TRANSFORMATION

PORTS
TRANSFORMATION
PAST AND FUTURE

HUTCHISONPORTS

Hutchison Ports celebrates its 50th anniversary in an enviable position as the world's leading port network. That success arises from an expansive vision that sees more than docks, quays, cranes and containers. The future will see the ports group growing by leading a technological and human transformation in the logistics industry. The technologies in play and the people that develop them are at the core of this global powerhouse.

Throughout its history, Hutchison Ports has consistently displayed creativity in management and has shared its best practices across its global operations. Space constraints in the home base of Hong Kong led to innovative, super-high container stacking methodologies that still influence modern practice. Rapid adaptation to the era of container shipping saw the Port of Felixstowe leapfrog past its competitors to become the biggest port in the UK. And Hutchison Ports developed its own Terminal Operating System, nGen (See *Sphere* 32). But there is more to come. Much, much more.

THE NEW ERA: SMARTER, LEANER, FASTER

Hutchison Ports' focus on efficiency and exploring new potential sites for development was wildly successful in putting its operations across the planet.

The future transformation of the ports group's fortunes is focused on technology-led efficiencies that drive cost reductions and environmentally friendlier ways of working. Standardisation made possible through nGen will amplify the impact of successful innovations and best practices and make the most of economies of scale, in particular through shared services. New digital technologies will be integrated with nGen and other operations. Automation of vehicles and equipment will be a big part of the story. New ideas combined with experience will deliver a transformed future for Hutchison Ports – even a SMARTer future.

STANDARDISATION IS SMART

SMART isn't just an adjective – it's a formal programme of transformation. The SMART Network Strategy has four major

components that complement one another: Standardisation, Automation, Digitisation and Organisation. Understanding these elements is crucial to understanding how Hutchison Ports is changing everywhere, from headquarters and the dockside to integrated logistics platforms and customer service centres.

At the heart of Hutchison Ports terminal operations is the nGen system. First created in 2003 and deployed in Yantian, it has spread across the ports group's network. It is the nervous system – the brain, spinal cord and network of nerves – of Hutchison Ports. Constantly upgraded, it is the key to standardising best practices and implementing new technologies across the entire network of ports.

While the business may look simple – containers on, containers off, done – those in the ports game know that the truth is anything but that. High volumes, local rules and regulations, business culture and historical realities make each port unique in how it operates. However, a great deal more can be done to implement best practices. nGen enables the delivery of those best practices across the ports network.

Trying to determine how to integrate best practices with a bewildering array of highly customised local systems in acquired businesses would present any normal company with a monumental and complex task. However, nGen provides a framework and connectivity that vastly simplifies that process – one that is being used across the Hutchison Ports network. Starting from only one port in 2003, nGen has grown and it handled 55% of all throughput in 2018. The plan is to achieve 70% by 2022.

The benefits are real. Savings of up to 20% have been realised in the past five years alone, compared to using off-the-

shelf software. More importantly, nGen is customised to enable it to play an integral role in establishing Hutchison Ports' standard way of doing business, enabling the ports group's rapid expansion and the roll-out of the other elements of the SMART plan as they come into play i.e. Automation, Digitisation, and Organisation.

AUTOMATIC FOR THE PEOPLE

Prior to the container age, working on the docks was arduous work, with weather-beaten men hurt by loose cargo falling out of hoisted nets. Containers made the work infinitely safer, but crane workers still need to ascend to great heights to work in a cabin.

The new era of automated and remote-control technology is being implemented across Hutchison Ports' operations. It is bringing safety, health and comfort benefits to workers, enabling diversity in the workforce, and dramatically increasing the efficiency of operations.

The Rubber-Tyred Gantry Crane (RTGC) is the most commonplace equipment in the container yard storage areas of the world. They have become eco-friendlier in recent years as new RTGCs are now

Hutchison Ports has consistently displayed creativity in management.

electric powered. But they still need an operator on top of a crane for hours. Hutchison Ports began converting cranes into semi-automated remote-control (RC) cranes in the early 2010s in Hong Kong. Remote-Control Quay Cranes (RCQC) were introduced in 2015 in the company's Saudi Arabia operations, where high temperatures can be crushing. Thailand is the next frontier, with both RCQCs and RC RTGCs coming into play.

These remote-control cranes are quickly accepted by the workers, taking them out of the crane cabins and placing them in air-conditioned offices. Formerly, the profession was dominated by male operators. But now, a more diverse workforce can be recruited to operate these cranes. And all operators can benefit from nGen helping them with the loading and unloading of containers.

"J.A.R.V.I.S., MOVE THAT CONTAINER PLEASE"

The *Avengers'* Iron Man, aka Tony Stark, had his onboard computer assistant, J.A.R.V.I.S., to help him keep track of systems and help him out in a pinch. Likewise, semi-automated crane operations help operators do their jobs, improving overall efficiency.

There are automated and semi-automated cranes that port operators can choose from today. Combined with RC tech, semi-automation can help workers do their jobs

better and more efficiently. For example, semi-automated RC RTGCs can help almost every crane operator achieve the two-minute loading/unloading standard expected of an expert operator.

The next step is, of course, fully automated cranes that can do the jobs by themselves. Think *Iron Man 3* when J.A.R.V.I.S. delivered a host of over 20 specialised Iron Man suits programmed and battle-ready to assist Tony Stark. New cranes can be programmed to find, pick up and deliver a container with assistance from artificial intelligence (AI) technology. This includes fully automated straddle carriers in some ports. The road map for development in Laem Chabang, Thailand, has recently seen the ports group invest US$600 million in a range of automated and semi-automated RC cranes, showing

> **Remote-control cranes are quickly accepted by the workers, taking them out of the crane cabin and placing them in air-conditioned offices.**

the way for the rest of Hutchison Ports. In addition to new cranes, a transformation at pavement level is taking place as traffic control, signage and more are being changed to allow the co-mingling of driverless and people-driven vehicles.

It may seem eerie watching from the ship, as driverless vehicles patiently wait for apparently unmanned cranes to deliver containers to them before they manoeuvre around container parks and away. But those operations deliver big savings – up to 60% for RC RTGCs versus traditional RTGCs. Fully automated cranes may deliver even bigger savings. J.A.R.V.I.S., feel free to handle the containers as you see fit!

DIGITISE TO LOCALISE – AND GLOBALISE

nGen is the nerve network of the Hutchison Ports operations – and far beyond. All those automated machines will have to plug into, and communicate with, systems that talk to every part of global operations. Beyond that, they will need to speak to the rest of the entire logistics world.
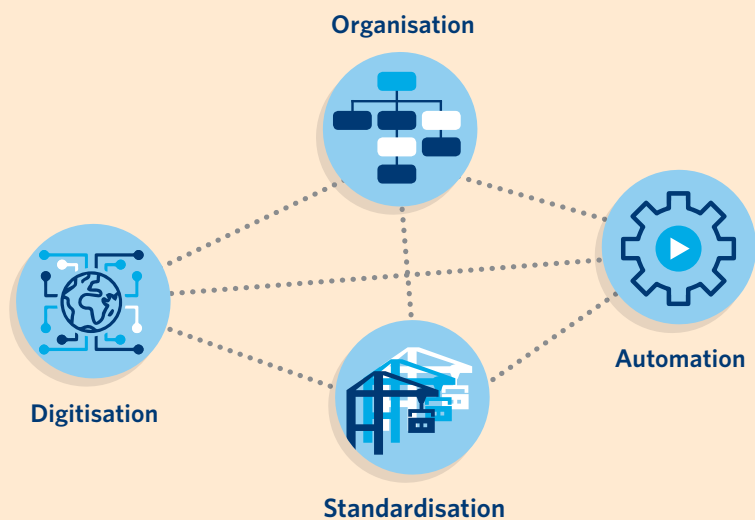
Part of the digitisation story is the demand to connect to the different players and platforms in different countries. Government bodies, like customs departments, are among the most important seeking data from nGen. Preparations are also underway to connect nGen to the new Global Shipping Business Network platform, and it also has Electronic

SMART NETWORK STRATEGY

Organisation

Automation

Digitisation

Standardisation

Data Interchange protocols in place to speak to shipping line customer software, tractor appointment systems, mobile services for truckers coming to port, and more.

All this effort in digitisation brings big savings. Transfer of data – with industrial-grade safeguards to protect private information – to approved parties can be made instant, seamless and paperless, eliminating wasted time and anxiety for logistics partners and their clients throughout the logistics chain.

SOMETHING FOR EVERYONE

Of course, clients don't need to see and access the entirety of the nGen system. They have their own specific needs and concerns. For them, Hutchison Ports is constantly developing nGen-compatible systems to cater to their specific situations.

An example of this is the development of the Landside Digitisation Programme (LDP) to be implemented at Gateway Terminals in the Middle East and Africa terminals. Local shippers, agents and consignees normally queue up at on-site cashier counters with mounds of documentation and cash in hand. With LDP, documents can be scanned and submitted online, and the system takes care of the container booking and delivery processing. Forget risky cash transport; all payments will soon be made online.

And that's just for the customers. Truckers registered on the system arrive at the port, book appointments for delivery and pickup by smartphone, do their administration at an electronic kiosk, and get an e-receipt at the end of the process.

In Mexico, customers are data hungry and so Hutchison Ports has developed SmartPort to feed them. Data analytics and processing and real-time container tracking are all part of the online services. If customers have questions, a chatbot can answer them. It's good for the ports group too; up to US$1 billion savings are expected to be delivered through digitisation in Mexico's port operations alone.

In the UK, different demands resulted in different solutions. The Port of Felixstowe and other UK ports have a deep integration with rail and road connections. Logistics partners there wanted to optimise the inland planning of laden and empty transport legs by truck, barges, and rail. PARIS, the intermodal transport optimisation software developed and supported by Hutchison Ports in the high-tech Cambridge cluster, provides real-time transportation automated planning and optimisation.

AI CAN LIFT CONTAINERS – AND EXPEDITE DECISION-MAKING PROCESSES

With the advent of high-speed Internet connections, it makes sense that the ports group could centralise most data in the hands of highly trained experts to provide for deeper learning and better coordination. This concept is being tested in the new Regional Operations Centre (ROC) in Karachi, Pakistan. Moving forward, Hutchison Ports will develop the use of AI and algorithms to further optimise the efficient handling of data at its second ROC, which is to be developed in South East Asia. AI will read emails and documentation to

extract information from data for automatic stowage planning capabilities. Centred in the middle of the Asian region and its many time zones, it will still be possible to have vital people watching over the data, ready to step in when necessary and whenever needed. Where late-night shift work requires people to work non-natural hours, a centralised system will allow more people to put in a healthier working day.

THE SMART WAY FORWARD

From Standardisation through connectivity with nGen, and now the first ROC, the spread of best practice and efficiency in operations will flow. Automation means helping people to do their jobs better and, ultimately, a streamlined, skilful workforce. Digitisation links together the entire logistics supply chain and allows for customised platforms to take care of customer needs and to drive more efficiencies. At the heart of this change are the people of Hutchison Ports, who are driving this transformation to create an efficient supply chain that uses the most advanced and constantly evolving technology to propel global trade forward.

Onwards to the next 50 years – and beyond! □

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UK

The Netherlands

Spain

Pakistan

China

Shenzhen

Hong Kong

Thailand
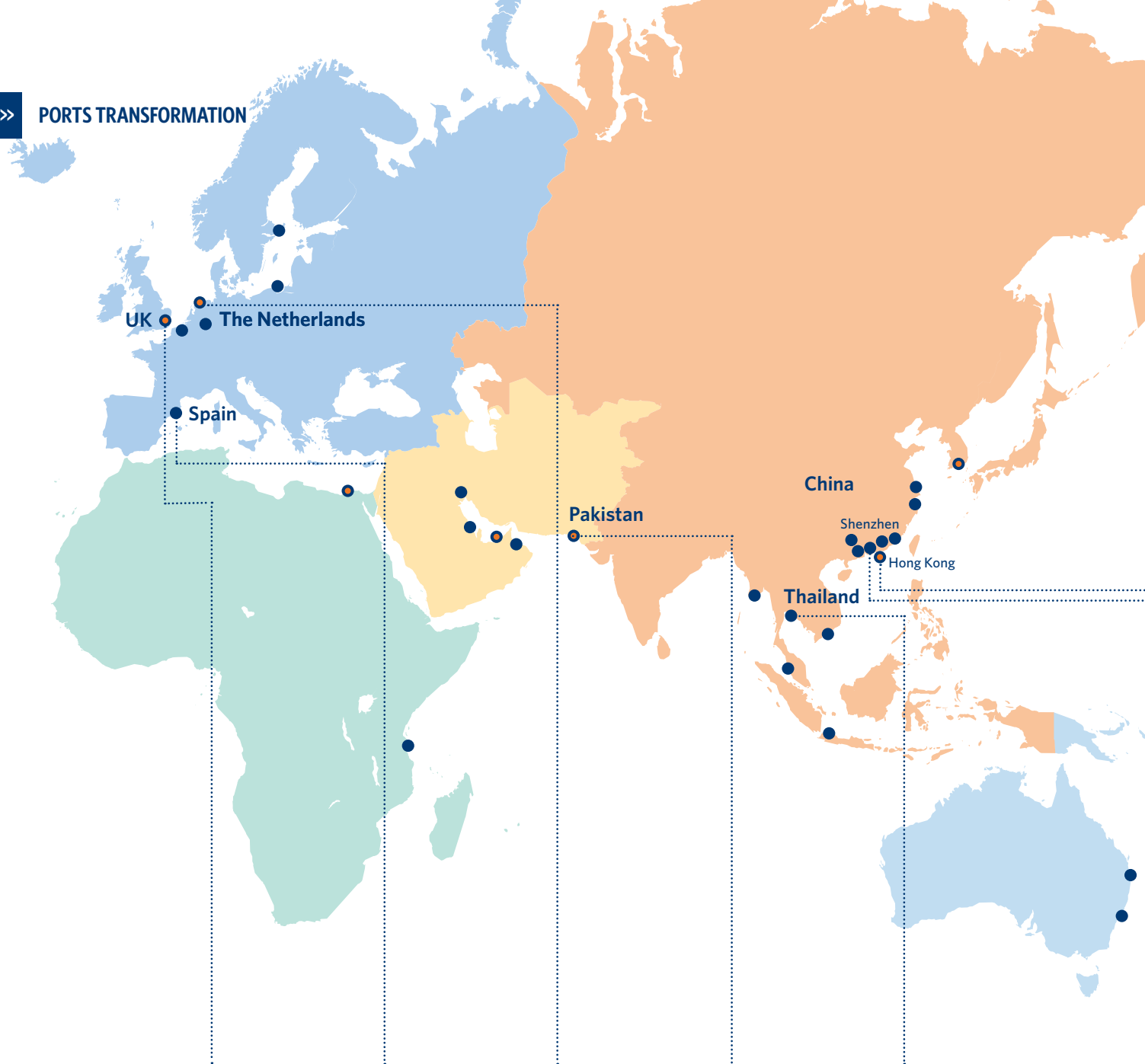
Early adopter, technology creator

The advent of the container saw the Port of Felixstowe, one of the busiest ports in the UK, take to the new technology to reaffirm its status as the "Port of Britain". PARIS, the market-leading intermodal transport optimisation software, was jointly developed and supported in the mid-90s by Hutchison Ports (UK) and partners from Cambridge.

The path to automated ports ...

Opened in Spain in 2012, Hutchison Ports BEST is the ports group's first semi-automated deep-water container terminal and the most technologically advanced port development project. Semi-automated equipment improves efficiency and safety and is a stepping stone to more complete automation.

... across Europe and beyond

Hutchison Ports acquired the first fully automated terminal – ECT – in the Netherlands in 2002. Then in 2008, the ECT Euromax Terminal commenced operation. It was designed for fast, safe and efficient handling of the biggest container ships. Both terminals laid the foundations for the adoption of automated terminal operations across the ports group.

Centralised thinking for regional operations

Hutchison Ports Pakistan established the first Regional Operations Centre in 2018. It will centralise stowage planning delivery for both terminals in Pakistan and will extend it to service other terminals within Hutchison Ports' regional network.

Remote control for safety and efficiency

Terminal D in Laem Chabang, Thailand became the world's first container terminal to deploy both Remote-Control Quay Cranes and Rubber-Tyred Gantry Cranes in 2019, improving efficiency, safety and worker welfare.

TECHNOLOGY ROADMAP

Mexico

● Single Port   ◉ Multiple Ports
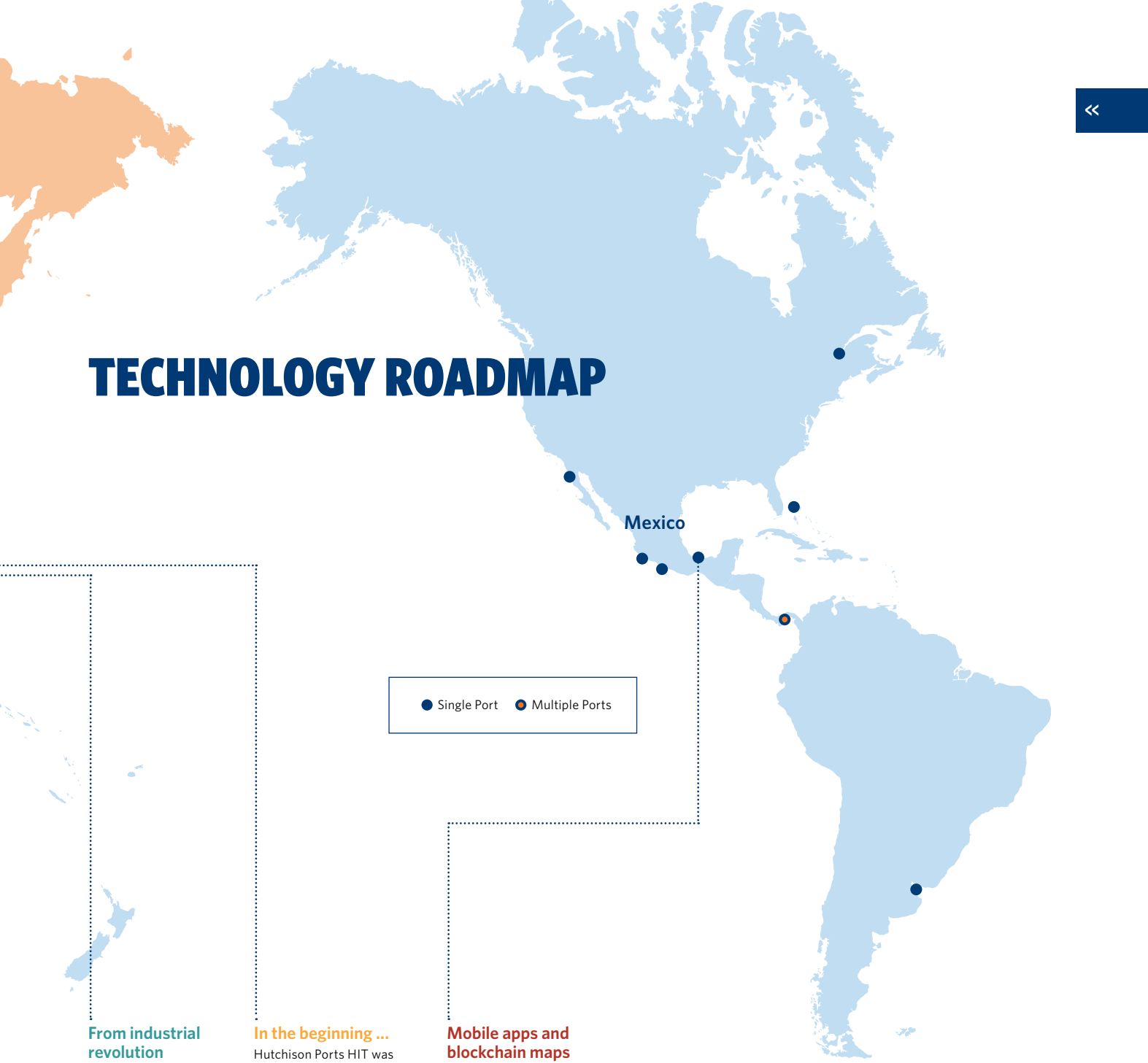
From industrial revolution to software innovation

China boomed as economic reform saw manufacturing experience explosive growth. Shenzhen was ground zero in this industrial revolution, and Hutchison Ports Yantian was established in 1993. nGen was first deployed in Yantian in 2003, leading the way to its global adoption by Hutchison Ports. The terminal continues its innovation and developed its award-winning Multi-vessel Optimisation System.

In the beginning ...

Hutchison Ports HIT was founded in 1969 to provide cargo and container handling in Hong Kong. HIT innovated from the start. Limited space led to the development of sophisticated container tracking and industry-beating stacking in the 1960s and 1970s. These creative practices still influence modern container stacking. nGen, the company's proprietary Terminal Operating System, was born here in 2003.

Mobile apps and blockchain maps

The Americas are home to Hutchison Ports operations in Mexico and the birthplace of the SmartPort mobile software for data-hungry clients, partners and logistics connectors. Since 2015, the Port of Veracruz has run smoother through a range of mobile technologies that create a holistic view of logistics for all its partners. The Port is now collaborating with local partners to explore blockchain solutions to improve security and trade efficiency.