

# Maritime Digitalisation Playbook

## A digitalisation guide for Maritime Singapore

Jointly presented by:



# Joint Foreword by MPA and SSA

Dear Members of Maritime Singapore,

**The global maritime industry is at the cusp of a digital revolution.** Advancements in digital technologies have given us unprecedented abilities to collect, store and process large amounts of data. Today, many aspects of maritime commerce and operations are conducted via digital platforms, efficiently and effectively. **However, not all of us are convinced of the returns from digitalising early** due to pressing challenges with skills shortages, system interoperability, and cybersecurity.

Yet, from time to time, unprecedented world events provide us with the impetus to re-examine our existing positions and devise new strategies for recovery and growth. The recent COVID-19 crisis has reminded us that global supply chains are not immune to shocks and the importance of supply chain resiliency. Despite these unforeseen disruptions, the maritime community is still enabling world trade and delivering essential goods, with those that are more digitalised being in a better position to do so as they have greater visibility and control of their supply chains. **We are heartened to see more maritime companies embracing digital technologies**, such as telecommuting tools and cloud computing, to sustain operations while not compromising on safety of their employees, customers and vendors.

The months ahead will be tough for us as we grapple with the evolving COVID-19 situation and plan for post-crisis recovery. During these difficult times, we encourage you to keep an eye on the future **by pressing ahead with digitalisation and positioning ourselves for new growth frontiers**.

This is where the **Maritime Digitalisation Playbook (MDP)** comes in. A collaboration between the Maritime and Port Authority of Singapore (MPA) and Singapore Shipping Association (SSA), this timely Playbook aims to help maritime companies uncover opportunities in digital transformation and highlight some first steps that one could take. The three sections of the Playbook – **Discover, Framework, and Resources** – are a systematic approach that can help you organise and execute your plans.

Guided by the Sea Transport Industry Transformation Map (ITM) and supported by like-minded digital leaders in our Circle of Digital InnOvators (CDO) network, we are working towards realising our vision of Singapore as a **Global Maritime Hub for Connectivity, Innovation and Talent**. Digitally mature maritime companies are an indispensable part of that vision, and digital readiness will help companies thrive in that future. With the full breadth of support provided, we are ready to partner you on your digitalisation journey today!



**Mr. Kenneth Lim**  
Chief Technology Officer  
Maritime and Port Authority of Singapore



**Mr. Steen Brodsgaard Lund**  
Chairman of Digital Transformation Committee  
Singapore Shipping Association

# Organisation of the Maritime Digitalisation Playbook (MDP)

The **“Discover: Digitalisation in Sea Transport Sector”** section presents an overview of the state of digitalisation in the Sea Transport sector, based on the nation-wide Digital Acceleration Index (DAI) study commissioned by the Infocomm Media Development Authority (IMDA). You can find out more about drivers of digitalisation at global and sectoral levels as well as the benefits of levelling up on the digitalisation front.

In **“Framework: An approach towards Digitalisation”**, you will find a Digital Transformation Framework that guides you through the “why”, “what” and “how” of your digitalisation journey. Companies that participated in the DAI study will find this section familiar as their results can be mapped to this Framework<sup>1</sup>.

Finally, the **“Resources: Supporting your digitalisation journey”** section outlines the various avenues of government support available and explains how the supplementary materials in the Annexes can be used. These materials include DAI results, technology scans and case studies for key maritime subsectors; a template for you to articulate your digital transformation plan; and a self-assessment checklist for companies that did not participate in the 2020 DAI Study.

1: The personalized DAI results for the organisations that participated in the DAI survey will be sent to the respondent who completed the survey in May/June 2020. More information about the DAI survey can be found on Slide 5. If your organisation did not participate in the DAI survey, the Self-Assessment Checklist (refer to Annex A2) can be used to estimate your organisation's digital maturity.

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# 1.1 State of Digitalisation in Sea Transport

Results from the 2020 DAI sectoral survey

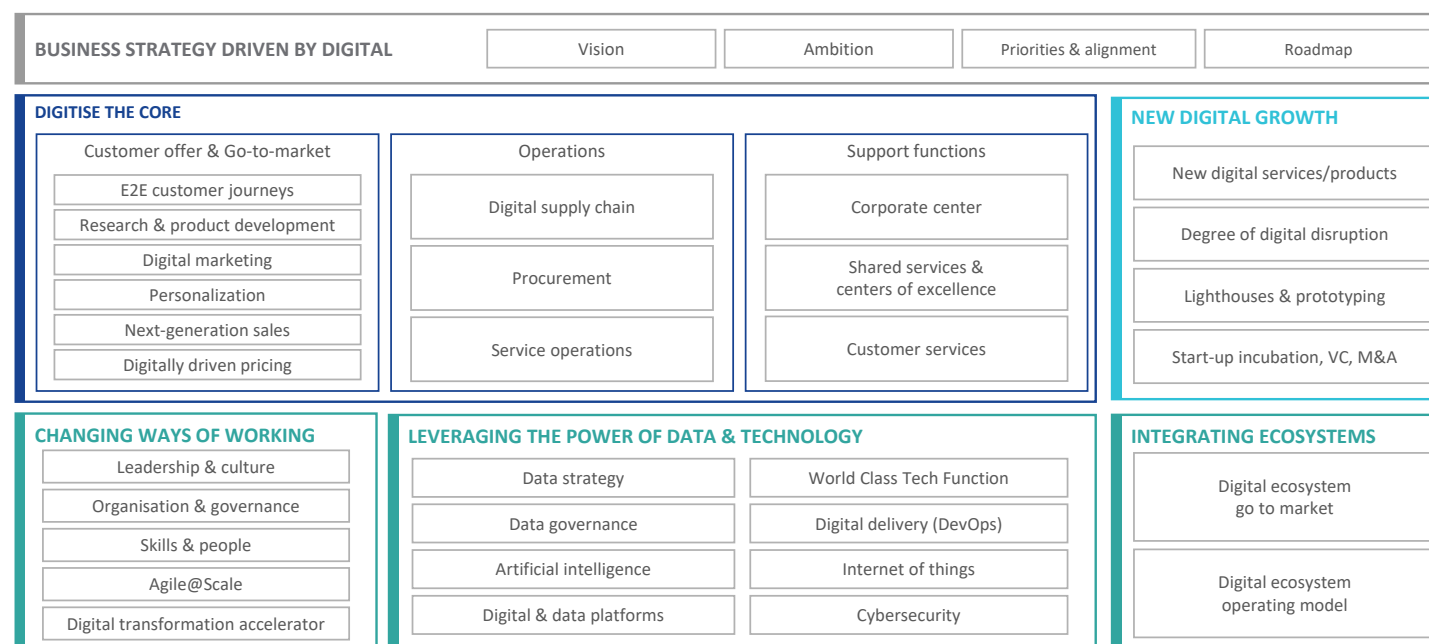
- Sea Transport MNC/LLCs vs. SMEs
- Priority areas for Digitalisation



# Between January and March 2020, over 200 maritime organisations participated in the Digital Acceleration Index (DAI) survey to assess their digital maturity

This was part of a 3-year survey commissioned by IMDA to assess the state of digitalisation of organisations in Singapore

## End-to-end digital framework (35 dimensions, industry-specific)



Benchmark vs >7,200 data points



Regular update to keep up with fast moving digital trends

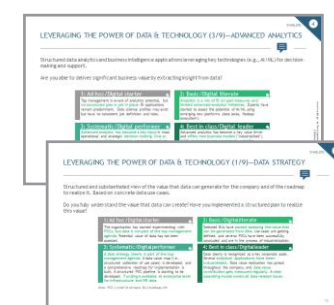


Partnerships with leading universities



Validation by >100 global topic experts

## Four maturity stages



...



For each dimension, choose which stage resembles the as-is maturity in the organisation



## DAI score

Digital maturity (1-100)

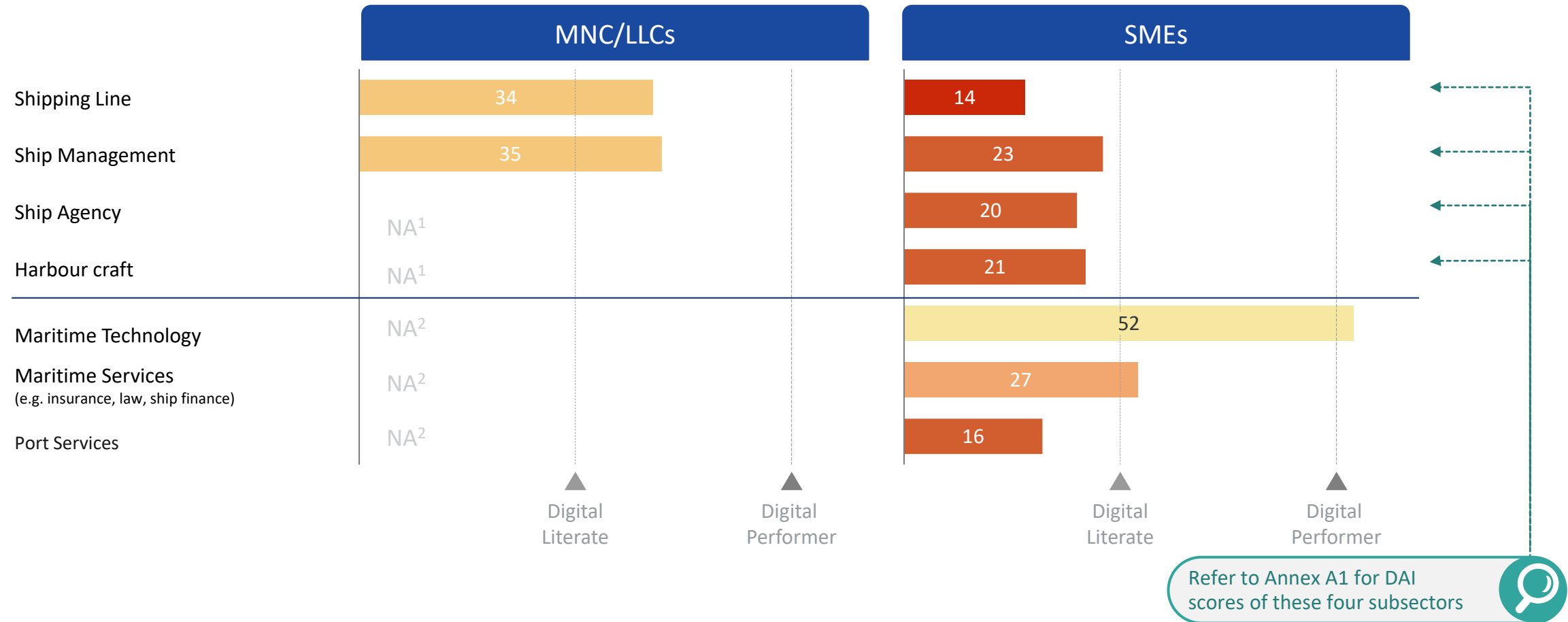
0-8	Starter
9-17	
18-24	
25-33	Literate
34-41	
42-49	
50-57	Performer
58-65	
66-74	
75-82	Leader
83-91	
92-100	

Note. Digital Acceleration Index is a survey conducted by the Infocomm Media Development Authority. The DAI 2020 survey was conducted between Jan – Mar 2020. Individual results will be given to participating organisations in May - Jun 2020. If your organisation did not participate in the DAI survey, the Self-Assessment Checklist (see Annex A2) can be used to estimate your organisation's digital maturity.



# In Singapore's Sea Transport sector, MNC/LLCs are Digital Literates, while SMEs are mostly Digital Starters

MNC/LLCs are stronger in operations, ways of working and data & technology

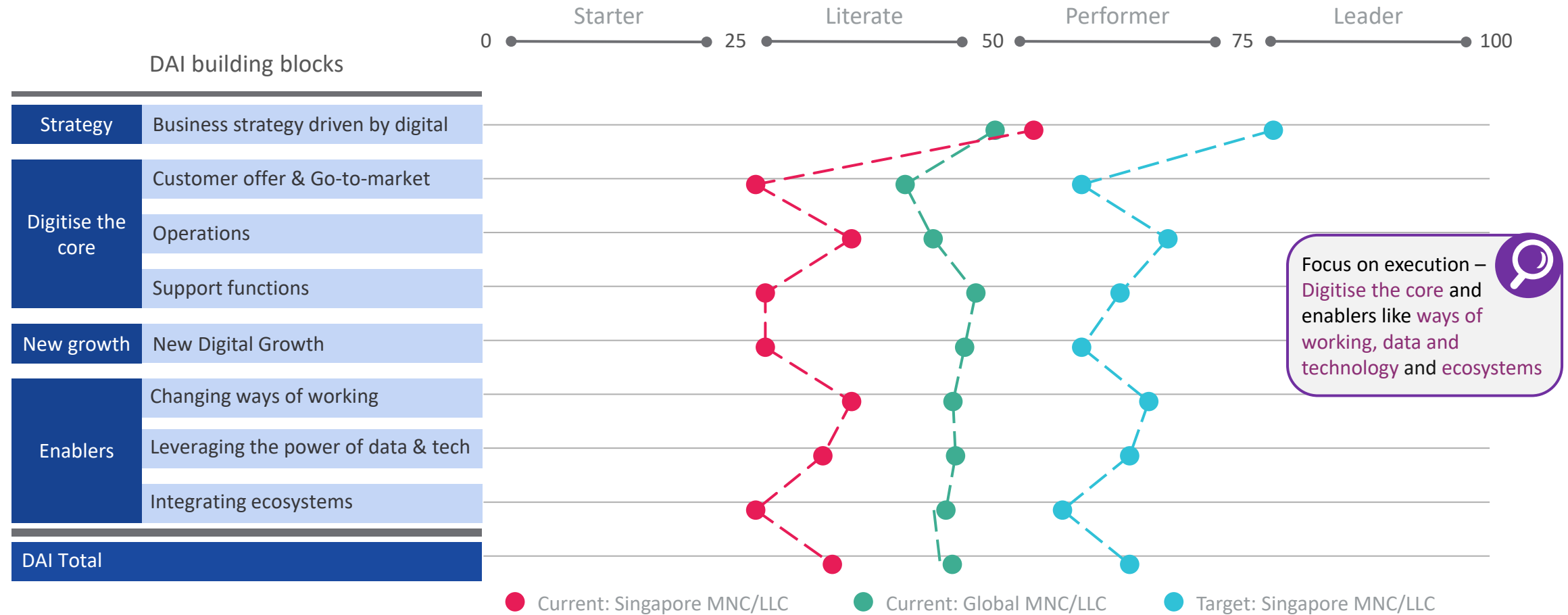


1. Largely SME sector 2. Small sample size  
Source: IMDA DAI assessment



# Sea Transport MNC/LLCs are Digital Literates

Sea Transport MNC/LLCs are scoring higher in strategy, and aspire to improve execution and enablers

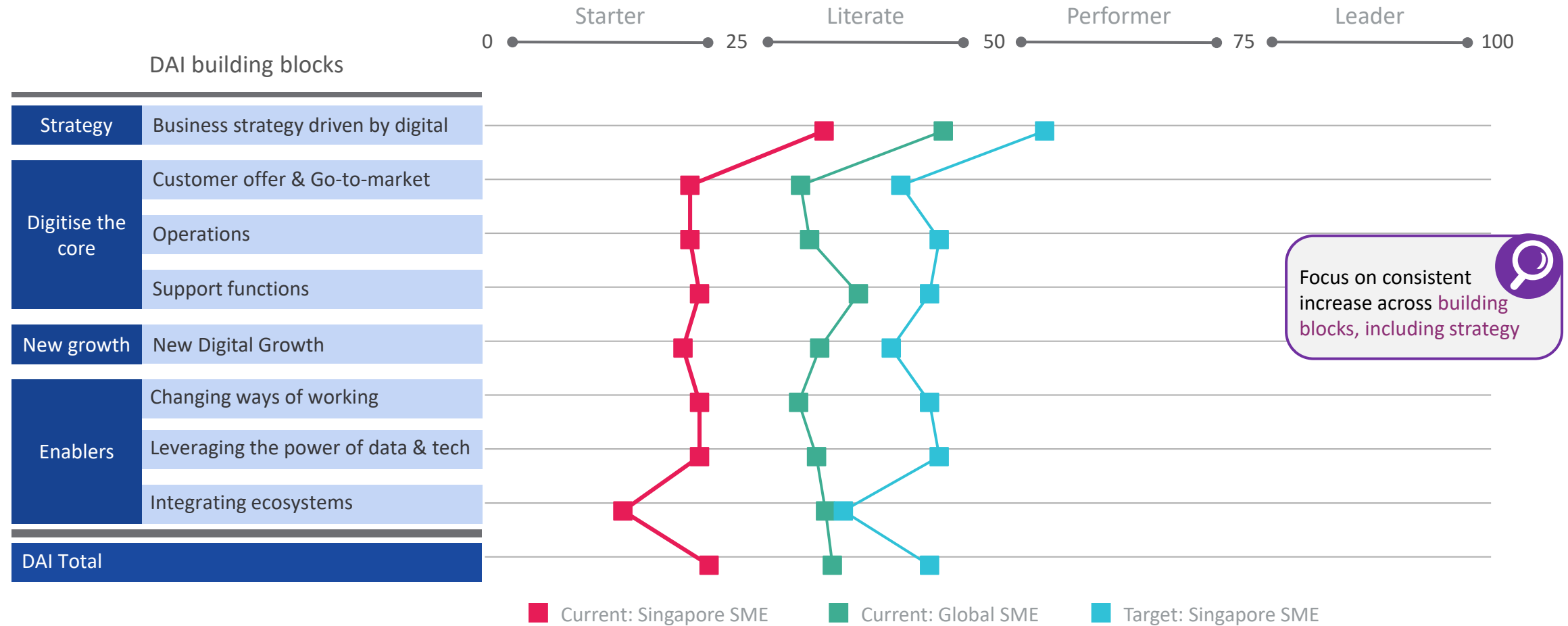






# Sea Transport SMEs are Digital Starters

Sea Transport SMEs are also scoring higher in strategy, with room for growth across all building blocks

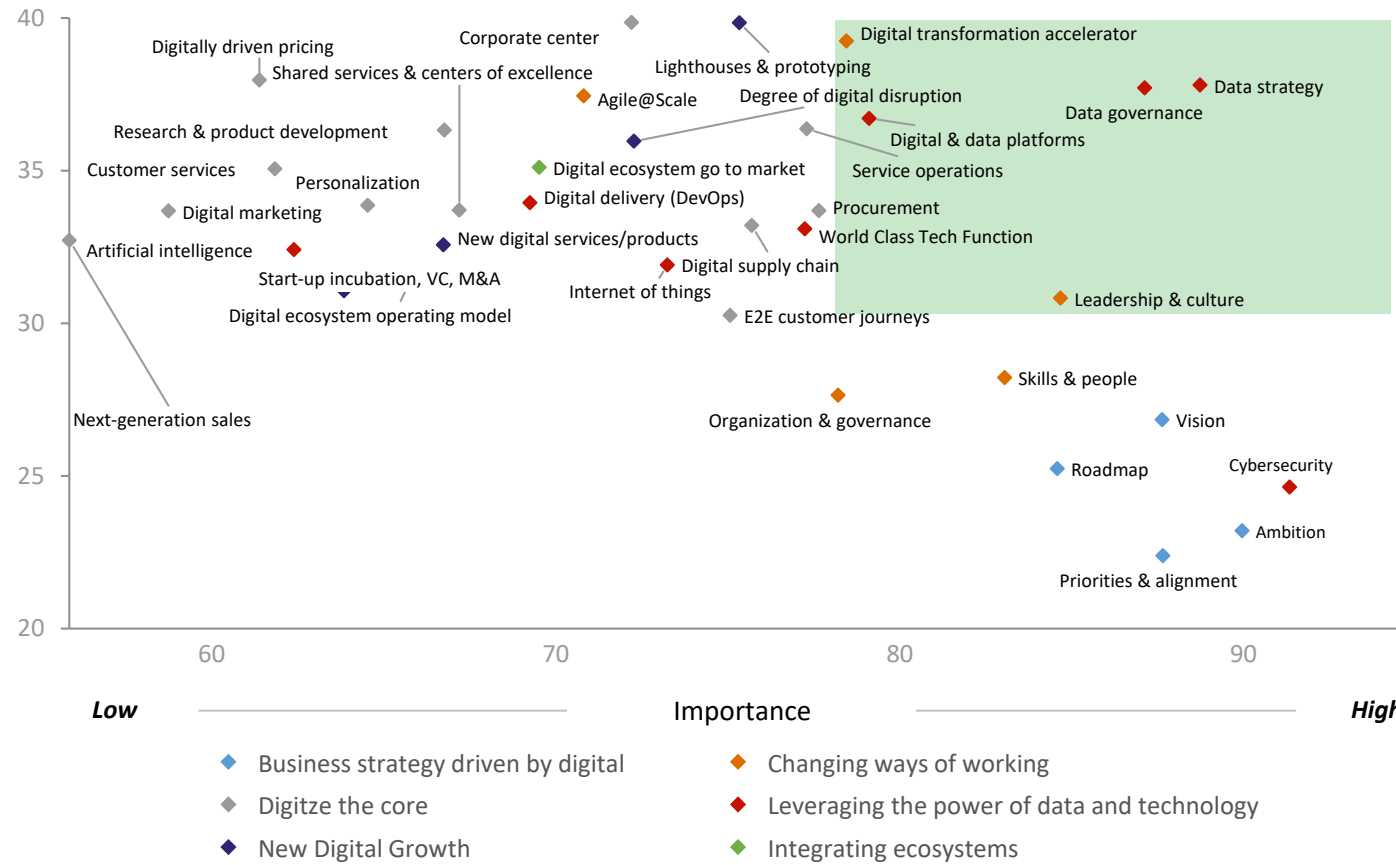




# Sea Transport MNC/LLCs: Need to focus on data, platforms, ways of working

Graph indicates dimensions with largest target gap (y-axis) and highest importance (x-axis)

Gap between current and target state<sup>1</sup>



## Top 5 Dimensions with largest gaps and highest importance

- ◆ Data strategy
- ◆ Data governance
- ◆ Digital transformation accelerator<sup>2</sup>
- ◆ Digital & data platforms
- ◆ Leadership & culture

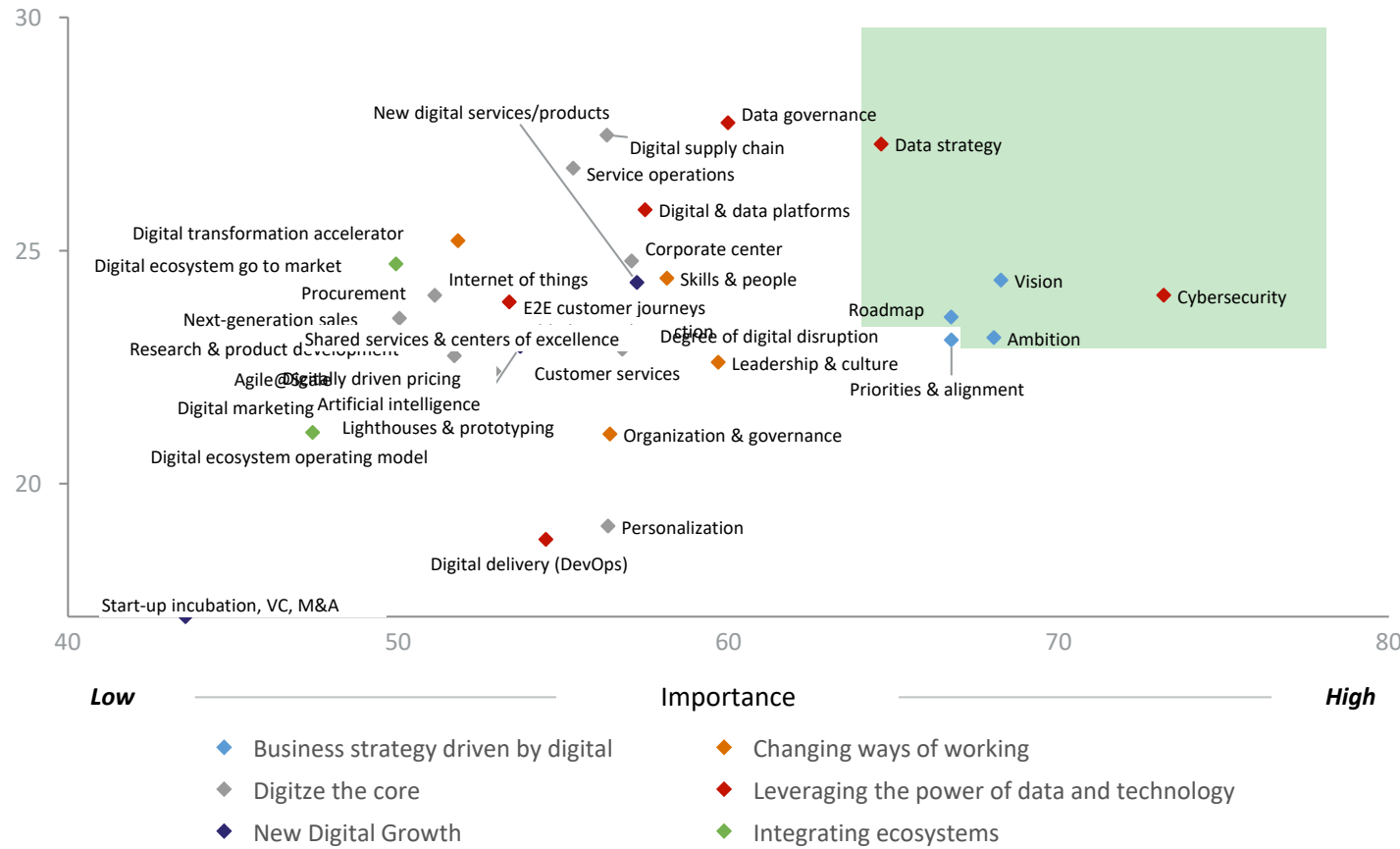
1. Determined by gap between current digital maturity and target state of organisations in three years  
 2. Respondents asked about presence of a dedicated unit that owns and drives digital transformation at scale  
 Source: IMDA DAI assessment



# Sea Transport SMEs: Need to focus on strategy, cybersecurity and data

Graph indicates dimensions with largest target gap (y-axis) and highest importance (x-axis)

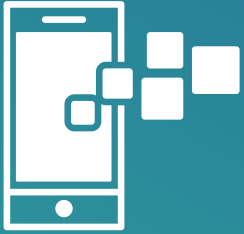
Gap between current and target state<sup>1</sup>



**Top 5 Dimensions with largest gaps and highest importance**

- Cybersecurity
- Vision
- Data strategy
- Ambition
- Roadmap

1. Determined by gap between current digital maturity and target state of organisations in three years  
Source: IMDA DAI assessment



# 1.2 The Value Of Being Digital

Understanding why Digitalisation is Crucial

- Why digitalise in Sea Transport?
- Evidence of digitalisation benefits



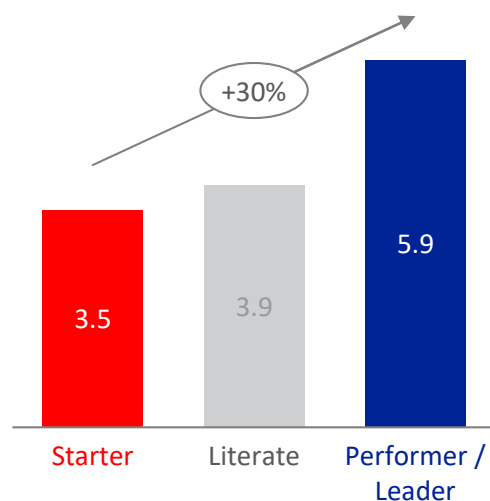
# Research shows that going digital pays off

Across sectors, digital performers and leaders outperform their peers

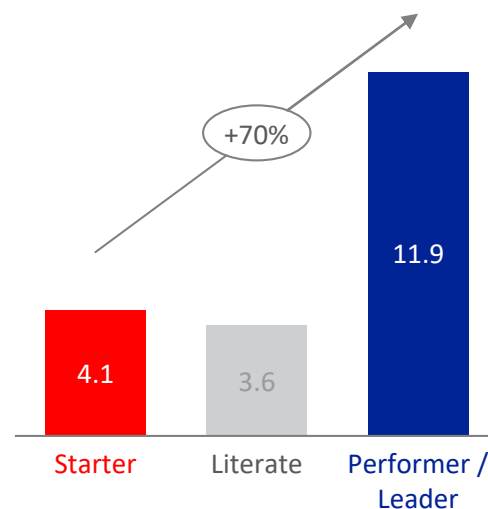
Cross-industry analyses of 2015-2018 CAGR<sup>1</sup> for each metric (where DAI score and public market figures are available)



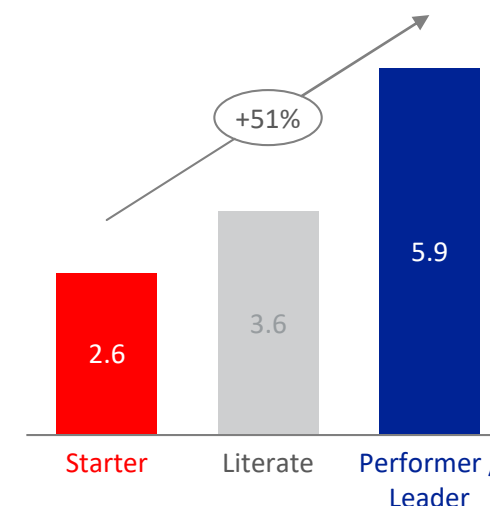
## 1 Increased performance EBITDA<sup>2</sup> growth [%]



## 2 Deeper focus on innovation R&D<sup>3</sup> expenditure growth [%]



## 3 More value creation Total enterprise value growth [%]



1. Compound annual growth rate (CAGR); 2. Earnings before interest, tax, depreciation and amortization (EBITDA); 3. Research & development

Note: n = 224, cross-industry, n for starters = 64, n for literates = 105, n for performers & leaders = 55. For a reliable sample size base, Digital Performer and Digital Leaders aggregated to one category

Source: S&P Capital IQ, Digital Acceleration Index Global Database



# Five reasons why digitalisation needs to be a key agenda in your organisation today



Competitors are doing it

Organisations who digitalise will ...

Be able to offer **more competitive offerings**

Organisations who ignore digitalisation will ...

Be **slow to react**, having relatively subpar offerings

In maritime context, this could mean ...

Analysing business trends and customer needs in order to offer **competitive freight rates**



Customers want it

Increase **customer engagement** and reduce churn

See **customers leaving for competitors** that meet their needs

Improving **cargo visibility** throughout voyage through track and trace



Regulations are evolving

**Adhere to new rules** and standards more nimbly

Be at risk of regulations and being **significantly affected by new rules**

Using analytics to optimise **bunker procurement and consumption of compliant fuels**



Protect against headwinds

Have the means to adjust and course-correct for global events

Be **vulnerable** during events that cause **economic downturns**

Using analytics to optimise **fleet deployment** and **de-risk supply chains** for customers



Need to future-proof

Connect with and be entrenched in **maritime digital ecosystem**

Be **unable to benefit from digital ecosystem** and risk displacement

Reduction in **transaction cost and time** associated with trade documentation

*These are illustrative, non-exhaustive examples*



# Digitally-ready organisations are best-positioned to thrive in the future

This future of Maritime Singapore is guided by the Sea Transport Industry Transformation Map (ITM)

## Vision

A Global Maritime Hub for Connectivity, Innovation and Talent

### 4 Key Pillars of Transformation



#### Innovation

Build a vibrant innovation ecosystem to drive competitiveness and new growth areas

Create an **enabling environment for innovation**

**Build capabilities** of local technology solutions providers and start-ups

Partner stakeholders to **develop and enhance maritime R&D capabilities**



#### Productivity

Build a highly-automated and digital maritime environment

Leverage technologies and automation to **enhance business processes and workflows**

**Drive productivity transformation** through Maritime Cluster Fund



#### Jobs & Skills

Develop a future-ready Maritime workforce

**Strengthen & build manpower pipelines**

**Redesign job roles and reskill workers** for the future

**Promote awareness** of maritime careers



#### Internationalisation

Support maritime organisations to grow into global champions

**Facilitate access** to markets of interest

**Build capabilities** of local maritime organisations



### Trade operations and financing

Manage **physical movement and tracking of goods, improving real-time visibility** for shippers and logistics service providers

#### Benefit

Enable **trade financing and compliance solutions in a common portal** to ease process for customers

#### Examples (note: list is not exhaustive)

CALISTA, TradeLens



### Trade documentation and authentication

Handle all trade related paperwork within **encrypted platforms**

Ensure the **legitimacy and origin** of trade documentation for faster approval

Networked Trade Platform, TradeTrust



### Port clearance and access to services

Allow **one-stop access for regulatory clearance** to speed up port handling time

Enable **digital shopfront for booking**, facilitating JIT<sup>1</sup> and increased productivity for port services and shipping lines

digitalPORT@SG™, digitalOCEANS™

Digitalisation is a pre-requisite **to benefit from current and upcoming digital platforms and ecosystems**

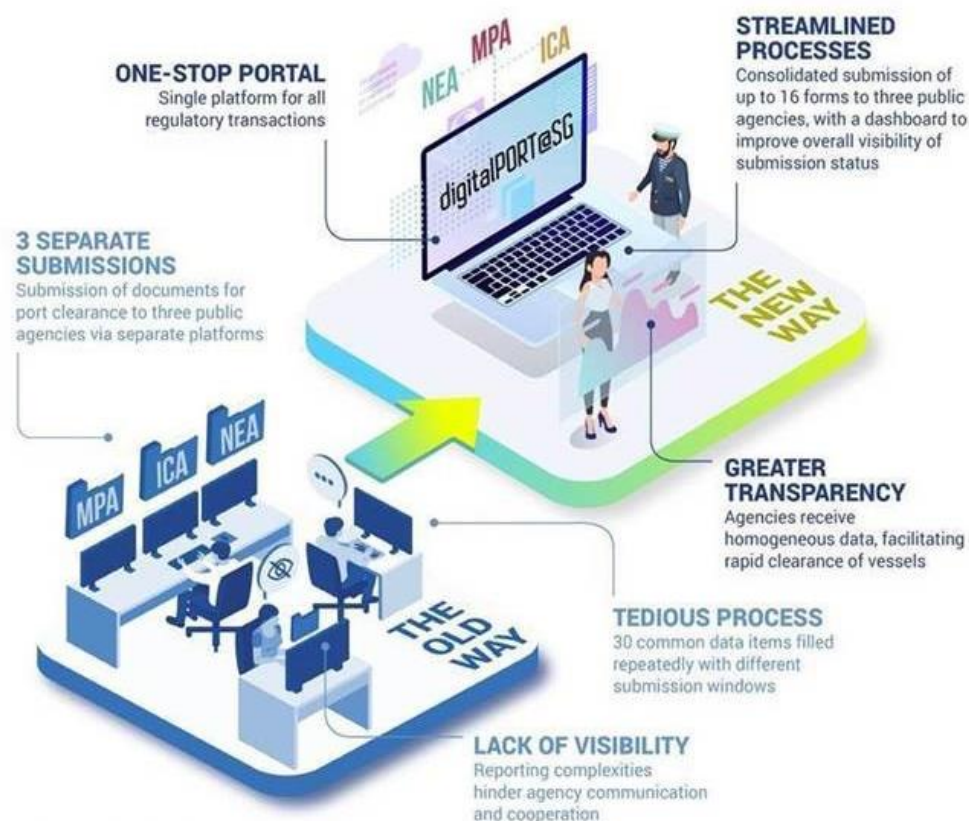




# digitalPORT@SG™ and digitalOCEANS™ will usher in the next phase of maritime digitalisation in Singapore and promote greater connectivity among the global community

Launched in October 2019, Phase 1 of **digitalPORT@SG™** will streamline regulatory transactions (i.e. B2G) onto a single portal. In 2H2020, work will commence on Phase 2 development. When completed, it will facilitate the ordering of marine services and just-in-time operations in Port of Singapore.

The full benefits of digitalisation could only be harnessed if there are harmonised data standards. Hence, MPA launched the **digitalOCEANS™** initiative to champion the development and adoption of common data standards and common exchange APIs to facilitate port clearance across the world

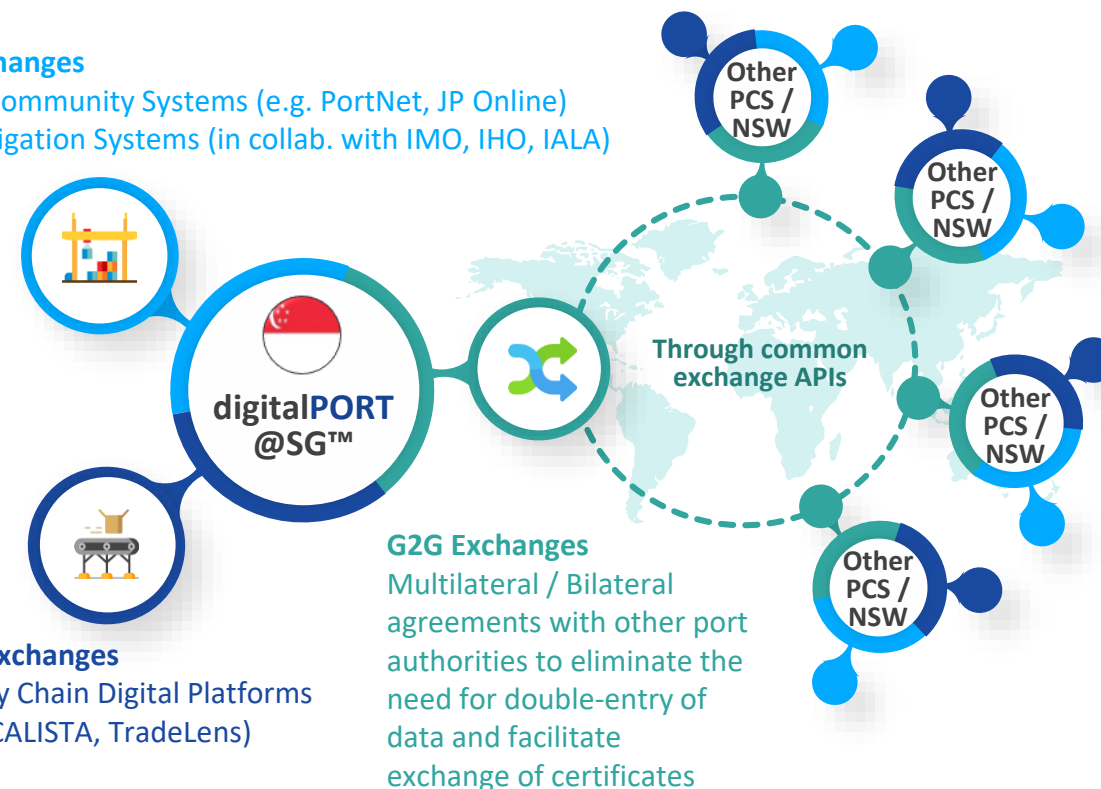


## B2G Exchanges

- Port Community Systems (e.g. PortNet, JP Online)
- E-Navigation Systems (in collab. with IMO, IHO, IALA)

## B2B2G Exchanges

- Supply Chain Digital Platforms (e.g. CALISTA, TradeLens)



1. digitalPORT@SG™ - "Digital Portal for One-stop Regulatory Transactions at Singapore"

2. digitalOCEANS™ - "Digital Open/Common Exchange And Network Standardisation"

3. PCS/NSW - Port Community System / National Single Window

4. IMO, IHO, IALA – International Maritime Organisation, International Hydrographic Organisation, International Association of Marine Aids to Navigation and Lighthouse Authorities



# 1.3 Maritime Sector Landscape

Key Global Trends Driving Digitalisation



# Global trends propelling the maritime sector towards digitalisation

Four key trends driving organisations to digitalise



## Shifts in global trading system and consumer preferences

**Uncertainties in international relations** (e.g. US-China trade war, Brexit, COVID-19, etc.), are becoming more frequent, requiring players to more nimbly react to or pre-empt trade volatilities through dynamic pricing and capacity deployment

**Supply chains are evolving** (reshoring, de-risking of supply chains, etc.), requiring players to digitalise for greater transparency, so as to manage complex supply chains better

**Service standards are rising** (e.g. e-commerce), forcing shippers (and therein shipping lines) to also rise up to meet these increasing customer demands (e.g. to track and trace cargo)



## Overcapacity and blurring of business models

**Headwind of overcapacity** driving pressures on margins, leading to ...

- Consolidation of shipping lines
  - Move into higher margin segments of value chain (e.g. logistics)
  - Collaboration between shipping lines
- ... all of which require digitalisation to enhance communication and reduce transaction costs

**Customers becoming competitors** (e.g., e-commerce firms disintermediating forwarders and entering logistics), forcing players to differentiate their offerings

**Proliferation of maritime-tech startups** through increasing interest from VCs<sup>2</sup> and larger corporates



## Advancement and emergence of new technologies

**Increasing global connectivity** (e.g. cheaper VSAT connectivity, 5G, edge computing, etc.) allows for vessels to become ubiquitously connected

**Proliferation of data technologies** (cheaper storage, processing, cloud, etc.), enabling large volumes of data to be collected & processed

**Emergence of new technologies** (AI/ML, blockchain, IoT, etc.) drives new use cases for better productivity and service delivery, as well as the need for new technology standards



## Evolving emphasis on sustainability and risk

**Increasing emphasis on sustainability and clean fuels** requiring players to better track bunker consumption, emissions and/or retrofit ships

**Heightened fears on privacy and data security**, requiring players to adopt strict cybersecurity standards

**Beyond Environment, increasing focus on Social & Governance** too, leading to digitalisation of areas such as supply chain provenance and seafarer safety



# Global trends requiring maritime sub-sectors to digitalise

These trends may have upstream or downstream impact on other players, necessitating their digitalisation as well



Port Operators

- Intensifying competition among ports, leading to increasing focus on digitalisation (e.g. harnessing data to reduce port congestion and limit delays)
- Increasing data collection to provide customers with greater supply chain visibility and control
- Increasing adoption of digital technologies to automate labourious tasks, which in turn reduces human error, enhance workplace safety and just in time services



Shipping Lines

- General overcapacity
- Increasing frequency of geopolitical events
- IMO 2030 & 2050 decarbonization targets requiring significant advances in sustainable technologies (e.g. new engines, alternative fuels etc.)
- Cost pressures leading to increased focus on route optimisation for fuel economy

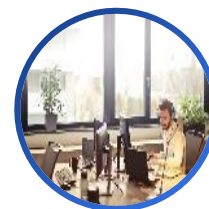
(Specific to container liners)

- Profit pressures leading liners to
  - Consolidate
  - Move into logistics
  - Collaborate (e.g. DCSA)
- Rising shippers' demands
  - E2E cargo visibility
  - Bypassing forwarders
  - Vertical-specific needs



Ship Managers

- Increase in non-traditional owners seeking management services (e.g. banks and fund managers)
- Thinning margins put pressure on smaller players to consolidate and seek scale economies – some of which is made possible by digital systems or solutions
- New industry regulations / standards that require additional reporting and possibly, adoption of novel, sustainable technologies



Ship Agents

- Digital platforms revamping the way agents coordinate their workflow with service providers, but could potentially disintermediate shipping agents in the long-run
- General increase in digitization, rather than digitalisation, for more conducive work processes and/or environments (e.g. move away from paper-driven processes, use of mobile devices to display or generation trade documents etc.)



Harbour Crafts

- Move to digital platforms & JIT requiring operators to digitalise in order to benefit
- Increasing use of digital platforms to manage order-taking & vessel operations

(For bunker suppliers)

- New IMO regulations would require suppliers to measure the quantity and verify quality of fuel delivered within tight timelines.



Other players

- Increasing use of digital platforms & blockchain technology for maritime services (e.g. broking, customs clearance, marine/cargo insurance, trade financing)
- Disintermediation of freight forwarders by large shippers and e-platforms
- Classification societies diversifying from surveying to offer digital consultancy and solutions
- Increasing interest by VCs in maritime tech startups that provide software and hardware solutions which will further digitalise the sector

Increasingly integrated ecosystem requiring modernization of IT infrastructure, standardization for interoperability, and additional cybersecurity safeguards  
Changing demographics of workforce— increasingly difficult to replace workers in certain segments of the maritime value chain



# 1.4 Global Technology Scan

- Key digital trends in Sea Transport
- Examples of use-cases and their potential impact



# New technologies are becoming technically and commercially viable

Is your organisation using any today?

## Existing opportunities

Existence of clear use cases that have been operationally or commercially deployed by global maritime leaders

Potential to further embed into maritime operations and maximize value



Digital platforms



Advanced analytics



Internet of Things



Robotic process automation



Cyber security

## Next frontier

Multiple clear use cases but majority are still in POC<sup>2</sup> or trial stage, and have not been fully operationalized

Bolstering existing use cases



Connectivity technologies  
(5G, edge computing, etc.)

Unlocking new use cases through these technologies



Blockchain technology



Artificial intelligence



VR/AR<sup>1</sup> technology



Autonomous ships & drones

## Over the horizon

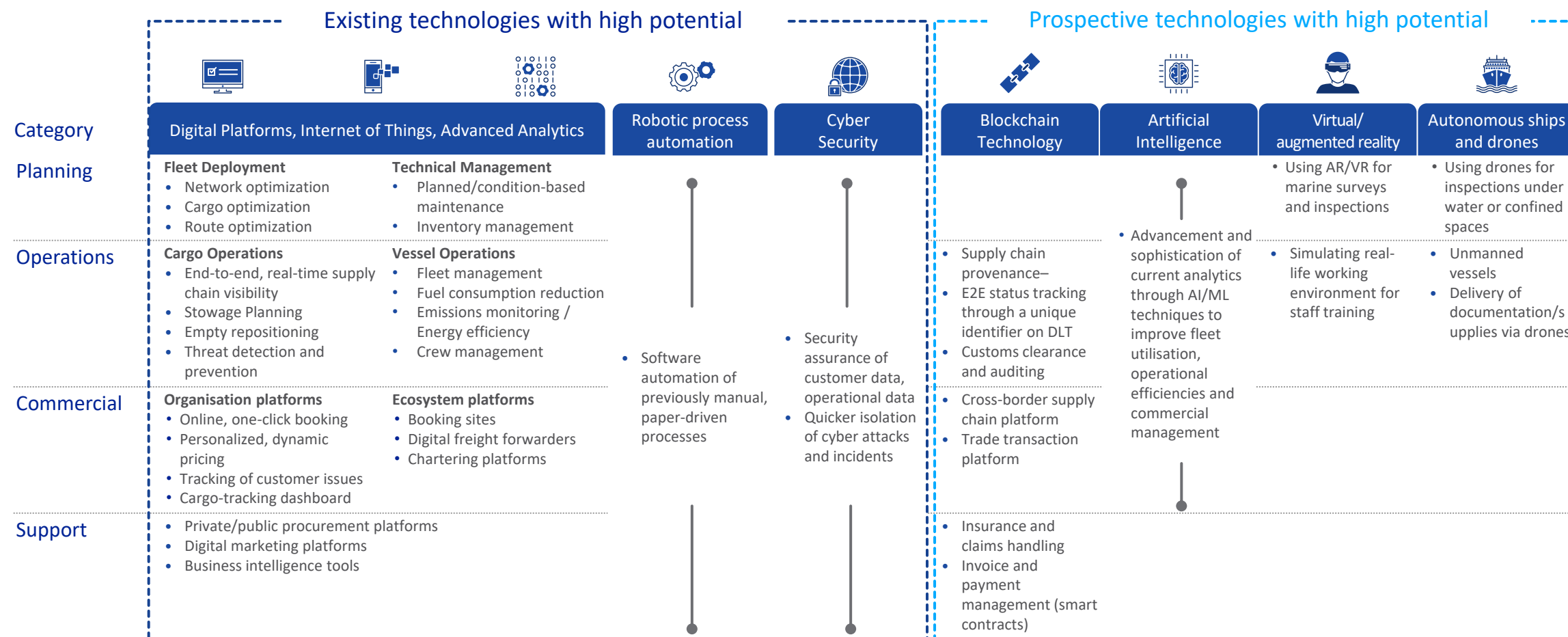
Few, select use cases and a majority of them are still in POC<sup>2</sup>/trial stage, and years away from operationalization

1. Virtual Reality (VR) / Augmented Reality (AR);  
2. Proof of concept (POC)





# Examples of digital opportunities within Sea Transport sector



Refer to Annex A1 for digital opportunities within Shipping Lines, Ship Management, Ship Agency and Harbour Craft subsectors





## 2. Digital Transformation Framework

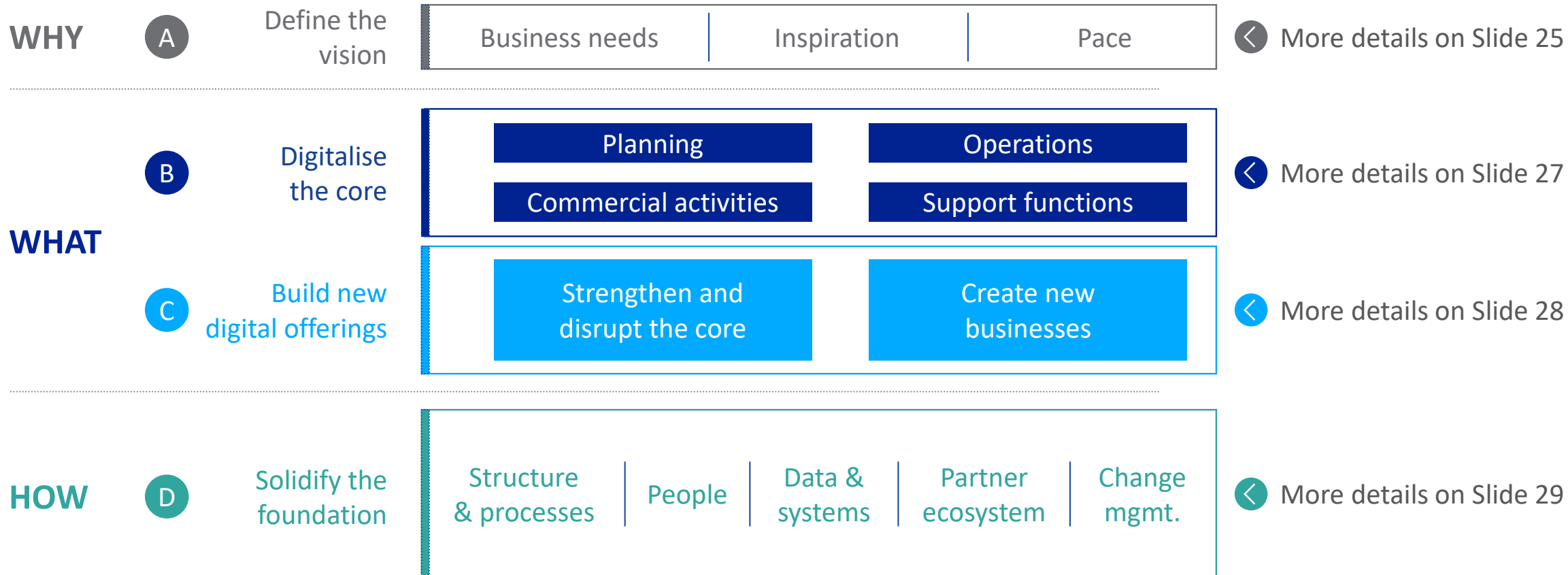
- 2.1 Why – Define the vision
- 2.2 What – Digitize the core and build new digital offerings
- 2.3 How – Solidify the foundation





# Digital Transformation Framework

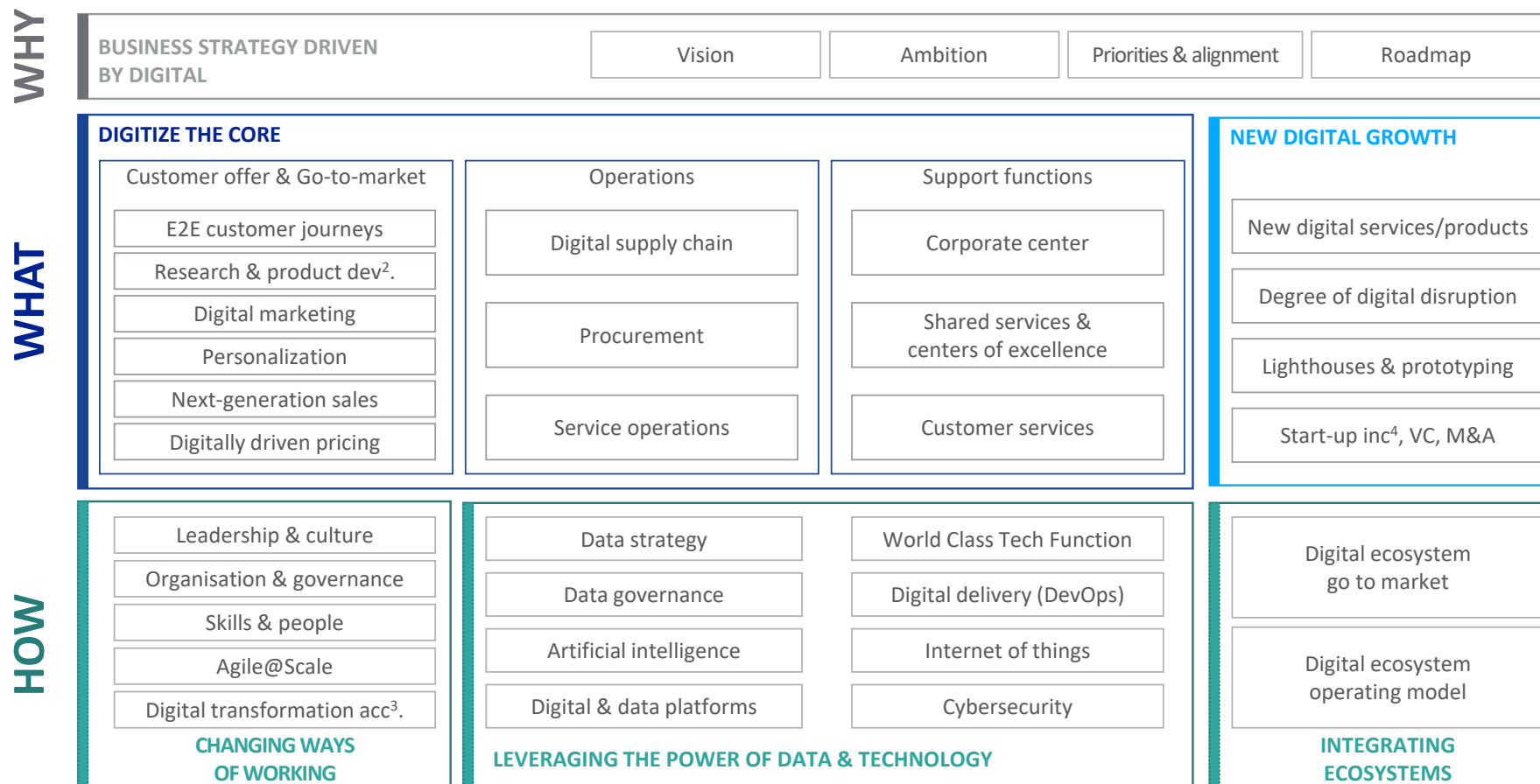
Digital transformation requires a holistic approach and understanding the why, what and how





## Use the DAI<sup>1</sup> to identify your starting point and the gaps in your digital ambitions

Note that the DAI<sup>1</sup> dimensions can be mapped onto the Digital Transformation Framework, helping you to prioritise your digitalisation initiatives



### Start today!

Use the DAI to guide your approach in digitalising your organisation



If you have not taken the DAI survey, refer to Annex A2 for more information on the Self-Assessment Checklist

Also – do participate in the 2021 DAI survey!

1. Digital Acceleration Index 2. Development 3. Accelerator 4. Incubation



## A WHY: A clear vision is essential to ensure your organisation is on board

Set a clear vision that takes into account your business needs and digital ambitions, coupled with realistic milestones. Thereafter, communicate this to **everyone** in your organisation



### Business needs

- Can you **identify current pain points** within your operations, examining end-to-end: both as a customer and as an employee? (e.g. back-and-forth communication with customers, low employee engagement)
- Are there new **competitors that could displace your business/threaten your competitive advantage**. If so, how would you want to respond?



### Inspiration

- Have you looked at **potential technology use cases** that could be applied to your organisation? Refer to Annex A1 if you have not!
- Have you **scanned your business environment for digital inspirations**?



### Pace

- Have you thought **realistically** about how fast your organisation can transform?
- Have you established a timeline that is **bold, but yet pragmatic**?
- Have you used the **self-assessment checklist** to assess the digital maturity of your organisation? Refer to Annex A2 if you have not. Also, **do participate in the 2021 DAI survey!**



## B WHAT: Digital solutions can support your organisation's core business processes

Examine how digital solutions can be deployed across your organisation's work flow to deliver your services more efficiently and effectively

Planning	Can your organisation use <b>data &amp; analytics</b> to optimise workflow – e.g. using data to forecast resources required?
Operations	Can you incorporate the use of technologies to <b>digitalise core business processes?</b> – e.g. automating paper-driven tasks
Commercial activities	Can you leverage on technology to <b>reach new customers?</b> – e.g. using online channels for digital marketing
Support functions	Can <b>you digitalise support functions?</b> – e.g. automating billing

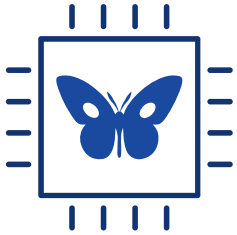
For a more comprehensive list of potential digital opportunities, please see Annex A1





## **C** WHAT: New digital offerings to bolster existing services and potentially establish new revenue streams

Look beyond your current business and see what new services and customers can be served



### Strengthen and disrupt the core

Offer a new service to your existing customers through digital means

- Have you thought about **what other organisations are doing to serve their customers?**
- Does your **customer asking for new services** from you that **you are not providing?**



### Create new businesses

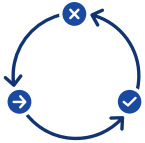
Provide a service to new customers through digital means

- Are there **adjacent businesses** that you could enter into?
- Are there **new technologies** in the market that you could use to provide a service to new customers?
- Are there **new ways of delivering services in other industries** that you could learn from?



## D HOW: Digital transformation requires strong enablers

Securing your organisation's commitment provides a strong foundation for transformation



### Structure & processes

- Is there a clear **ownership structure** that enables focus on innovation?
- Have you considered adopting **agile methodology** for working / project management?
- Are there **KPIs<sup>1</sup>** to foster innovation & entrepreneurship?



### People

- Have you thought of attracting and developing **non-traditional, ICT talent** (e.g. data scientists, UI/UX<sup>2</sup> designers, etc.)?
- Have you considered **build-operate-transfer programs**?



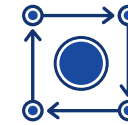
### Data & systems

- Can your systems provide **scalability and modularity** to allow integration?
- Have you anticipated the need for **employee retraining** to avoid the pitfall of anchoring to legacy systems?



### Partner ecosystem

- Besides developing digital solutions in-house, have you considered participating in the broader **maritime innovation ecosystem**?



### Change management

- Have you considered the pace at which your organisation could **adapt and adopt** to the introduction of complex digital technologies?
- How do you intend to convince everyone to **migrate away from existing processes** that are working well today?

1. Key Performance Indicators (KPIs) 2. User Interface/User Experience (UI/UX)

Use the Digital Innovation Implementation Pack provided in the Resources Section to structure your approach

Template

## 4. Risks and mitigants

We recognize the following risks and have developed mitigation plans for them

Potential categories to consider:

Procurement

Funding

Engagement

Advisory and Project Management

Product Development and Research


Template


## 5. Immediate actions required

Potential categories to consider:


	<p><b>Procurement</b></p> <ul style="list-style-type: none"> <li>Shortlist and select vendors (and if applicable, issue RFPs<sup>1</sup>, RQs<sup>1</sup>, etc.)</li> <li>Finalize commercial/technical discussions with said vendors</li> </ul>
	<p><b>Funding</b></p> <ul style="list-style-type: none"> <li>Identify funding support channels and submit funding applications</li> <li>Engage financial institutions (e.g. bank) to obtain funding</li> <li>Plan with internal teams to draw down organisation funds</li> </ul>
	<p><b>Engagement</b></p> <ul style="list-style-type: none"> <li>Socialize and seek support from relevant teams within organisation</li> <li>If applicable, seek regulatory guidance from MPA</li> </ul>
	<p><b>Advisory and Project Management</b></p> <ul style="list-style-type: none"> <li>Seek advisory or consultancy services</li> <li>Seek project management support</li> <li>If applicable, seek mentorship through an accelerator (e.g. PIER71)</li> </ul>
	<p><b>Product Development and Research</b></p> <ul style="list-style-type: none"> <li>Conduct customer interviews to validate pain points</li> <li>Refine product specifications through market testing</li> </ul>

<sup>1</sup> Request for Proposals, <sup>2</sup> Request for Quotations





Assess risks involved and tangible  
immediate actions to start the  
initiative

 Refer to Annex A4 for the Digital Transformation Proposal Template in .PPT format



# 3. Resources

Supporting your digitalisation journey

- Introducing the Self-Assessment Checklist in Annex A2
- Introducing the Digital Transformation Proposal Template in Annexes A3 & A4
- List of programmes and initiatives you can tap on





## If you missed the 2020 DAI survey, we strongly encourage you to start with the Self-Assessment Checklist – and to participate in the 2021 DAI survey!

### About the Self-Assessment Checklist

The self assessment checklist assesses your organisation's digital maturity based on 6 blocks, which collectively comprises 35 dimensions/questions. Answer each question based on your current position and your target in 3 years for your organisation.

While this checklist provides you with a quick assessment, it is not a substitute for the DAI. As such, if you have already participated in the DAI, there is no need to fill out this checklist. There is also little need to conduct this self-assessment more frequently than once a year. We would encourage all organisations to participate in the next edition of the DAI in 2021.

### Things to look out for

The checklist indicates both the current position and the target for your subsector for each of the 35 dimensions. You can use this to compare to your own answers.

Take note of dimensions in which your organisation has the largest gap in (biggest difference in position between current and target), and prioritise your investments /activities to realise your digital ambitions in these areas.

### List of dimensions based on question number

#### Business strategy driven by digital

- 1. Vision
- 2. Ambition
- 3. Priorities and alignment
- 4. Roadmap

#### Digitize the core

- Customer offer and Go-to-market
  - 5. E2E customer journeys
  - 6. Research & product development
  - 7. Digital marketing
  - 8. Personalization
  - 9. Next-generation sales
  - 10. Digitally driven pricing

#### Operations

- 11. Digital supply chain
- 12. Procurement
- 13. Service Operations

#### Support functions

- 14. Corporate center
- 15. Shared services & centers of excellence
- 16. Customer services

#### New digital growth

- 17. New digital services/products
- 18. Degree of digital disruption
- 19. Lighthouses & prototyping
- 20. Start-up incubation, VC, M&A

#### Changing ways of working

- 21. Leadership & culture
- 22. Organisation & governance
- 23. Skills & people
- 24. Agile@Scale
- 25. Digital transformation accelerator

#### Leveraging the power of data & technology

- 26. Data strategy
- 27. Data governance
- 28. Artificial Intelligence
- 29. Digital & data platforms
- 30. World Class Tech function
- 31. Digital delivery (DevOps)
- 32. Internet of things
- 33. Cybersecurity

#### Integrating ecosystems

- 34. Digital ecosystem go to market
- 35. Digital ecosystem operating model

### Abbreviations

Shipping Line	-	SC
Ship Management	-	SM
Ship Agency	-	SA
Harbour Craft	-	HC
Sea Transport (avg.)	-	ST

### Current vs. Target

Current position for average SME	SL	SM	SA	HC	ST
Target state for average SME	SL	SM	SA	HC	ST



Please refer to Annex A2 for the Self-Assessment Checklist

## 1c. Enablers – Understanding what is needed for chosen initiative

Priority grid by dimensions<sup>1</sup>

Gap to target maturity state<sup>2</sup>

High	Low
<ul style="list-style-type: none"> <li>• 8</li> <li>• 20</li> <li>• 35</li> </ul>	<ul style="list-style-type: none"> <li>• 3</li> <li>• 16</li> <li>• 18</li> </ul>
<ul style="list-style-type: none"> <li>• 6</li> <li>• 27</li> <li>• 30</li> </ul>	<ul style="list-style-type: none"> <li>• 1</li> <li>• 22</li> <li>• 32</li> </ul>
<ul style="list-style-type: none"> <li>• 9</li> <li>• 21</li> </ul>	<ul style="list-style-type: none"> <li>• 2</li> <li>• 29</li> <li>• 7</li> <li>• 32</li> </ul>

Business strategy driven by digital

- 1. Vision
- 2. Architecture
- 3. Priorities and alignment
- 4. Roadmap

Digitalize the core

- 5. E2E customer journey
- 6. Network & product development
- 7. Digital portfolio

Changing ways of working

- 21. Learning & working
- 22. Organization & governance
- 23. Digital culture
- 24. Digital literacy
- 25. Digital innovation ecosystem

Leveraging the power of data & knowledge

- 26. Data strategy
- 27. Data governance
- 28. Artificial intelligence

Template

## 1b. and 1c. Detailed description of initiative and enablers required

Low

High

1. Process Dimension

Introduction to the product or solution

- (Dummy text to be included)
- (Dummy text to be included)
- (Dummy text to be included)

Measurable benefits of the product

- (Dummy text to be included)
- (Dummy text to be included)
- (Dummy text to be included)

Enablers required & impact to current processes

- (Dummy text to be included)
- (Dummy text to be included)
- (Dummy text to be included)

Success stories globally

- (Dummy text to be included)
- (Dummy text to be included)
- (Dummy text to be included)

- Brief introduction & history of the initiative
- What is the underlying technology?
- Who will use the product? (e.g. Internal use, clients, ...)

- Outline the key benefits and tie back to DAI dimensions
- Make benefits measurable – e.g. The solution is projected to reduce error from XX% to XX%, saving \$XX

- Describe enablers required and what is needed to set them up
- Outline changes in processes; consider using a process/flow chart to describe the changes

- Alleviate "fears" by showing proof that others have done it – and more so if they have done it well!



## 2. Implementation Plan

Project will span [x weeks] from [x]

Activity	2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 1	█	█	█	█				
Activity 2			█	█				

1x Project Manager  
1x Data Scientist  
2x Business Developer

## 3. Financials

[xx] capital required; breakeven in [x]

Financial impact (SGD '000)

Initiative will be profitable in [2022-2024]

Initiative will cost [xx] in [year]... [2021]

Initiative will breakeven on initial investment in (month and year) [2024]

Legend: █ CAPEX investment, — Profit/Loss, - - - Cumulative profit / loss



Template

## 4. Risks and mitigants


We recognize the following risks and have developed mitigation plans for them

Potential categories to consider:

Template

### 5. Immediate actions required

Potential categories to consider:

	<b>Procurement</b>	<ul style="list-style-type: none"> <li>• Shortlist and select vendors (and if applicable, issue RFPs', RQs', etc.)</li> <li>• Finalize commercial/technical discussions with said vendors</li> </ul>
	<b>Funding</b>	<ul style="list-style-type: none"> <li>• Identify funding support channels and submit funding applications</li> <li>• Engage financial institutions (e.g. bank) to obtain funding</li> <li>• Plan with internal teams to draw down organisation funds</li> </ul>
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	<b>Advisory and Project Management</b>	<ul style="list-style-type: none"> <li>• Seek advisory or consultancy services</li> <li>• Seek project management support</li> <li>• If applicable, seek mentorship through an accelerator (e.g. PIER71)</li> </ul>
	<b>Product Development and Research</b>	<ul style="list-style-type: none"> <li>• Conduct customer interviews to validate pain points</li> <li>• Refine product specifications through market testing</li> </ul>

1. Request for Proposals 2. Request for Quotations

SSA MPA MPA MPA ECG





# List of support channels and resources

Do you have these questions about digitalisation? We are ready to help!

## Questions that you may have



Strategy

- How does digitalisation **fit into our overall business**?
- What does a **digital roadmap** look like?
- How do we **convince the organisation** to digitalise?



Prioritise and kickstart

- How and what do we **get started on**?
- Are there **examples of what other organisations have done** that we can use to get inspiration?
- How do we **prioritise what area** to start digitalising?



Funding and procurement

- Where can we find **maritime-specific software**?
- We're still using paper – is there **basic software** that can help?
- Is the Government able to **defray costs** in certain areas?
- We have an idea – where am I able to **find funding**?



Talent and upskilling

- We're **struggling with hiring of tech talent** – where could we find them?
- Are there **courses available** to upskill our team?
- Are there **guides** that spell out the skills required?



Develop and implement

- We have an idea, who should we approach to **develop the solution**?
- Can a **team work with us** to digitalise our operations?
- Are there **maritime-focused accelerators**?



Partnerships & Ecosystems

- How could we **learn from others** in driving digitalisation?
- I have an idea and I don't mind **partnering others** to co-develop the solution. Where should I go?
- What **digital platforms** should I plug myself into?

## Available avenues of support

- Learn from leading experts by attending industry events (e.g. Singapore Maritime Technology Conference, SSA Tech & Demo Day)
- Upskill yourself on digital strategy, operations technology road mapping, and change management with co-funding support from [SkillsFuture Series](#)
- To understand global use cases, and how your peers are prioritising their digitalisation efforts, refer to the Global Technology Scan section (see above; more details in annexes)
- Leverage [Sea Transport Industry Digital Plan](#) to holistically understand digital roadmap & solutions
- Get bespoke advice from an expert through the [SME Digital Tech Hub](#)

- [Maritime Innovation and Technology \(MINT\) Fund](#) provides up to 50% on qualifying expenses related to maritime R&D and maritime technology product development
- [Maritime Cluster Fund \(Productivity Development\)](#) provides up to 70% co-funding support on qualifying expenses for customisation of maritime solutions
- [Sea Transport Industry Digital Plan Grant](#) and [Productivity Solutions Grant](#) provide up to 70% co-funding (\$30k cap per FY) for local SMEs to adopt pre-approved maritime sector-specific solutions and generic business capability solutions respectively

- Search for talent through [MyCareersFuture.sg](#) and [Maritime Singapore Connect](#)
- Groom in-house talent through [Maritime Cluster Fund \(Training@MaritimeSingapore\)](#) or [Tech Skills Accelerator \(TeSA\)](#), which provide co-funding support for training courses and on-the-job training (for TeSA only)
- [Skills Framework for Sea Transport](#) and [Skills Framework for ICT](#) provide reference job descriptions and skills requirements for key maritime and ICT job roles

- Get matched with solutions providers via the [Maritime Innovation Opportunities](#)
- Get help on digital project management services under [SME Go Digital Programme](#)
- Participate in [PIER71 activities](#), [MINT Fund Call-for-Proposals](#) and [MPA Joint Industry Programmes](#)

- Join the [Circle of Digital Innovators \(CDO\)](#) network
- Form a consortium under the [Partnerships for Capability Transformation \(PACT\)](#) scheme
- Onboard existing ecosystem platforms (see next page)



# List of programmes and initiatives to support your digitalisation journey

Click on the links below to find out more!

## Raising Awareness

### Events & Seminars

- MPA – [Singapore Maritime Technology Conference](#)
- SSA – [Tech & Demo Day](#)
- SMF – [Maritime D/Coded Tour](#)
- SMI – [SMI Forum, Seminar, Breakfast Series](#)
- IPI – [TECHINNOVATION](#)

### Digital Resources

- SMI – [Singapore Maritime R&D Roadmap 2030](#)
- IMDA/ESG/MPA – [Sea Transport Industry Digital Plan](#)<sup>1</sup>
- ESG – [Tech Depot @ SME Portal](#)
- IPI – [Online Marketplace](#)
- WEF – [Redesigning Trust Toolkit](#)

### Advisory & Consultancy

- [Singapore Business Federation \(SBF\)](#)
- Association of Small and Medium Enterprises (ASME) – [SME Digital Tech Hub](#)
- ESG – [SME Centres](#)
- IPI – [Innovation Advisors Programme](#)
- SMEs Go Digital – [Digital Project Management](#)<sup>1</sup>

## Building Digital Capabilities

### Digital Roadmapping

- A\*STAR – [Operations & Technology Roadmap \(OTR\) Programme](#)<sup>1</sup>

### Technology Development

- MPA – [Maritime Innovation & Technology \(MINT\) Fund](#)<sup>1</sup>
- A\*STAR – [Tech Access](#)

### Technology Deployment/Customisation/Adoption

- MPA – [Maritime Cluster Fund \(Productivity Development\)](#)<sup>1</sup>
- IMDA/ESG/MPA – [Sea Transport Industry Digital Plan](#)<sup>1</sup>
- ESG – [Productivity Solutions Grant \(PSG\)](#)<sup>1</sup>
- SMEs Go Digital – [Pre-approved / Start Digital Solutions](#)<sup>1</sup>
- A\*STAR – [A\\*ccelerate](#)

### Talent Recruitment

- IMDA – [Tech Skills Accelerator \(TeSA\)](#)<sup>1</sup>
- SMF – [Maritime Singapore Connect Office](#)
- WSG – [MyCareersFuture.sg](#)

### Talent Development

- IMDA – [Tech Skills Accelerator \(TeSA\)](#)<sup>1</sup>
- SSG – [SkillsFuture Series](#)<sup>1</sup>
- WSG – [Professional Conversion Programme \(PCP\) for ICT](#)<sup>1</sup>
- [Skills Framework for Infocomm Technology](#)
- [Skills Framework for Sea Transport](#)

## Partnering and Plugging In

### Innovation Platforms

- SMI – [R&D Grant Call](#)<sup>1</sup>
- MPA – MINT Fund/[Call-for-Proposals \(CFP\)](#)<sup>1</sup>
- MPA – MINT Fund/[Joint Industry Programme \(JIP\)](#)<sup>1</sup>
- MPA – [PIER71](#)<sup>1</sup>
- MPA – Maritime Innovation Workshop
- [Maritime Living Labs](#) (MPA, PSA, JP)
- [Maritime Centres of Excellence \(COEs\)](#)
- IMDA – [Open Innovation Platform \(OIP\)](#)<sup>1</sup>
- ESG – [Partnerships for Capability Transformation \(PACT\)](#)<sup>1</sup>
- [PSA UnboXed](#)

### Digital Platforms

- Customs – [Networked Trade Platform \(NTP\)](#)
- MPA – digitalPORT@SG™
- MPA – [Singapore Maritime Data Hub \(SG-MDH\)](#)
- PSA – [Portnet](#)
- JP – [JP Online](#)

### Standards Development

- IMDA – [TradeTrust](#)

## Networks & Communities

MPA – [Circle of Digital InnOvators](#) | MPA – [Circle of HR InnOvators](#) | SSA – [Digital Transformation Committee](#)

1. Government co-funding will be provided for qualifying activities/expenses for these programmes

2. URL links are updated as at May 2020. Readers are advised to refer to the respective organisation's websites for latest information on the various initiatives, programmes and schemes.



## 4. A Digital Vision for Maritime Singapore

# Our Digital Vision: Enhanced Connectivity with Open Innovation and Digital Talent

A digitalized Maritime Singapore is crucial to our ambition of establishing Singapore as a **Global Maritime Hub for Connectivity, Innovation, and Talent**.

## Connectivity

A digitalised Maritime Singapore will strengthen the collaboration capabilities of maritime communities through common data standards and systems interoperability; and will thereby enhance global supply chain efficiency and resiliency. From sales booking to network planning; from voyage operations to cargo operations; from technical management to crew management; maritime companies will be digitally connected from one end to the other, providing seamless services to their customers. At the ecosystem level, communications among players across the maritime value chain, in Singapore and abroad, will be streamlined as information will be shared expeditiously in standardised formats through open, trusted, secure platforms.

## Innovation

A digitalised Maritime Singapore will embrace open innovation and drive the development of maritime technologies that enhances efficiency, safety, and sustainability of maritime operations. Maritime companies will also be at the forefront of product and service innovation - adopting omni-channel approaches in marketing of freight and offering hyper-customised, frictionless experience for cargo owners and shippers.

## Talent

A digitalised Maritime Singapore will have a multi-skilled workforce that embraces big data analytics, marine cyber-physical systems (e.g. sensors networks, remote monitoring and control, digital twins) and autonomous systems (e.g. unmanned vessels, hauliers & trucks, drones). A learning and innovative maritime workforce will develop new products and services using agile and design thinking methodologies; and leverage upon their extensive industry knowledge with deep technical skills in ensuring the safe and efficient delivery of supply chain solutions.

[#DigitalMaritimeSG](#)



“

We see an acceleration of digital adoption in the past months due to the ongoing COVID-19 pandemic. Disruption and digitalisation will be the new normal for the maritime industry. Many digital technologies that were once considered impossible, are now ubiquitous in our daily lives. These technologies are also being deployed in the maritime space improving efficiency, safety and, in the longer term, sustainability. MPA has been partnering industry players including our SMEs to drive digital transformation. The Maritime Digitalisation Playbook is yet another Maritime Singapore effort to bring the industry to the next level, which will better position ourselves in the recovery phase.



**Ms. Quah Ley Hoon**

Chief Executive  
Maritime and Port Authority of  
Singapore

“

The Maritime Digitalisation Playbook (MDP) is a joint private-public initiative reflecting the efforts that the SSA is bringing to the industry. We are mindful that some companies may find it daunting to embark on the digital journey. MDP is a materialisation of SSA's thought leadership for the industry - to help companies, especially SMEs, map out business priorities vis-a-vis the digitalisation landscape. We do not want anyone to be left behind, and we strongly encourage our members and maritime companies to take heed of MDP. I call on all CEOs and owners to utilise the checklist and template to help identify their companies' target gaps. Do tap into the plentiful and useful information under the Resource Section, such as support programmes and initiatives available to companies, to achieve your digitalisation vision.



**Ms. Caroline Yang**

President  
Singapore Shipping Association

“

Harnessing digital technologies is an important strategy for Singapore's sea transport sector to maintain our competitiveness as a global transshipment hub. IMDA is supporting our partners MPA and SSA in this effort through initiatives such as the Maritime Digitalisation Playbook, the Digital Acceleration Index and Industry Digital Plans. Maritime companies can make use of these programmes to digitalise their business models and processes, and integrate more tightly with a rapidly transforming global economy.



**Mr. Tan Kiat How**

Chief Executive Officer  
Infocomm Media Development  
Authority

# Acknowledgements

The Steering Committee would like to thank the working committee for their dedication and effort in driving the Digital Acceleration Index (DAI) study and creation of the Maritime Digitalisation Playbook (MDP)

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