local “PortCDM community” to bring all the interested actors together
- participate in the IPCDMC either as a participant or an observer

among the ~3900 ports with its actors and the ~90 000 merchandise ships conducting ~20 million port calls yearly

as a part of the maritime supply chain
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2020 --

The Vision of PortCDM
Concluding remarks

PortCDM can provide a significant IMPROVEMENT in the overall performance of the maritime transportation chain ecosystem.

Port CDM and digital data sharing provides significant positive benefits by enabling port call
Thanks you!

Mikael Lind
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