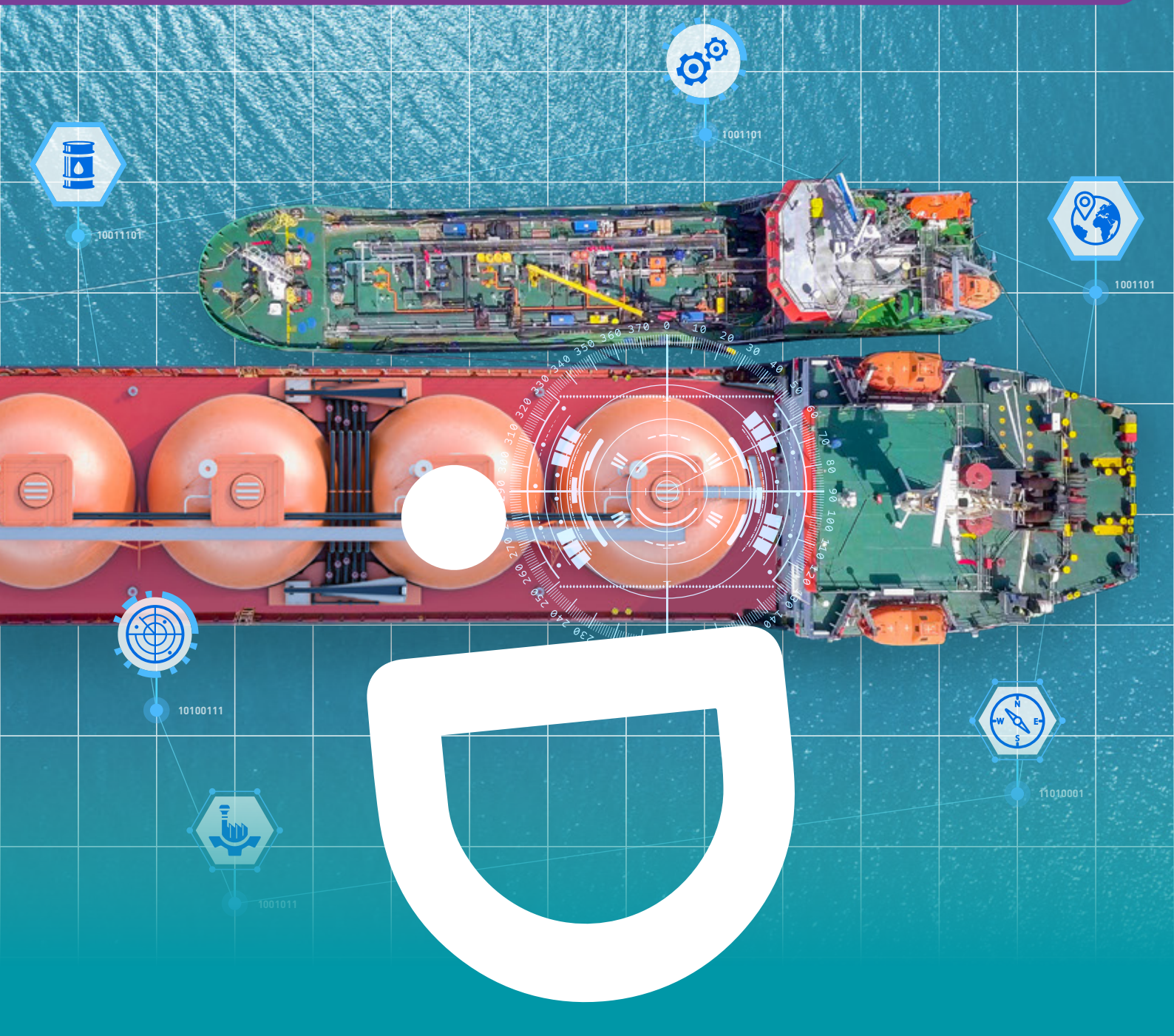


SEA TRANSPORT (BUNKERING) | INDUSTRY DIGITAL PLAN

A Guide for Small and Medium Enterprises (SMEs) to Assess Their Digital Readiness and Opportunities to Go Digital



Sector lead:



In Support of:



Supported by:



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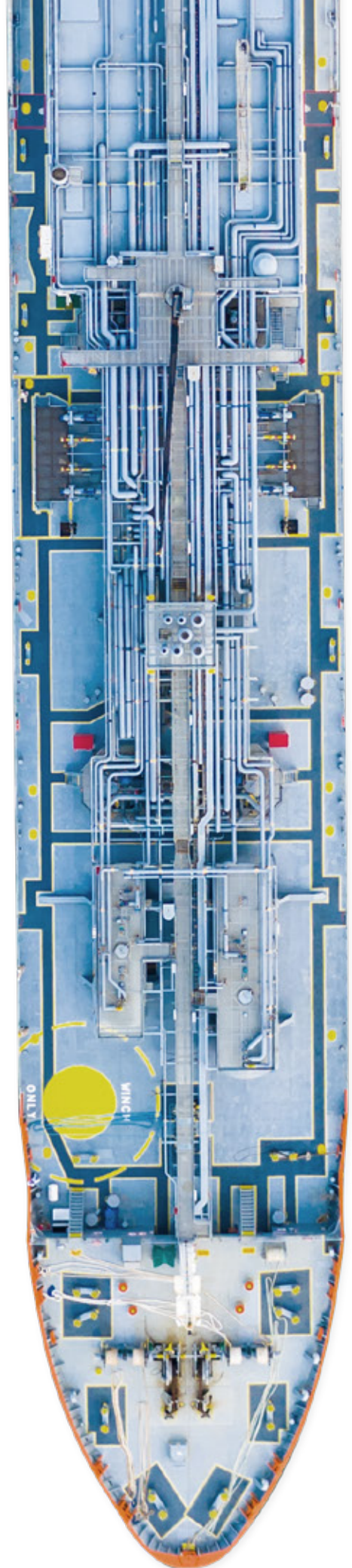
DIGITAL SKILLS
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GET STARTED
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OUR SEA TRANSPORT INDUSTRY

The Sea Transport industry, which comprises the port, port services, shipping and maritime services sub-sectors, is a key pillar of the Singapore Maritime Cluster, which:



Employed about
170,000
workers

Handled
37.2 million
TEUs² in container
volume in 2019

Contributed about
7%
of Singapore's GDP¹

**INTERNATIONAL
MARITIME CENTRE**
Shipping & Maritime Services

Home to about
5,000
Maritime Establishments

GLOBAL HUB PORT
Port Operations & Marine Services

¹GDP refers to Gross Domestic Product
²TEUs refer to Twenty-foot Equivalent Units

Source: Maritime & Port Authority of Singapore (MPA)

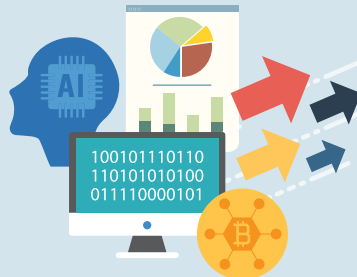
TRENDS IMPACTING SEA TRANSPORT



Intensifying competition from key ports and maritime centres

More intense competition from regional ports that are expanding (eg. Klang, Tanjung Priok) and aspiring maritime centres (eg. Dubai, Shanghai) drive the need for our sea transport sub-sectors to improve their operational efficiency.

Source: Maritime & Port Authority of Singapore (MPA)



Accelerating pace of technological advancements

The acceleration of technology advancements, e.g. data analytics, Internet-of-Things, artificial intelligence, blockchain, smart sensors, and robotic process automation, brings opportunities for greater productivity.



Shrinking local workforce, rising costs and more educated workforce with higher aspirations

Tighter labour market, rising manpower costs and higher aspirations of a more educated workforce increase the need for well-trained workers, who can leverage technologies to optimise resources, streamline and simplify business processes.

INDUSTRY TRANSFORMATION MAP (ITM)

The Sea Transport Industry Transformation Map (ITM) was launched in January 2018. Developed by the Maritime and Port Authority of Singapore (MPA) in partnership with the industry, unions and other government agencies, the Sea Transport ITM builds on MPA's strategic long-term plans to develop Singapore's next-generation port and strengthen our International Maritime Centre (IMC).

Specific initiatives have been laid out under the Sea Transport ITM to catalyse innovation, drive productivity improvements and enhance the skills of the maritime workforce.

Source: Sea Transport Industry Transformation Map



Click [here](#) or scan this QR code for more details on the Sea Transport ITM

SMEs GO DIGITAL

Aligned to the ITM, the Industry Digital Plan (IDP) is part of the SMEs Go Digital programme that helps make going digital simple for SMEs.



SMEs GO DIGITAL

3 STEPS TO GO DIGITAL



For more information

Scan the QR code or visit
www.imda.gov.sg/SMEsGoDigital

Support available

- Chief Technology Officer-as-a-Service (CTO-as-a-Service)
- Industry Digital Plans
- Pre-Approved Solutions
- Start Digital
- Grow Digital
- Advanced Digital Solutions
- Government Grants e.g. Productivity Solutions Grant (PSG)

1 | Is your business digital-ready?

Find out using the Industry Digital Plan (IDP) for your sector.

2 | How do you get started?

Take up pre-approved solutions with grant support.

3 | Where can you get help?

Access the CTO-as-a-Service for support.

SMEs Go Digital comprises the following:

CTO-as-a-Service

Assess your digital readiness, explore digital solutions and request for digital advisory and project management services.

INDUSTRY DIGITAL PLANS (IDP)

Step by step guide on digital solutions and training required at each stage of your business growth.

PRE-APPROVED SOLUTIONS

Proven off-the-shelf digital solutions pre-approved by IMDA to meet your business needs. Government grants, e.g. Productivity solutions Grant (PSG), are available for the adoption of these solutions.

START DIGITAL

Foundational digital solutions for new SMEs to get a head start in going digital.

GROW DIGITAL

Leverage Business-to-Business (B2B) and Business-to-Consumer (B2C) e-commerce platforms to go international, without a physical presence overseas.

ADVANCED DIGITAL SOLUTIONS

Advanced and integrated digital solutions to help you strengthen business continuity and build longer term resilience.

DIGITAL ROADMAP FOR BUNKERING

This Digital Roadmap serves as a guide for your business as you embark on your digital journey.

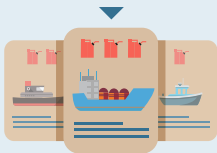
STAGE 01

GETTING READY FOR THE DIGITAL ECONOMY

Streamlined Operations
Optimised Resources



Bunker Barge Planning System



Bunker Fuel Data Profiling



Bunker Sales Management



Video Surveillance and Monitoring System

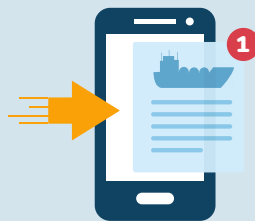
STAGE 02

GROWING IN THE DIGITAL ECONOMY

Integrated Insights
Collaborative Ecosystem



Advanced Vessel Management



Electronic Bunker Delivery Note (e-BDN)

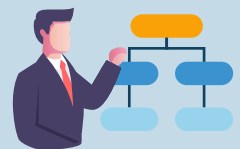
STAGE 03

LEAPING AHEAD

Autonomous Operations
Intelligent Business



Blockchain for Bunkering Transactions



Just In Time (JIT) Platform



Smart Vessels

BUSINESS CAPABILITIES

Accounting Management, Human Resource Management, Customer Relationship Management, Sales Management, Inventory Management, Fleet Management and Cybersecurity

Note: The roadmap will be progressively updated to reflect the advent of new digital tools and technologies for the industry.

STAGE 01

GETTING READY FOR THE DIGITAL ECONOMY

Streamlined Operations, Optimised Resources

Streamline and integrate your business processes to enhance productivity and efficiency



DIGITAL SOLUTION

SOLUTION DESCRIPTION

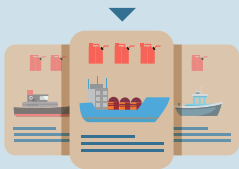
BENEFITS



Bunker Barge Planning System

Auto-schedule bunker barges (according to vessels' estimated time of arrival (ETA) and fuel type), track bunker barges and customers' vessels, and a dashboard to analyse barges performance.

- Schedule bunker barges dynamically according to vessels' ETA instead of manually through spreadsheets
- Enable the ease of tracking of bunker barges' positions and monitoring their performance



Bunker Fuel Data Profiling

Automate data from Mass Flow Meter (MFM) for further analysis, such as to plot charts and flag out anomalies.

- Enable off-site monitoring on MFM and/or quality sensor data for better visibility over bunkering processes

Note: These solutions cannot be used in place of requirements to show proof of regulatory compliance.



Bunker Sales Management

Automate request for quotation, manage order and purchase, nomination details and schedules (i.e. vessel name, quantity, fuel type, bunker time and location, etc.), and a dashboard to analyse profit margin.

- Improve the management of sales and purchase processes
- Provide insights on customers' details, credit worthiness and buying history
- Enable the ease of generating performance reports
- Reduce costly omission and data entry error



Video Surveillance and Monitoring System

Manage external/internal surveillance of vessels to monitor the safety of crews and pump operations, using tamper-proof camera with night vision capability. Key features include real-time off-site and/or on-demand monitoring.

- Improve access to real-time monitoring
- Minimise disputes in the event of incident and insurance claims
- Reduce pilferage of cargo/fuel

STAGE 02

GROWING IN THE DIGITAL ECONOMY

Integrated Insights, Collaborative Ecosystem

Enable integrated insights through collaborative ecosystems to maximise business value



DIGITAL SOLUTION



Advanced Vessel Management

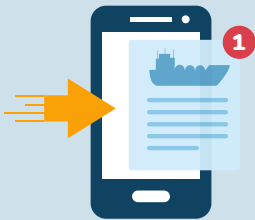
SOLUTION DESCRIPTION

Facilitate vessel management through advanced features including:

- Monitoring of fuel consumption, speed, travel distance, engine performance, engine vibration, sound, temperature, etc.
- Maintenance of records.

BENEFITS

- Optimise vessel performance and maintenance to reduce operating cost



Electronic Bunker Delivery Note (e-BDN)

Digitalise bunker delivery note, with data fields auto-populated from the MFM, endorsed with secure electronic signatures and forwarded to relevant parties.

- Increase the productivity of stakeholders involved in the supply chain and minimise the possibility of data entry error
- Provide instantaneous transfer of bunkering data to both buyers and sellers

STAGE 03

LEAPING AHEAD

Autonomous Operations, Intelligent Business

Deploy autonomous robots and advanced technologies to maximise business value and impact



DIGITAL SOLUTION



Blockchain for Bunkering Transactions

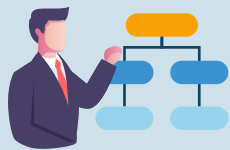
SOLUTION DESCRIPTION

Enable end-to-end bunker transactions for tracing bunker quality and quantity.

Note: Solution may also include synthetic markers or Deoxyribonucleic acid (DNA) tags to track bunker fuel at every stage of its supply chain.

BENEFITS

- Provide an accurate means for tracing bunker quality and quantity
- Enable the detection of fuel-related anomalies and malpractices



Just In Time (JIT) Platform

Facilitate real-time information sharing within the port community for better coordination of port activities.

- Optimise port resources and operational efficiency
- Minimise unnecessary emission and fuel wastage
- Improve schedule reliability and supply chain visibility



Smart Vessels

Use high degree of automation and sensors on-board smart vessels.

Key features include:

- Automated mooring system
- Automated navigation system
- Integrated platform management system

- Improve safety and reduce the number of incidents
- Increase productivity with the reassignment of crew to perform higher value-added tasks

DIGITAL SKILLS NEEDED

Bunkering job roles will evolve to meet the changing needs of customers and support the growth of companies. Upskilling of workers helps companies to harness the potential of digital technologies, and remain competitive and relevant.



ALL USERS

Require broad-based digital literacy and awareness

ADVANCED USERS

Require higher proficiency digital skills

“TECH BASICS” SKILLS

Broad-based innovation mindset and digital literacy/awareness

SkillsFuture Singapore (SSG) funded broad-based courses e.g. Skills Future for Digital Workplace

“TECH ADVANCED” SKILLS

Higher proficiency level digital skills

Training mapped to the Skills Framework for Sea Transport and Information and Communication Technology (ICT)

Examples of job roles



Bunker Trader



Bunker Surveyor





Bunker Operations Manager

DIGITAL SKILLS NEEDED

DIGITAL ROADMAP ON TRAINING



	STAGE 01 GETTING READY FOR THE DIGITAL ECONOMY	STAGE 02 GROWING IN THE DIGITAL ECONOMY	STAGE 03 LEAPING AHEAD
"TECH BASICS" COURSES Require broad-based digital literacy and awareness	Introduction to Bunkering Operations with Digital Capabilities <ul style="list-style-type: none"> • Introduction to information management for Bunker Supply Chains • Mindset Transformation for Workplace • Maritime Cyber Security (Basic) Training Programme • Fundamental Data Analysis using Excel 2016 • Introduction to Data Analytics and Applications • Robotic Automation Process • Appreciation of IoT and Data Management • WSQ Fundamentals of the Personal Data Protection Act • HR for Non-HR Managers • Relationship Marketing & Digital Customer Relationship Management • Effective Digital Marketing and Sales • Stakeholder Relations 	Leveraging information management for Bunker Supply Chain <ul style="list-style-type: none"> • Intermediate Robotic Process Automation • Introduction to AI and Machine Learning • Practitioner Certificate in Personal Data Protection (Singapore) Preparatory Course • Fundamentals of Drones/Unmanned Aerial Vehicle (UAV) • Leveraging digital technology to streamline operational effectiveness and enhance information flows 	Optimising information management for Bunker Supply Chain <ul style="list-style-type: none"> • Robotic Process Automation Implementer • Introduction to Data Analytics and Applications • Advanced Operations of Drones/Unmanned Aerial Vehicles • Transforming business and processes with Blockchain
"TECH ADVANCED" COURSES Require higher proficiency digital skills	Vendor Solution Specific Training <ul style="list-style-type: none"> • Data Storytelling • Tableau Desktop I and Desktop II • DS102: Data Analytics with Python • Certified Deep Learning Specialist 	Vendor Solution Specific Training <ul style="list-style-type: none"> • Certified Data Analytics (R) Specialist • Deep Learning and Machine Learning with TensorFlow • Advanced Data Analytics and Machine Learning with R 	Vendor Solution Specific Training <ul style="list-style-type: none"> • AWS Big Data Specialist • Wiley Certified Data Analyst

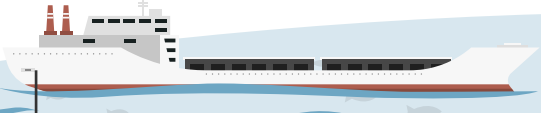


 These training programmes are aligned to Skills Framework and emerging areas under SkillsFuture Series

"Tech Basics" Course Directory: <https://www.sp.edu.sg/pace/sea-transport-industry-digital-plan>

"Tech Advanced" Course Directory: <https://www.myskillsfuture.gov.sg/content/portal/en/training-exchange/course-landing.html>

GET STARTED TODAY

You will be supported at every stage of your digital journey, through three simple steps:



1 | Is your business digital-ready?

Find out if you are digital-ready by using the IDP resources [here](#) or scan the QR code.



Sea Transport IDP



CTO-as-a-Service

- Tap on the [CTO-as-a-Service](#) to complete your Digital Readiness Self Check in the web app and select from the recommended digital solutions that best meet your business needs.

2 | How do you get started?



SFEC

- Visit the [MPA](#) website to contact solution providers to procure and implement digital solutions. If funding support is required, apply for Sea Transport IDP Grant.
- Apply for training subsidies under the [SkillsFuture Enterprise Credit \(SFEC\)](#).



Maritime & Port Authority of Singapore

3 | Where can you get help?



SME Centre

- Tap on the [CTO-as-a-Service](#) for digital consultancy and project management services.
- Visit [SME Centre](#) if you require business advisory.

ADDITIONAL INFORMATION



FOR SME

DIGITAL CONSULTANCY & SOLUTIONS

CTO-as-a-Service
go.gov.sg/CTOaaS

SMEsGoDigital
<https://imda.gov.sg/SMEsGoDigital>

GoBusinessGovAssist
<https://govassist.gobusiness.gov.sg/productivity-solutions-grant>

MPAWebsite
<https://www.mpa.gov.sg/web/portal/home/maritime-companies/research-development/industry-digital-plan>

BeSafeOnline
https://www.csa.gov.sg/~media/csa/documents/publications/be_safe_online/be_safe_online_handbook.pdf

BUSINESS ADVISORY

SME Centres managed by Trade Associations

- SME Centre@ASME
- SME Centre@SCCCI
- SME Centre@SICCI
- SME Centre@SMCCI
- SME Centre@SMF

<https://www.enterprisesg.gov.sg/smecentre>
 Enterprise Infoline: +65 6898 1800

FOR ICM VENDORS

SMEs Go Digital
<https://www.imda.gov.sg/icmvendors>

FOR INDIVIDUALS

CAPABILITY UPGRADING & CAREER FACILIATION

Institute of Higher Learning
<https://www.sp.edu.sg/pace/sea-transport-industry-digital-plan>

Course Directory
<https://www.myskillsfuture.gov.sg/content/portal/en/training-exchange/course-landing.html>

Fundamentals for Future Economy
<https://www.skillsfuture.gov.sg/digitalworkplace>

Skills Framework
<https://www.skillsfuture.gov.sg/skills-framework>

Sea Transport Skills Framework
<https://www.skillsfuture.gov.sg/skills-framework/sea-transport>

TechSkills Accelerator (TeSA)
<https://www.go.gov.sg/TeSA>

WSG's Careers Connect
<http://www.wsg.gov.sg/career-services.html>

WSG PCP
<https://conversion.mycareersfuture.sg/Portal/ProgramListing.aspx?source=PCP>

WSG's MyCareersFuture
<https://www.mycareersfuture.sg>

e2i Centres
<http://e2i.com.sg/app>

Maritime Singapore Connect
<https://www.maritimesgconnect.com>

MPA pre-approved courses
<https://www.mpa.gov.sg/web/portal/home/maritime-companies/setting-up-in-singapore/developing-manpower/training-maritime-singapore>

MPA Academy
<https://www.mpa.gov.sg/web/portal/home/mpa-academy>

#SGDIGITAL

Singapore Digital (SG:D) is a nation-wide movement to unify Singapore's digitalisation efforts. Whether it is help for different industries to start their digitalisation journeys, or creating new ecosystems, opportunities and capabilities for the future, SG:D is set to take us ahead as a leading digital global node. The :D smiley face icon in the logo signifies the optimism of Singaporeans advancing together with digital innovation. As we progress into the digital economy, it is all about the people - the heart of all we do.



imda.gov.sg/sgdigital



twitter.com/IMDAsg
twitter.com/MPA_Singapore



facebook.com/IMDAsg
facebook.com/MPA.SG



youtube.com/IMDAsg
youtube.com/mpasmw



instagram.com/imdasg
instagram.com/maritime_sg



linkedin.com/company/imdasg
linkedin.com/company/mpasingapore

The content of this guide is provided for informational purposes only and is correct as of February 2022.

