

# The National Maritime Case Competition (NMCC) 2019

---

The objective of this year's National Maritime Case Competition (NMCC) is to explore maritime industry in the age of digitalization. With reference to the effects and consequences of the fourth industrial revolution, termed "Industry 4.0" as seen in other industries, you are required to:

- Identify and analyze any potential opportunities and gaps for Singapore maritime industry,
- Suggest ways to seize the opportunities and mitigate the gaps in preparation for the age of digitalization

# Case Background

Despite constant effort to implement the concepts behind Industrial Revolution 4.0, there is still a long way to go before such success.

- What are possible reasons that technology is facing difficulty in penetrating the industry?
- Are we able to justify a stronger push for technology in the maritime industry by analysing existing cases in the market?

Envision a technologically advanced Maritime Industry. As the future of Singapore's economy, what do you hope to see for Singapore's Maritime future? What changes can we bring about, as revolutionaries entering the new age of Industrial Revolution 4.0?

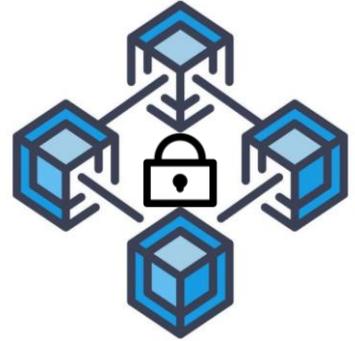


# Summary of Proposed Solutions

# Blockchain Technology

Database or a ledger that maintains a continuously growing list of data records

- Stores data chronologically and securely
- Allows digital information to be distributed but not copied
- Updates in real-time; making it easy to seamlessly obtain data
- Decentralised yet synchronised



# Joint Automated RFID Vessel Integrated

## Systems Replace



Technology is used to perform jobs previously done by a person.



## Atomiz

Break up a job into pieces; automate as much as possible  
Eg. Able to send out frequent automated reports



## Blockchain Technology

Information will be secured with blockchain ledger technology



## Relief

Technology takes on tasks that are dull





# ***MarineOne***



- Improves market interconnectivity
- Improves information flow
- Enhances efficiency
- Powered and secured by Blockchain

# Training via Virtual Reality



- Improve learning experience
- Better prepare the maritime labour market for the changing tides of digitalization
- Retrain incumbent workforce to reduce the effects of displacement



# Industry Transformation Map (ITM)



## DESIRED OUTCOMES



### Employers

- Strategies that provide integrated assistance across domains
- Stronger support for innovation and internationalisation
- Single govt agency to integrate transformation efforts



### Employees

- New and re-designed jobs with better wages
- More opportunities overseas
- Stronger support for upgrading and skills deepening

- It is a multibillion programme for 23 industries
- Deepen partnerships between government and industrial players
- Maritime Industry to tap on it to enhance Singapore's physical connectivity and non physical trade flow

# Cyber Security

- Organisations increasingly connected with smart devices and network.
- Increases vulnerability to cyber attacks
- Companies to identify vulnerable areas and develop protective measures to reduce likelihood of cyber attacks.

# Technological Start-up Firms

- Blockchain and AI still in development stage.
- Singapore to further innovate the technologies for the industry.

**PIER71**

# Machine Learning Model and Analytics

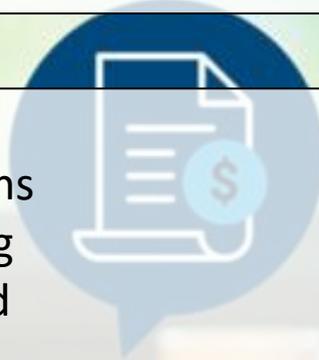
- Using Big data software to gather data
- Machine learning algorithms to analyse patterns & powerful insights
- Optimise vessel allocation, maintenance schedules, cargo resource management
- Able to make plans in advance, save cost and more efficient
- Slow in Adoption due to lack of trust and low accessibility to data

**Solution: Encourage operators through Pilot projects on the benefits and reliability of technology**

# Digitisation of Paper Based Documents

## Benefits

1. Streamline operations
2. Reduces cost of filing
3. Reduces risk of fraud



Distributed Ledger Technology distributed to all documents in phases  
Standardised format = swift transformation of data to information  
Increases efficiency

An Orchestrator to legislate & protect interest of parties  
Cross Domain interoperability between technologies & infrastructure

# Maritime Talent Community

Students maximise their technological potential to aid industry - Increase attractiveness

Pool of scholarship and bursary recipients

Opportunities with industry experts to gain insight

## CSR Initiatives

Attract traders to interact with services

Be active, creating another competitive advantage

# Automation

Success based on 3 Factors



Pursue relevant skills  
to excel in rapid  
changing workspace



Encouraged with  
incentives to embrace  
innovative change



Promote deep skill  
learning to propel  
workforce  
Aid companies to build  
innovation lab  
Mitigate risk

# Smart Containers using IOT

- Monitor Environmental changes in the Container
- Save time & cost incurred (Physical Checks)
- **Reasons for poor Adoption**
  1. High capital costs
  2. Restricted access from Maersk Line

## **Solution:**

Reduce initial capital costs through

1. The utilisation of Low priced sensors
2. Communication protocols such as Zigbee
3. Obtain satellite services from 3rd party providers.



# ALTERNATIVE SOLUTIONS

# Business Model

## Industry 4.0

1. Creation of new and efficient business models
2. ↑ Functionality of maritime ecosystem  
(Stakeholders can cooperate to make use of data from connected systems)

## ONLY ACHIEVED IF:

Change Organisation practices and structures to

- Prioritise key capabilities required to enable technologies

Eg. Encourage ecosystem thinking



# Rethinking Operations

## Industry 4.0

- Potential to increase Business efficiency and Streamline business processes
  - Use of remote sensors to monitor and detect breakdowns early
  - Digitisation of documents (Reduce error)
  - VR to better prepare staff

Pushed by: \$7.2 Million Investment by MPA in related projects

(Bears testament to the inevitability of AI)

# Environmental Sustainability

- With Research and Development, newer materials and designs of vessels/machinery with environmental protection and reduced weight are produced
  - Optimised performance and Significant energy efficiency gains
- Potential for developing green technologies that assess energy consumption and reduce fuel usage
  - Pushing the industry towards clean power sustainability.

# Gaps in Industry 4.0

1. Time and efforts required to harness
  - Eg. AI requires many testing phases that can slow down or affect operations
1. Development of technology may be too rapid for new rules and regulations to keep up
  - Global/local consensus may not be formed quickly enough to regulate these technologies
  - No statute governing → Problems may arise



# References

Summarized solutions taken from our finalist teams:

- Bits & Bolts
- Cornflax
- JBM
- Maritime Monsters
- Merrytime
- MinusONE
- SAiL
- Sashimi