



Digital Transformation in the Shipping Industry and Future of AI



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I Company Overview (HMM)



HMM provides the best transportation service based on over 100 diverse vessels, logistics facilities, a global network of routes connecting the world like a spider’s web, latest IT systems, and skilled maritime professionals.

Business Performance in 2023

Sales ¹⁾	No. of global service routes	TEU capacity	Bulk cargo volume	CDP Climate Change (‘Leadership’ Level)
	Over 48 routes	813,015 TEU	43.61 million tons	A-
KRW 8,401 billion	No. of very large carriers with a capacity of more than 15K	Market share in the container ship business	No. of terminals operated	EcoVadis (as of April 2024)
	20 carriers	2.7 %	3 owned terminal	Platinum

I Company Overview (HMM Ocean Service)



HMM Ocean Service is a total management company that was spun off in August 2012 as a subsidiary of "HMM" and provides services such as ship management and newbuilding supervision.

Vision

A sustainable global company through digital technological innovation and eco-friendly ship management.

High-tech, Ocean-friendly, Sailing to the world!

Ship Management
(102 Vessels)

Employees
(180 people)

Fleet Control Center
(2020Y, the first in South KOREA)



Company's Track Record
(49 years since HMM establishment)

Maritime Staff
(abt. 3,100 people)

Training Center
(2005Y, the first in South KOREA)

II Shipping Industry Today

- **Trends** and challenges in today's shipping industry (KPMG, May 2024)

 **Decarbonization and the energy transition**

 **Supply chain optimization**

 **E-commerce growth and new consumption patterns**



 **Digitalization**

 **Port and Shipping display dynamic nature**

 **Building resilience**

II Shipping Industry Today

- Trends and **challenges** in today's shipping industry (KPMG, May 2024)



Environmental concerns



Rapid technological change



Political unrests



Shortage of skilled talent

II Shipping Industry Today

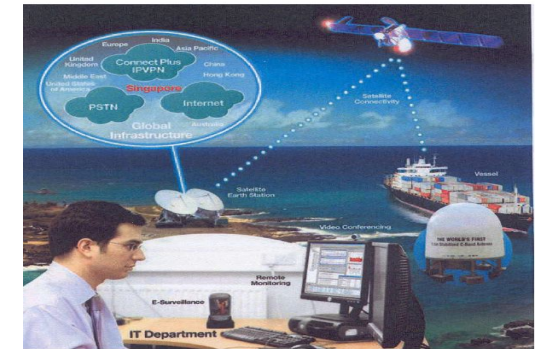
○ How to Improve Decision-Making at Sea?



MITAGS



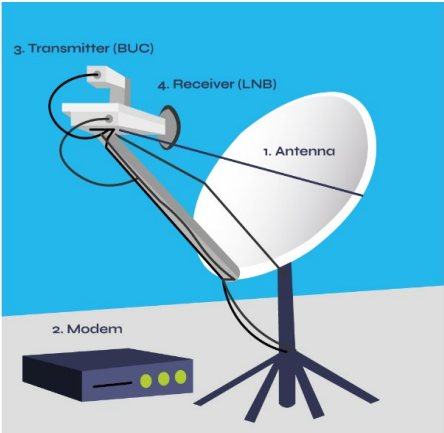


MARITIME INSTITUTE OF TECHNOLOGY
AND GRADUATE STUDIES

1. Ensure Access to **Accurate Information**
2. Encourage **Diversity of Thinking**
3. Establish Clear **Roles and Expectations**
4. Prioritize **Clear Communication**
5. Encourage **Error-Tolerant** Crew Procedures
6. Encourage Honesty About **Personal Circumstances** That May Hinder Decision-Making
7. Establish Standard **Communication Practices**



III Digital Transformation

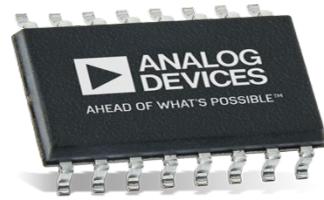
○ History of Marine Digitalization ?

1980	1990	2000	2010	2020
Satellite Communication	Digital Communication	Data Communication	High - Speed	Technological Innovation
<ul style="list-style-type: none"> • Inmarsat A (1982) 	<ul style="list-style-type: none"> • GPS (1990) • Inmarsat B (1994) • AIS(Automatic Identification System) 	<ul style="list-style-type: none"> • VSAT (Very Small Aperture Terminal) 	<ul style="list-style-type: none"> • GX(Global Express) • Trial MASS(Maritime Autonomous Surface Ships) 	<ul style="list-style-type: none"> • Low Earth Orbit (LEO) • AI and Data Analytics • MASS Code (2025)
				

III Digital Transformation

○ Digitalization Stages

Ship Electrification & Digitization



- The first stage was to electrify ships and digitize their machinery.
- Switching from old mechanical and analog systems to digital and electrical ones
- Electric propulsion, digital engine controls, and integrated bridge systems

Digitalization:



- As ships became more computerized, the emphasis switched to using data from onboard systems to improve decision-making.
- Data analytics, CBM(Condition Based Maintenance), remote monitoring

Smart Ship



- Smart ships are outfitted with modern sensors, communication solutions,
- Automation systems that allow for real-time data collection, analysis, and decision-making.

Autonomous Ship



- The most recent advance in maritime digitalization is the development of autonomous marine vehicles (AMVs).
- Unmanned surface vessels, underwater drones, and autonomous ships.

III Digital Transformation

○ Shipping companies Activities (Digital Business 2 (2022) 100022)

Companies	Motives	Measures
CMA CGM	<ul style="list-style-type: none"> • customers' satisfaction • environmental protection • Enhanced seafarer training • increase in competitiveness 	<ul style="list-style-type: none"> • collaboration with tech start-ups
Evergreen	<ul style="list-style-type: none"> • customers' satisfaction • improved service quality 	
Hapag-Lloyd	<ul style="list-style-type: none"> • sustainable value creation • accurate marketing 	<ul style="list-style-type: none"> • Cultural change • innovation across the entire supply chain
HMM	<ul style="list-style-type: none"> • increase in competitiveness • cost efficiency • customers' satisfaction 	<ul style="list-style-type: none"> • collaboration with an IT company • establishment of a special team
ONE	<ul style="list-style-type: none"> • increase in competitiveness • cost efficiency • customers' satisfaction • asset optimization • improved service quality 	<ul style="list-style-type: none"> • Standardization through collaboration within the shipping industry • Joint research with stakeholders in supply chain
OOCL	<ul style="list-style-type: none"> • cost efficiency 	<ul style="list-style-type: none"> • collaboration with tech start-ups • collaboration with stakeholders in supply chain
<i>Summary Notes</i>	<p><i>Identified Similarities</i></p> <ul style="list-style-type: none"> • <i>increased competitiveness</i> • <i>customers' satisfaction</i> • <i>cost efficiency</i> 	<p><i>Identified similarities</i></p> <ul style="list-style-type: none"> • <i>Collaboration with outsiders</i> • <i>digital integration</i>

III Digital Transformation

○ Shipping companies Activities

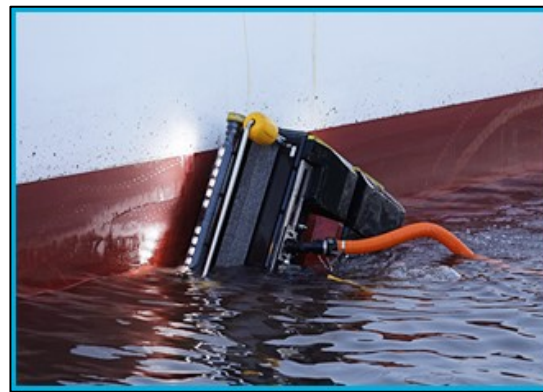
Digital Twin



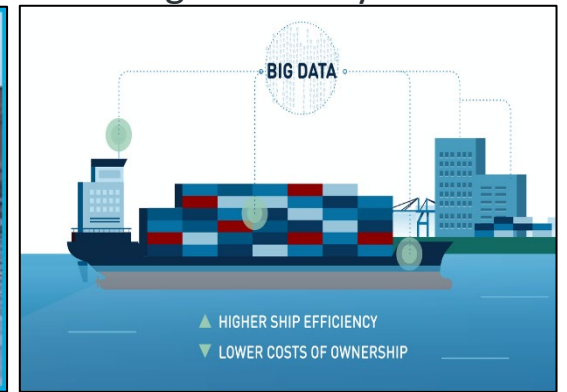
Wearable Device



Underwater drone



Big data analysis



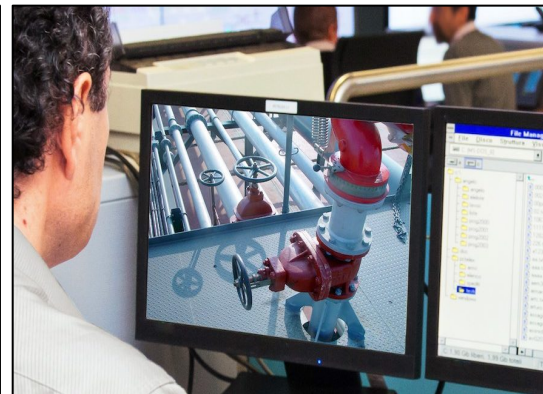
Sensor & Data Gathering



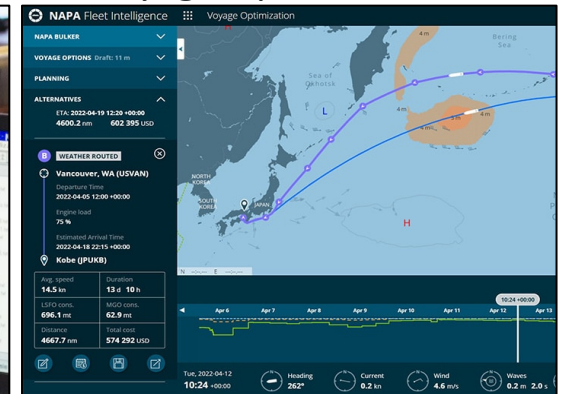
3D Print



Remote Inspection

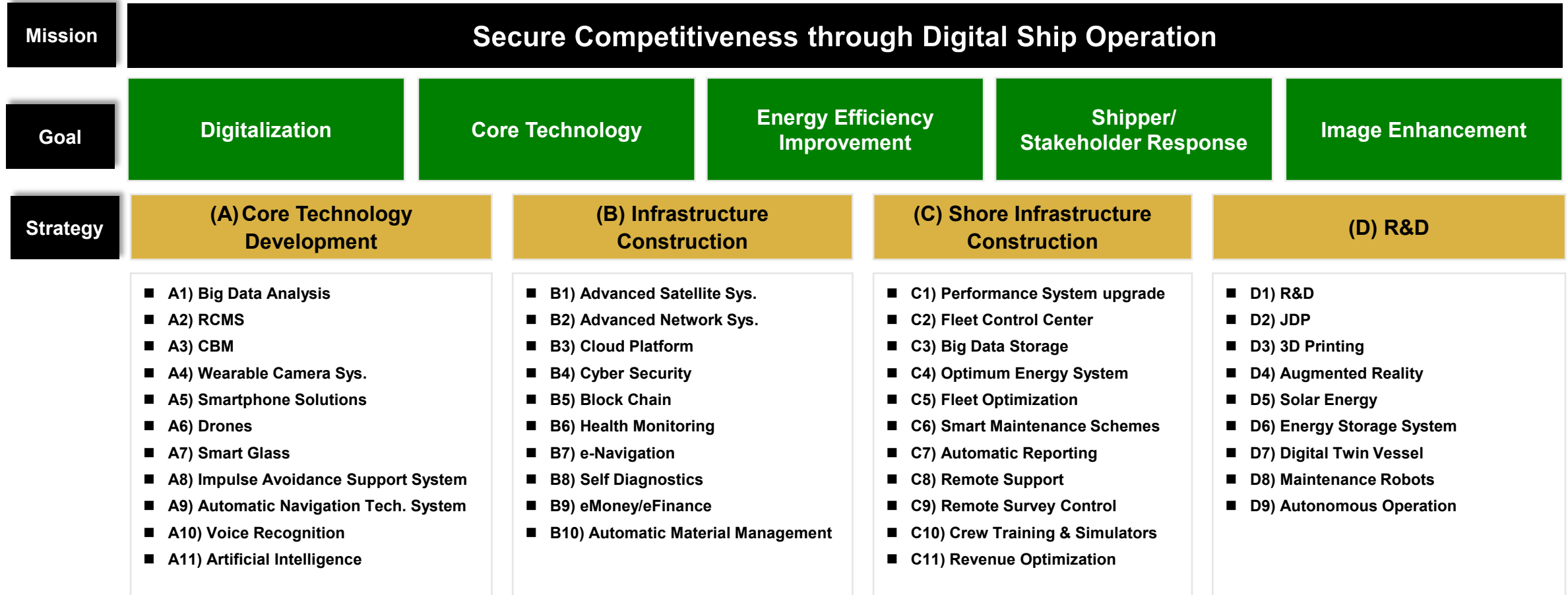


Voyage Optimization



III Digital Transformation

○ HMM Activities

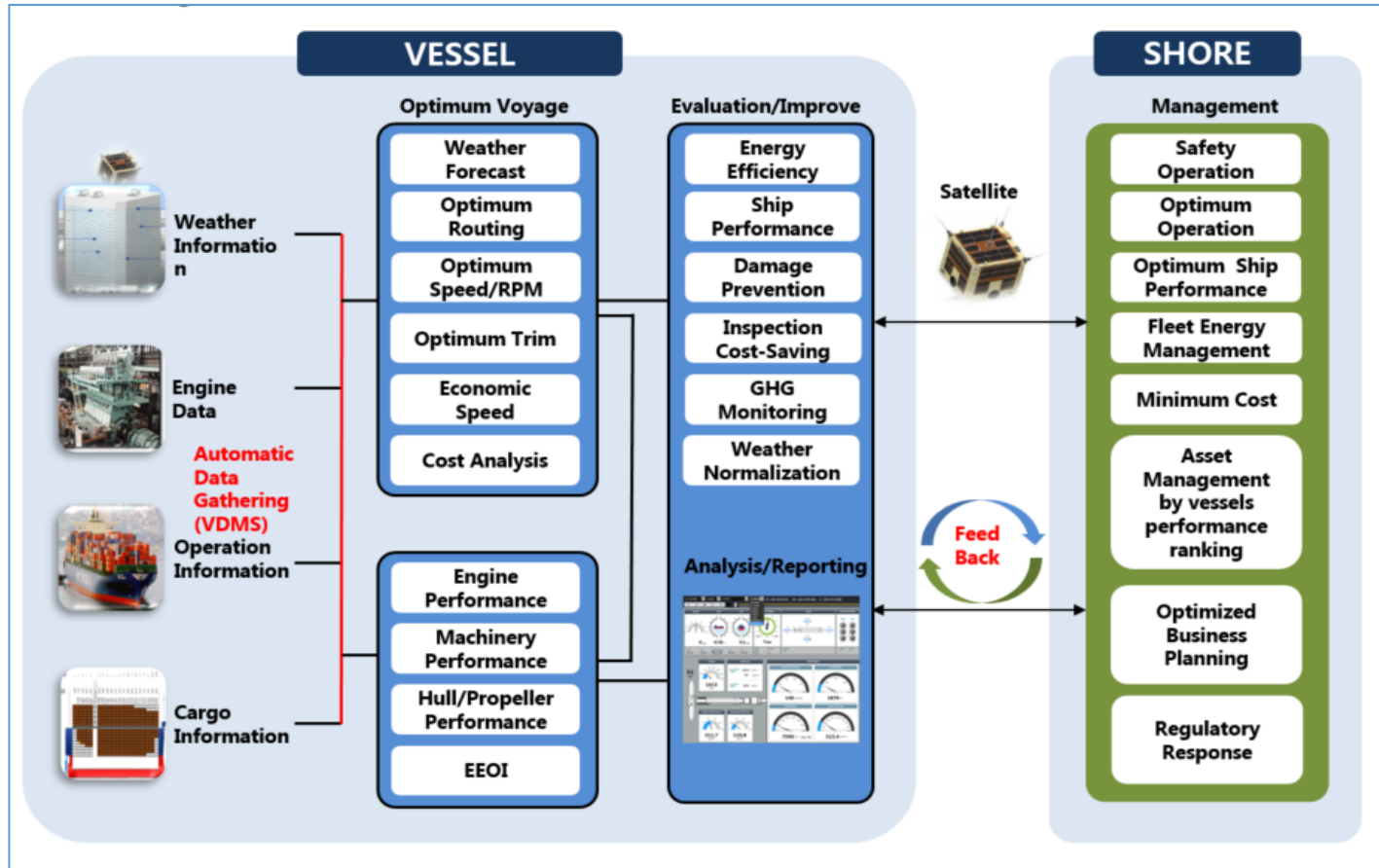


* CBM : Condition Based Monitoring System

III Digital Transformation

○ HMM Activities

HMM Fleets Control Center



IV Conclusion

○ Challenges in shipping Digitalization

Investment Cost

Maersk CEO ; Autonomous Box Ship '**Not in My Time**'

Lloyd's list (16 Feb, 2018)

Technical Reliability

INTERTANCO ; **No Market** for Unmanned Ships in Tanker Sector

World Maritime News (9 Jan. 2018)

Cyber Security

BIMCO ; Shipping **can't Afford to be Another KODAK**

Ship & Bunker (28 Sep. 2018)

Lack of skilled workforce

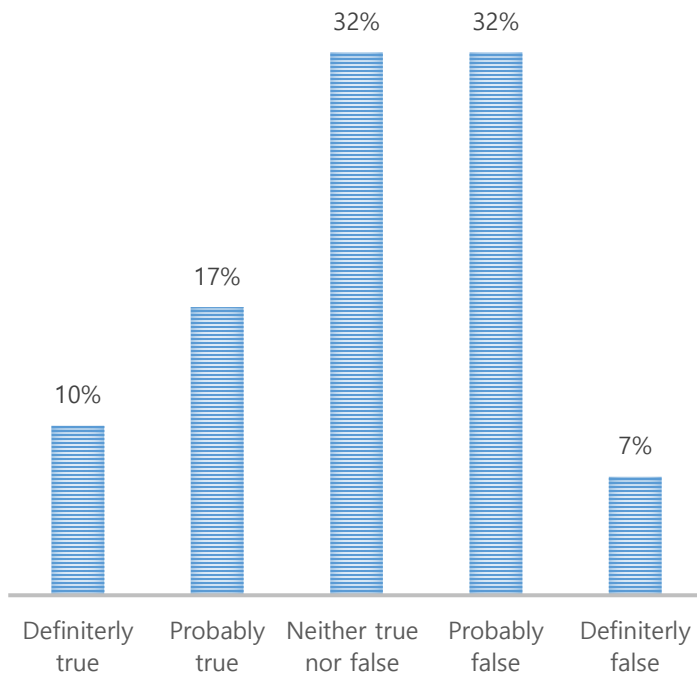
Shipping industry leaders are a conservative bunch, who are still treading cautiously when it comes to investment in digitalization. For many, the benefits are huge, but for some the **jury is still out**

Lloyd's list (19 Oct.. 2021)

IV Conclusion

○ Challenges in shipping Digitalization (PWC Survey, Sep. 2017)

Q) Ships will be controlled from land in the foreseeable future



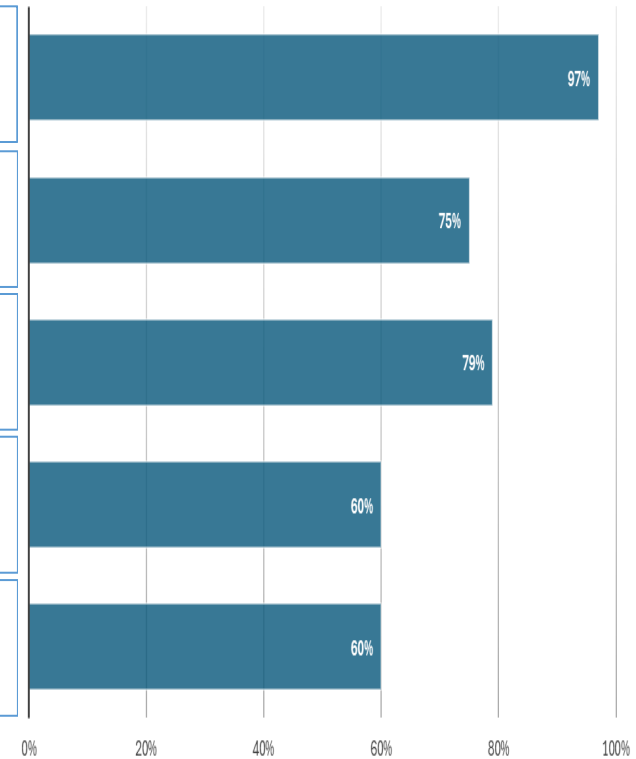
A crew on board the ship can respond immediately to an emergency such as fire or leaks

A crew on board can perform maintenance work directly on board the ship and generally keep it in better condition, thus obviating the need for expensive berthing times

A computer-controlled ship is a potential target for hackers and pirates

Cargo, and particularly hazardous substances, can be monitored on a daily basis by the crew on board, ensuring that any damage can be immediately averted

There will be high IT costs for safety reasons as all important components must be configured redundantly (i.e., backup systems must be set up)



IV Conclusion

○ Disadvantage in shipping Digitalization

- Despite the large-scale training data, there is a **lack of clear understanding of the context**
- **Limited ability** to understand and process some **common-sense reasoning and knowledge**
- **Lack of creativity** as responses are generated based solely on training data
- Reflects the **biases and limitations present** in the training data
- **Lacks the ability to interpret real-time information** as it is trained based on existing data

IV Conclusion

○ Challenges in shipping Digitalization

Autonomous does not necessarily mean 'Unmanned'. There has been a rowing back on autonomous shipping technology. The latest thinking suggests that autonomous means "Differently manned"

Lloyd's list(30 May 2018)

- **Unmanned is not ultimate target of Digitalization**
- **Not substitute for people, functions to assist people**
- **Focus on the basic technologies** (Sensing, Control, Monitor & Analysis)

IV Conclusion

○ Challenges in shipping Digitalization

*Digitalization in the maritime sector hinges on more than just technological advancements; the strategic use of data plays a crucial role. As the industry pushes towards sustainable operations, **standardised data** practices and **clarity on data ownership** have emerged as essential components*

Thetius (10 Sep. 2013)

- **Data Platform** : Manufacturer, Ship builder, Shipping company
- **Data Ownership** : Manufacturer, Ship builder, Shipping company, Customer, Stakeholder

IV Conclusion

○ Risk or Opportunity

Digitalization



De-carbonization



Thank you for your attention

