2016 Korean-Hellenic Maritime Cooperation Forum **Smart Ship and connectivity**



8 June 2016







Contents

- I. Market Trend
- II. Industry Changes
- III. IoT Technologies
- IV. New Perspectives
- V. Connected Smart Ship







Market Trend Overview

Three key trends around the maritime industry call for profound innovations

Industry Changes



"Strive for Turnaround"

Diverse Stakeholder Voices



"Value-Added Services"

IoT Technologies



"Vessel of Future"



Industry Changes

Ocean transportation players strive for high performance in high complexity

Mega Vessels



- >10,000 TEU Ships
 + 127% Growth
 (2013~2016)
- Additional 18.8% on order book - 3.4 Mn TEU, 60%> 10,000 TEU

Modernized Infrastructure



- World port TEU throughput >1 Bn by 2020 (623 Mn today)
- Investment for larger terminal expansion

 Longer berth lengths
 Deeper draft
 - -Larger quay cranes
- Larger hinterland



- Global transshipment volume >320 Mn TEU by 2020 (175 Mn today)
- Sophisticated cargo handling requirements
- Higher crane density
- Higher crane and berth productivity

Extended Network



- Multi-modal network connectivity - global & hinterland
- Global port connectivity



Diverse Stakeholder Voices

New innovations are required to meet diverse stakeholder expectations



Source: Accenture Maritime Industry Analysis, HHI Marine Service VOC, DNV-GL Research



IoT Technologies

Technology is already available for 'vessels of the future'



Source: Accenture Digital IoT White Paper, 2015



Source: HHI R&D Center Report, 2013

New Perspectives - "Vessel Lifecycle"

We are taking a 'lifecycle' perspective of our vessels focusing on the total value of vessels to our customers



"With their focusing only on manufacturing, shipbuilders have ignored the potential values of ship operations and maintenance. Although vessel lifetime is more than 25 years, most shipbuilders have failed to expand into the aftermarket.

'Big Data' from all the processes of design, manufacturing, and operations & maintenance will enhance quality, safety, and efficiencies of vessels"

Former CEO of Lloyd Register



New Perspectives - "Value Chain"

The vessels are connected with various partners throughout the value chain, which has vast optimization opportunities





Connected Smart Ship

"Connected Smart Ship" is a joint initiative of HHI and Accenture to...

- Create business value for ship owners based on data analytics
- Transform the maritime industry by creating connected ecosystem



* VDR: Voyage Data Recorder, **AMS: Alarm Monitoring System



Value Propositions

Stakeholders	Value Propositions
Ship Owners & Liners	 Voyage optimization Track & monitor voyage Safe, environment-friendly, and economic voyage Vessel efficiency Vessel and equipment monitoring Diagnosis & assessment Predictive Maintenance
Port Terminal	 Visibility & efficiency Schedule management Stowage plan & monitoring Port operations support
Others (Logistics, Ship Class, Insurance, etc.)	Door-to-door cargo trackingData-driven value added services

Benefits

Reduced operations cost



through optimized navigation & shipping operations in overall value chain, and through proactive predictive maintenance with real-time diagnostic analytics



Increased revenue

by higher vessel utilization, value-added services to shippers, and new business models based on vessel data



Increased efficiency

by real time monitoring during sailing and providing end-to-end data integration



Value Propositions - Ocean Carriers Case



Source: Accenture Maritime Industry Analysis, 2014



$\text{Ocean Link}^{\text{TM}}$

Ocean Link[™] is a bundled offering of platform and services that HHI and Accenture co-develop to implement the CSS business





Key Differentiators

We understand your industry

- Laser-focus on your business values
- Combination of HHI's shipbuilding leadership and Accenture's global industry expertise

We lead shipbuilding & digital

- Integrated shipbuilding capability
- Ship-shore integration based on HHI-proprietary vessel data model
- Proven IoT and digital platform capability

We are open

- Flexible delivery and commercial model
- Continuous development of new advanced solutions
- Compatible with major device / solution providers
- Open to joint business model with you



[Back Up] Integrated ship-to-shore platform

Integrated ship-to-shore platform to aggregate complete vessel data to enable continuous innovative services for ship owners



