AN ECOSYSTEM-CENTRIC APPROACH TO SMARTER MARITIME

SINGAPORE'S PERSPECTIVE

Maritime and Port Authority of Singapore

A highly connected and efficient port, and a vibrant maritime ecosystem are key factors leading to the success and growth of Singapore's port and maritime industry. Working hand-in-hand with industry, trade associations and unions, the Singapore Government pushes ahead with many transformational initiatives to remain relevant to world's maritime industry and global economy.

This includes significant investments in port infrastructure (physical and digital) to ensure that Singapore retains its position as a global hub port and leading maritime centre. Today, the Port of Singapore continues to be one of the leading container hub ports in the world. Last year, Singapore was the second busiest container port with 36.6m TEU handled. As the world's top bunkering port, the annual bunker sales hit the 49.8 million-tonne mark.

Beyond a physical port, Singapore is also home to one of the highest concentrations of international shipping groups and a wide range of maritime services. Singapore is also the 5th largest ship registry in World, and widely recognised as a leading IMC in international benchmarking studies such as 'The Leading Maritime Capitals of the World' study by Menon Economics and 'Xinhua-Baltic Exchange International Shipping Centre Development Index' where Singapore clinched the top position.

Singapore leverages on her strategic location situated at the cross-roads of East-West trade to serve as a key node in Southeast Asia that connects to more than 600 ports in global supply chains, with about 1000 ships in the Singapore port waters at any point of time. Much has evolved from Singapore's beginnings as a small trading post. Today, Singapore constantly adapts and strives to remain relevant to the ever changing global trends in shipping, cargo movements and trade flows, driven by market forces, technologies and innovations. How can Singapore ride the waves of change and to contribute to a smarter maritime, while fulfilling its mission of developing Singapore as a premier global hub port and International Maritime Centre?

DRIVING FORCES OF SMARTER MARITIME

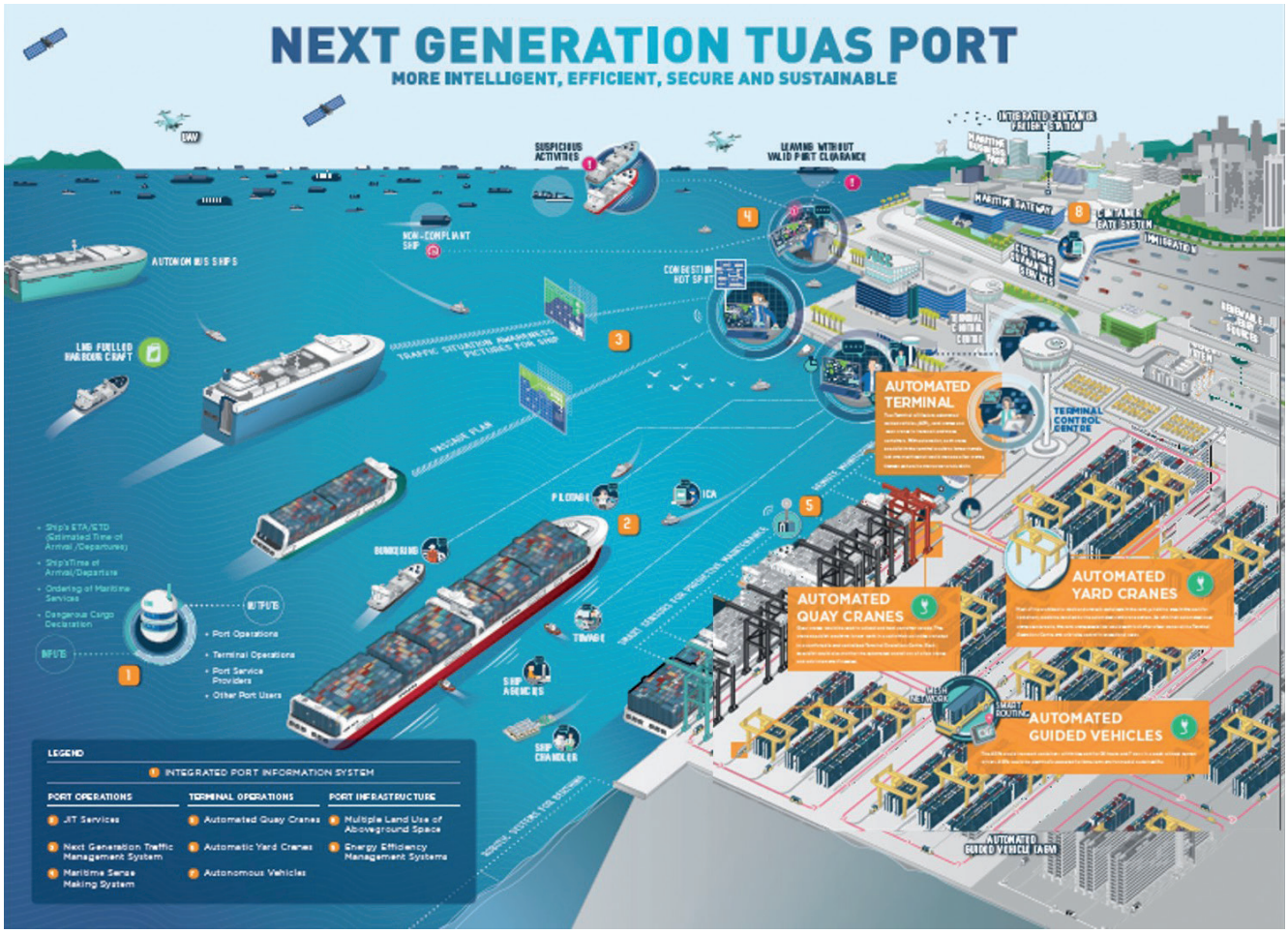
Singapore sees 3Ds – Digitalisation, Decarbonisation and Disruptions as the three areas that Singapore can contribute to a smarter maritime.

Increasing demands for connectivity and emergence of newer technologies, fuels and business models have made Singapore rethink the way we serve the maritime industry globally. Rapid and pervasive technological changes have precipitated new innovations and business models in nearly every industry. Maritime is no exception, with ports becoming more automated, ships becoming smarter with a wide array of sensors on board, and the rise of new business models such as marketplace and digital platforms.

Equally challenging is to bring on board talents for our maritime industry to stay smart and relevant.

SINGAPORE'S INDUSTRY TRANSFORMATION MAP

Faced with these challenges and opportunities, Maritime and Port Authority of Singapore (MPA) partners with the



Singapore's next generation port

industry, trade associations, unions and other government agencies to set out to chart a set of strategic blueprints called the Sea Transport Industry Transformation Map (ITM). It galvanises the maritime ecosystem to co-create Maritime Singapore's future - one that is smarter. The Sea Transport ITM builds on MPA's strategic long term plans to develop Singapore's next generation port (Next Generation Port 2030) and IMC (IMC2030).

Since the launch of the Sea Transport ITM in early 2018, specific initiatives have been laid out under the Sea Transport ITM to catalyse innovation, drive productivity improvements, as well as enhance the skills of the maritime workforce.

In particular, in the area of innovation, MPA has worked alongside various stakeholders in the maritime ecosystem, including industry, start-ups, technology partners and institutes of higher learning, to develop and implement the Sea Transport ITM. This will ensure the port of Singapore is well-positioned to tap on the technology developments, to innovate and identify solutions that can help us to achieve a smarter maritime.

At the same time, riding the wave of digitalisation and smart shipping in the maritime sector, Singapore will look at digitalising maritime documentation including electronic bills of lading, as well as pilot applications of blockchain technology. This will enhance information exchange to and from the port, thus facilitating smoother trade flows. Singapore's Maritime Single Window project further supports this strategy, by having a single window portal to digitally report and submit all port-related documentations, thereby improving efficiency for the maritime industry.

As vessels are getting smarter and larger, amidst growing industry consolidation, Singapore is making a strategic move by investing ahead of demand in developing a larger port in the western part of the island that will double her handling capacity to up to 65m TEUs. Not only will this port be able to effectively serve the mega shipping alliances, it will also leverage new technologies to push the envelope of port connectivity, efficiency and intelligence.

The Next Generation Port (NGP) 2030 initiative at the western end of Singapore (Tuas) is an opportunity for Singapore to build a technologically advanced hub port through the innovative use of technologies. It will be developed along four key thrusts - efficient port, intelligent port, safe and secure port, and green and community-oriented port. This includes enhancing the value chain of operations covering port operations and marine services on the sea, wharf-side services within the terminals, and the transport and logistics network in the hinterland using a new generation of technologies including robotics, automation, artificial intelligence and digitalisation. One such example is the Just-in-Time initiative, which enhances ship turnaround time in the port and optimises the planning of port services and resources. The NGP 2030 plan seeks to deliver compelling value for container shipping lines, to continue to keep Singapore relevant as a global hub port.

In view of land and sea space and manpower constraints, Tuas Port will leverage technologies including automation and modelling and simulation to optimise port land use for greater productivity. A mix of innovative policies and infrastructures will allow for greater sea space optimisation. Smart and connected systems leveraging data analytics and artificial intelligence will enhance the safety and security of vessels in port waters, to help us meet future demands of larger vessels calling at ports.

Overall, Tuas Port seeks to be a test-bed for innovative concepts and game-changing technologies that will set the Port of Singapore apart from competition and maintain Singapore's position as a premier global hub port and leading IMC.

ECOSYSTEM CENTRIC APPROACH IN INNOVATION

Underlying the innovation initiatives described above is MPA's ecosystem centric approach driven by three key strategies to drive competitiveness and new growth areas:

i) Deepening R&D capabilities in key strategic areas
ii) Grow maritime start-ups and technology enterprises
iii) Develop the MPA Living Lab

DEEPENING R&D CAPABILITIES IN KEY STRATEGIC AREAS

The Maritime R&D Roadmap 2025 was launched in 2019. It is jointly led by MPA and the Singapore Maritime Institute, with the involvement of IHLs, Industry and Technology Partners to consolidate R&D focus areas and technology needs of the maritime industry. The Roadmap charts out key thrusts for the research community to channel their R&D efforts, and helps to create better strategic alignment and resource allocation by funding agencies, industry and our research and technology communities. It outlines the following five strategic research thrusts: Efficient and Intelligent World-Class Next Generation Port, Strategic Sea Space and Maritime Traffic management, Smart Fleet Operations and Autonomous Vessels, Effective Maritime Safety & Security and Sustainable Maritime Environment & Energy, setting a clear direction for all stakeholders to focus their efforts on.

Centres of Excellence (COE) were also established, each focusing on specific research thrusts/areas, to develop and maintain a long-term quality pool of maritime researchers and specialised R&D capabilities. This includes co-development of a Maritime R&D Roadmap to chart future directions for capability development.

Since then, three research centres have been set up so far: a S$10million research centre set up for maritime energy and sustainable development in Nanyang Technological University (MESD @ NTU), an S$18million research centre in port operations modelling and simulation in National University of Singapore (C4NGP @ NUS) and the latest addition of a S$10million research centre in maritime safety in Singapore Polytechnic (CEMS @ SP). An upcoming research centre in autonomous and smart ships is also in the pipeline to take Maritime Singapore to a higher level of capabilities.

GROW MARITIME START-UPS AND TECHNOLOGY ENTERPRISES

MPA and NUS Enterprise collaborated to develop the first industry-wide acceleration programme, PIER71 (Port Innovation Ecosystem Reimagined). Located at Block 71 (Singapore), a designated space for the co-location of technology start-ups, it is a start-up incubator and accelerator that seeks to grow and strengthen the start-up ecosystem (Figure 2), to enhance the vibrancy of Singapore's maritime innovation ecosystem.

Figure 2: Start-up Ecosystem

PIER71 will be an important platform that brings together maritime enterprises and technology start-ups, to facilitate the process of mapping the problem statements to innovative technology solutions.

Its flagship programme, Smart Port Challenge (SPC) is a 5-month long competition that entails maritime enterprises working together through design thinking workshops to curate quality challenge statements. These challenge statements are brought to the start-up communities and mentors from the industry to allow cross pollination of ideas and solutions. All this will culminate in a pitching day after 10 weeks.

DEVELOP THE MPA LIVING LAB

The MPA Living Lab provides a technology partnership platform, with sufficient scale and real operating conditions in the port of Singapore that technology providers and industry partners can plug into for the co-development and piloting of innovations.

The MPA Living Lab also offer technology developers and industry partners a rich maritime data platform and a real operating environment at the port to co-develop and pilot innovative solutions.

To that end, it consists of both physical test bed areas at designated anchorages to facilitate the trials of technology development such as drones, autonomous ships, and communication technologies, and a cyber-test bed area where innovative projects such as remote pilotage, next-generation vessel traffic management, and maritime data hubs are housed and experimented.

THE WAY FORWARD

Singapore has identified that to drive a smarter maritime, a closer tripartite relationship between the government, industry and labour movement is of paramount importance.

Underpinning Singapore's success are sound pro-business and forward-thinking policies, strategic bets and bold investments in technology and manpower for capability development.

It may be timely to consider Singapore as the ideal location to bring together the right players in the maritime innovation ecosystem to co-create another hub – the maritime digital hub, to value add to the global supply chain. This is where maritime solutions of the future are created, where the best maritime talent can converge, and where Singapore can be the preferred node for connectivity, innovation and talent.

ABOUT THE ORGANIZATION

The Maritime and Port Authority of Singapore (MPA) regulates and licenses port and marine services and facilities. It also manages vessel traffic in the Singapore port while ensuring safety and security. The port section contains information, guidelines and procedures on matters relating to the port and its operations. The shipping section covers information on how to register a ship under the Singapore flag,as well as manning guidelines, procedures and requirements for owners and masters of Singapore-registered ships. MPA also posts circulars and notices to update the port and shipping community. Also important to the communities are information on port, shipping and other MPA tariffs. Available for download and reference is the maritime legislation of Singapore.

ENQUIRIES

www.mpa.gov.sg/web/portal/home