

ARE PORTS MORE IMPORTANT THAN CAPITALS?



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The New Geography of Power: Seaports,
Sovereignty, and Strategic Competition

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SUMMARY

The port has become the functional capital; the capital remains the sovereign one

80% OF WORLD TRADE BY VOLUME MOVES BY SEA	4.9% OF PORTS HANDLE HALF OF MARITIME EXPORTS	20.3 MILLION BARRELS A DAY PASS HORMUZ
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Capitals remain the seat of sovereign authority, but they are no longer the only place where national power is decided. As the measure of state survival moves from territorial control toward supply-chain sovereignty, the seaport has become the material engine of the state: the point at which trade, industry, energy, data and naval logistics all come ashore.

The scale of that dependence is not marginal. Maritime transport carries roughly 80 per cent of global trade by volume and about 70 per cent by value, and container throughput has passed 900 million TEUs. A small number of terminals mediate this traffic: fewer than five per cent of ports handle half of all maritime exports, and the seven largest operators run about 40 per cent of global container-terminal capacity.

Concentration is what makes ports strategically consequential — and what makes them fragile. Around 20.3 million barrels of oil a day pass through a single strait. Red Sea insecurity lengthened the average voyage by 8.5 per cent without a single formal closure. Reported maritime cyber incidents roughly doubled between 2024 and 2025. In each case the damage is done by altering expectations, not by stopping every ship.

The study argues against the binaries that dominate the debate. Foreign investment is neither automatically benign nor a debt trap: of forty Chinese sovereign-debt renegotiations reviewed, thirty-nine ended in write-offs, deferrals or restructuring, and none in seizure. Equally, a commercial concession is not strategically neutral — it can

create financial, operational, informational and standards dependence, and latent military option value, long before any naval flag appears.

The conclusion is not that the port displaces the capital. It is that the two form a single unit of analysis. The port concentrates the state's physical connection to the world; the capital concentrates the legal and political capacity to govern that connection. Where the two are integrated, maritime infrastructure produces resilience and reach. Where they are disconnected, the port becomes a single point of failure — or an instrument of someone else's strategy.

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Abbreviations

1MDB	1Malaysia Development Berhad
AED	United Arab Emirates dirham
AI	Artificial intelligence
APM	APM Terminals, the terminal operator of A.P. Moller-Maersk
COSCO	China Ocean Shipping Company
COVID-19	Coronavirus disease 2019
CSIS	Center for Strategic and International Studies
DP World	Dubai Ports World
FDI	Foreign direct investment
GDP	Gross domestic product
GPS	Global Positioning System
IEA	International Energy Agency
JAFZA	Jebel Ali Free Zone Authority

LNG	Liquefied natural gas
MPA	Maritime and Port Authority of Singapore
MSC	Mediterranean Shipping Company
NATO	North Atlantic Treaty Organization
PLA	People's Liberation Army
PLAN	People's Liberation Army Navy
PRC	People's Republic of China
PSA	PSA International, formerly the Port of Singapore Authority
TEU	Twenty-foot equivalent unit, the standard container measure
UAE	United Arab Emirates
UNCLOS	United Nations Convention on the Law of the Sea, concluded 1982
UNCTAD	UN Trade and Development
US	United States

Glossary

Bathymetric survey

Measurement of seabed depth and terrain. The study treats it as dual-use because the same data serves navigation, cable routing, submarine operations and amphibious planning without changing form.

Berth

The place at a quay where a vessel is moored and worked. Length, depth alongside and reinforcement determine which classes of ship a port can take, which is why the study reads them as engineering indicators.

Blue-water navy

A navy able to sustain operations far from its own coast. The study's argument is that this capacity rests on access to ports abroad, not only on the fleet itself.

Bunkering

The supply of fuel to ships. A bunkering hub earns revenue from vessels that never load or discharge cargo there, which is one of the ways a port acquires importance disproportionate to its throughput.

Chokepoint

A strait or canal through which a large share of maritime traffic must pass because the alternatives are much longer or dearer. The study treats it as consequential through the expectations it creates, not only through physical closure.

Concession

A contract granting a private or foreign operator the right to build or run a terminal for a fixed term while the host state retains sovereignty. The study argues a concession is not strategically neutral, and equally not a transfer of ownership.

Debt-trap diplomacy

The thesis that lending is extended in order to seize the asset it financed when the borrower defaults. The study rejects it on the recorded evidence, and does not replace it with the opposite claim that port lending is strategically inert.

Dual-use infrastructure

Infrastructure that is economically justified in peacetime and militarily useful in a crisis. The study insists capability, access and intent are separate questions and that establishing one does not establish the others.

Grey zone

Activity deliberately kept below the threshold of armed conflict, where the legal character of what is being done is contestable. In this study it covers survey vessels, port calls and data collection rather than force.

Hinterland

The inland area a port serves, and the road, rail, pipeline and inland waterway connections that reach it. The study treats hinterland depth as part of the port's strategic value, not a separate transport question.

Innocent passage

The right to pass through a coastal state's territorial sea without prejudicing its peace or security, subject to conditions the coastal state may enforce. Weaker than transit passage, with which the study contrasts it.

Latent military option value

The reduction in the time, cost and political difficulty of obtaining future naval support that a commercial presence creates. The study uses it in place of asking whether a port 'is' a base, and states that it guarantees nothing in a crisis.

Lawfare

The use of lawful administrative and regulatory powers – inspection, certification, customs, sanctions enforcement – to produce strategic effects that would otherwise require coercion.

Military-civil fusion

A framework under which civilian infrastructure is expected to avoid foreclosing future military use and to contribute to national strategic capacity. The study treats it as the clearest statement of the commercial-military continuum, not as proof of intent in any one project.

Network centrality

How much of the maritime network's traffic depends on a given node. The study's concentration figures are measures of centrality, and it is centrality rather than size that makes a port strategically consequential.

Operational technology

The control systems that run cranes, gates, terminals and vessel traffic, as distinct from the corporate information systems beside them. The study treats the boundary between the two as the principal cyber risk in a port.

Port state control

The authority a state exercises over foreign vessels calling at its ports – safety inspection, environmental compliance, documentation. The study reads it as leverage that can be applied selectively without any formal denial of access.

Redundancy

Alternative ports, berths, power supplies, communications and inland routes held against disruption. The study argues redundancy is expensive precisely because it looks inefficient in normal conditions.

Smart port

A port whose operations are coordinated through sensors, data platforms and automated systems. The study's point is that the same integration that raises throughput also concentrates the consequences of a failure of data integrity.

Transshipment hub

A port where containers are moved between vessels rather than into the local economy. Its influence comes from being difficult to replace, and its exposure from the fact that its traffic can reroute if users lose confidence.

Transit passage

The non-suspendable right of continuous and expeditious passage through straits used for international navigation, created by Part III of UNCLOS. Warships and state aircraft are included; submarines may transit submerged.

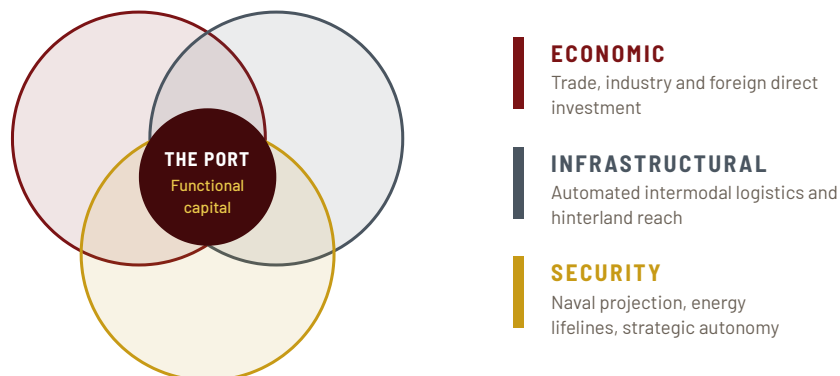
Introduction

Introduction

Capital cities have historically been revered as the undisputed epicentres of political authority, the administrative hubs of governance, and the symbolic embodiments of a nation's sovereign identity. For centuries, traditional geopolitical doctrine dictated that these inland, terrestrial hubs were the sole arenas from which the military strength and diplomatic intent of the state were projected into the international system. However, in the contemporary era of hyper-globalisation, the historical primacy of the political capital is being fundamentally challenged by a profound geographic and systemic shift. As the defining metric of state survival transitions from strict territorial control and the deployment of standing armies to "supply chain sovereignty", commercial seaports are rapidly evolving far beyond their legacy roles as mere concrete interfaces between land and sea. Today, they operate as the functional and economic capitals of the modern state—dynamic, multidimensional engines of geopolitical leverage that dictate a nation's integration into, or isolation from, the global hierarchy.

Influence in the twenty-first-century strategic landscape is no longer solely dictated by treaties signed behind closed doors in legislative halls. Instead, it is increasingly governed by the uninterrupted, highly concentrated flow of physical goods, critical energy resources, and the digital intelligence transmitted through subsea cables that predominantly land at these coastal gateways. The empirical reality of global commerce unequivocally underscores this monumental shift: maritime transport currently handles approximately 80 percent of global trade by physical volume and over 70 percent by commercial value. With global container port throughput experiencing exponential growth—reaching 858 million twenty-foot equivalent units (TEUs) in 2023 and projected to exceed 900 million TEUs—these maritime nodes have effectively become the central nervous system of the globalized economy. In a highly integrated world, a nation's macro-economic resilience against external systemic shocks and coercive statecraft is inextricably tied to the operational continuity of its maritime infrastructure.

To fully comprehend the immense geopolitical gravity of modern seaports, strategic analysis must transcend the rudimentary view of ports as localised transit facilities. A rigorous architectural analysis reveals that modern mega-ports operate at the critical intersection of three distinct yet deeply intertwined spheres of strategic influence. The first is the economic dimension, driven by the colossal scale of international trade, the facilitation of foreign direct investment (FDI), and the gravitational pull of clustered heavy industry and advanced manufacturing. The second is the infrastructural dimension, characterised by highly optimised, automated intermodal logistics networks and deep hinterland connectivity that physically bind continents together. The third, and perhaps most consequential in the era of great power competition, is the security dimension. This encompasses blue-water naval power projection, the safeguarding of vital energy lifelines, and the preservation of sovereign strategic autonomy through civil-military fusion architectures.

FIG 1 The strategic intersection of modern seaports

Where the economic, infrastructural and security dimensions overlap, the port stops being a transport facility and acquires the functions of a capital.

When these three strategic dimensions converge, ports entirely transcend the mere facilitation of maritime commerce to assume the elevated role of "functional capitals". While political capitals retain their function as the symbolic and bureaucratic seats of sovereign authority, ports function as the material, muscular engines of state survival. Historically, national strength was calculated by landmass and population size; today, it is increasingly quantified by a state's capacity to control, disrupt, or secure the logistical pathways that sustain the globalised system. A nation equipped with a highly diversified, technologically advanced port network possesses a profound strategic asymmetry over states that are either landlocked or reliant on outdated, single-point maritime infrastructure. Consequently, geopolitical influence is dictated less by diplomatic rhetoric and more by the material reality of port operations, elevating these coastal nodes to strategic assets that are frequently as critical to national security as the political capital itself.

Therefore, this paper asserts that modern seaports have become the primary, undeniable signatures of global geoeconomic leverage. By comprehensively examining their capacity to weaponise vital maritime choke-points, their systemic vulnerabilities within hyper-concentrated shipping and digital networks, their integration into dual-use military strategies, and the complex international legal regimes governing them, this analysis demonstrates that dominion over maritime networks is the ultimate prerequisite for strategic hegemony. Yet, this analysis does not posit a zero-sum equation that renders the political capital obsolete. Rather, it advocates for the recognition of a profound strategic symbiosis. A port's logistical dominance, technological superiority, and economic gravity are only as formidable as the diplomatic agility, sovereign will, and legal frameworks engineered within the capital. Ultimately, a state's enduring strength is measured by its capacity to seamlessly integrate the bureaucratic steering wheel of the political centre with the formidable maritime engine of the global economy.

An Analytical Framework for Port Power

A port's strategic value cannot be reduced to one statistic. Throughput measures activity, not necessarily control. Location measures opportunity, not necessarily capability. Ownership measures a legal or commercial relationship, not necessarily sovereign authority. Military suitability measures option value, not intent. A mature assessment therefore requires a multidimensional framework that separates the sources of power from the mechanisms through which that power can be exercised.

The framework establishes three principles. First, port power is cumulative. A facility that combines

chokepoint proximity, high network centrality, industrial depth, digital sophistication, and military-grade physical characteristics is more strategically consequential than one that excels in only a single dimension. Second, port power is conditional. The same commercial asset can have very different strategic effects depending on the host state's laws, alliance relationships, regulatory capacity, and alternatives. Third, port power is dynamic. Shipping alliances can reroute, technology can change productivity, climate can reduce capacity, and political decisions can alter access. Geography is durable, but the value extracted from geography is not fixed.

TABLE 1 – A MULTIDIMENSIONAL FRAMEWORK FOR ASSESSING PORT POWER

Dimension	What to Measure	Strategic Effect	Principal Failure Mode
Geographic position	Proximity to chokepoints, open-ocean access, route alternatives, exposure of approaches.	Creates fixed positional leverage and shapes the routes that can be served or threatened.	Overdependence on an exposed corridor or a geography that cannot be bypassed quickly.
Network centrality	Frequency of liner calls, transshipment share, shipping alliances, route diversity, service reliability.	Attracts, aggregates, and potentially redirects commercial flows.	Carrier rerouting, loss of confidence, or exclusion from mainline services.
Industrial and hinterland depth	Free zones, domestic cargo base, pipelines, rail, roads, warehouses, manufacturing and energy clusters.	Converts throughput into employment, value added, fiscal revenue, and national industrial power.	An enclave port that handles cargo but remains disconnected from the wider economy.
Ownership and operational control	Equity, concession terms, financing, terminal management, maintenance rights, emergency clauses.	Creates contractual influence, data visibility, and long-term access relationships.	Foreign dependence, opaque obligations, or weak sovereign intervention rights.
Digital and data architecture	Terminal systems, port-community platforms, AI, sensors, cable landings, cyber posture, vendor dependence.	Raises efficiency and provides operational visibility and intelligence value.	Cyber paralysis, manipulated data, supplier compromise, or vendor lock-in.
Military utility	Draft, berth length, structural strength, fuel, repair, secure storage, communications, access rules.	Enables logistics, sustainment, deterrence, and latent military option value.	Security dilemma, political backlash, targeting, or unauthorised strategic use.
Resilience and redundancy	Alternative terminals, spare capacity, power, workforce, climate adaptation, restoration time, inland alternatives.	Allows the state to absorb disruption and preserve priority flows.	Single-point failure and cascading economic or military disruption.

From Ownership to Control

Debates over foreign port investment are often distorted because the word “control” is used to describe several different relationships. Sovereign control belongs to the host state unless territory has been ceded. Equity ownership provides a financial stake and influence over corporate governance. A concession grants defined operating rights for a period. Terminal operation provides visibility over

cargo, schedules, customers, and equipment. Preferred commercial access may facilitate logistics without conferring authority over the port as a whole. Military access, logistics support, and formal basing require additional political and legal arrangements. These layers can reinforce one another, but none should be assumed from the existence of another.

TABLE 2 – DEGREES OF PORT CONTROL AND THEIR STRATEGIC MEANING

Layer	What It Confers	Strategic Value	What It Does Not Automatically Confer
Sovereign jurisdiction	Law, policing, customs, security, land and waterside authority, and emergency intervention.	Ultimate power to regulate access and determine national-security use.	Daily operational efficiency or commercial network centrality.
Equity ownership	A financial stake and influence over corporate governance and investment decisions.	Long-term presence, board access, and influence over expansion or capital allocation.	Sovereignty, full operational control, or military access.
Concession rights	Contractual authority to develop or operate specified facilities for a defined period.	Control over revenue, investment sequencing, and some operational conditions.	Authority over the entire port or the surrounding territorial waters.
Terminal operation	Management of equipment, labour, schedules, customers, and cargo information.	Detailed visibility over flows and practical influence over service delivery.	Legal title to the asset or an unrestricted right to deny state access.
Preferred logistics access	Berthing, supply, repair, or commercial-service arrangements for selected users.	Reduces the cost and uncertainty of future commercial or naval support.	A permanent military presence or exclusive access.
Military access or basing	Political and legal permission for warships, personnel, logistics, command, or permanent facilities.	Sustained power projection and operational presence.	Commercial ownership of the wider port or immunity from host-state politics.

This distinction sharpens the analysis of both Chinese and Western port networks. A treaty-based allied port used by the United States or NATO is strategically different from a commercial concession held by a state-linked company, even if both can support naval logistics. The former is usually overt, politically authorised, and embedded in alliance planning. The latter may create ambiguity because commercial activity establishes personnel, data, relationships, and physical capacity before any military role is acknowledged. Ambiguity itself can be strategically useful: it preserves access while lowering the political cost of an explicit base.

Port Power as a Conversion Mechanism

The most important strategic characteristic of a port is its capacity to convert one form of power into another. Financial capital can be converted into infrastructure; infrastructure into network centrality; network centrality into information; information into commercial leverage; commercial leverage into diplomatic influence; and physical capacity into military sustainment. The conversion is never automatic. It depends on contracts, political permission, technical standards, and crisis conditions. Yet the possibility of conversion is precisely why ports attract attention from states that would not normally compete over municipal transport infrastructure.

The port also converts vulnerability into leverage. A state that depends on one gateway for a large share of its economy may be exposed to coercion, but the same gateway may give the state bargaining power over external users. A chokepoint port can facilitate, delay, tax, inspect, or support traffic. A transshipment hub can gain influence from its indispensability while remaining vulnerable to rerouting if users lose confidence. Strategic port policy is therefore a continuous effort to maximise centrality without allowing centrality to become a single point of national failure.

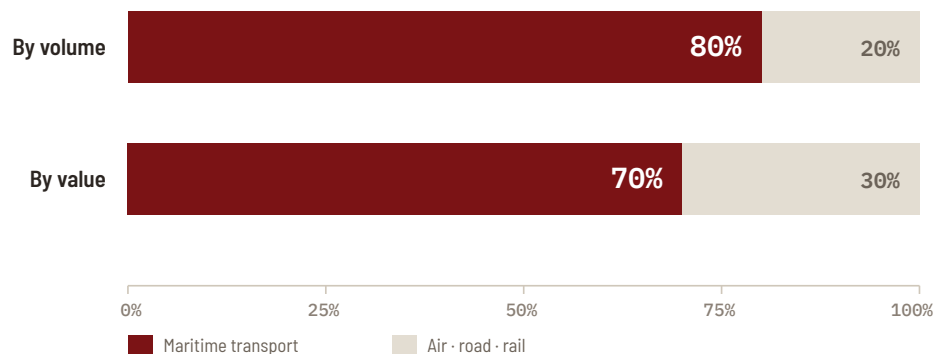
The Geoeconomic Foundations of **Port Power**

Maritime Trade as the Material Base of Globalisation

The strategic rise of ports begins with a basic physical reality: globalisation is not weightless. Production may be coordinated digitally and finance may move electronically, but the overwhelming majority of material trade still has to cross distance in ships. The maritime transport at approximately 80 per cent of global trade by volume and around 70 per cent by value. These shares are not merely descriptive. They indicate that the performance of the world economy is structurally tied to a limited set of coastal interfaces where cargo is transferred between oceanic networks and national territory.

The long-term trend reinforces this dependence. Seaborne trade per person rose from roughly 0.7 tonnes in 1970 to 1.4 tonnes in the contemporary period covered by the study. Developing economies, once treated primarily as peripheral exporters of commodities, now handle nearly two-thirds of global seaborne trade and receive about 69 per cent of maritime import volumes. This shift reflects their deeper integration into manufacturing, consumption, and value chains. It also redistributes strategic port importance toward Asia, Africa, the Middle East, and Latin America, where coastal infrastructure increasingly determines whether economic growth can be translated into stable industrial capacity.

FIG 2 Maritime transport dominates world merchandise trade



Source: UNCTAD, Review of Maritime Transport. Shares of global trade carried by sea.

Containerisation transformed the port from a site of manual cargo handling into the principal switching mechanism of international production. Standardised containers reduced handling time, theft, and transfer costs, allowing manufacturers to separate stages of production across multiple jurisdictions. The resulting system appears flexible because suppliers can be geographically dispersed, yet it is physically dependent on compatible terminals, cranes, yards, customs procedures, truck and rail links, and predictable vessel schedules. The container therefore did not eliminate geography; it made a small number of highly capable ports more central to the organisation of global geography.

TABLE 3 – MARITIME DEPENDENCE BY TRADE METRIC

Trade Metric	Maritime Transport Share	Alternative Modes (Air, Road, Rail)
Global trade by volume	~80%	~20%
Global trade by value	~70%	~30%
Total containerised trade	35% of maritime volume	>60% of commercial value
Developing-economy imports	69% of global volume	31%

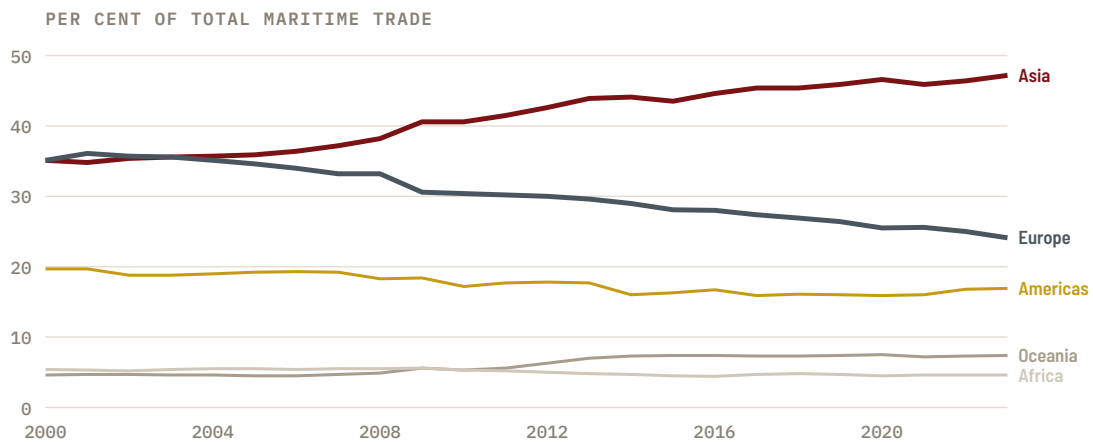
The difference between volume and value is particularly revealing. Containerised trade accounts for about 35 per cent of maritime volume but more than 60 per cent of commercial value. Bulk commodities remain indispensable, especially crude oil, gas, iron ore, grain, and coal, but container ports sit directly inside the manufacturing economy. A delay in a bulk cargo may affect a commodity market. A delay in containerised components can stop assembly lines, interrupt retail inventories, and propagate through multiple sectors simultaneously. This is why container-port performance has strategic consequences disproportionate to the physical share of cargo involved.

Global container throughput rose by about 57 per cent over the decade, reaching approximately 858 million TEUs in 2023 and more than 900 million in 2024. Growth at this scale changes the meaning of port infrastructure. Deep channels, larger cranes, automated yards, and extensive hinterland connections are no longer incremental efficiency upgrades; they are prerequisites for remaining inside the mainline shipping network. A port that cannot accommodate larger vessels or process cargo reliably risks a reduction in calls, loss of transshipment activity, and gradual exclusion from high-value routes. Network position is therefore both an economic asset and a competitive achievement that must be continuously defended.

Asia's Maritime Ascent and the Redistribution of Network Centrality

The regional chart shows Asia's steadily expanding share of maritime trade between 2000 and 2023, while Europe's share declines and other regions remain comparatively stable. The significance of this trend is greater than a change in cargo origin. It marks a redistribution of industrial production, port investment, fleet demand, and logistics expertise. As manufacturing and consumption shifted toward Asian economies, their ports became not only export.

China is central to this transformation. The data report that Chinese state-owned firms such as COSCO and China Merchants Ports, together with private Chinese-linked operators such as CK Hutchison, held contracts to operate in 133 ports across 67 countries in 2024. This broad figure captures a commercial ecosystem rather than a single centrally controlled network. It nevertheless demonstrates that Chinese maritime influence is expressed not only through the volume handled at domestic ports, but through an external operating presence extending from Asia to Europe, Africa, the Middle East, Latin America, the Caribbean, Australia, and parts of North America.

FIG 3 Asia's rising share of maritime trade, 2000–2023

Source: UNCTAD. Percentage shares of total maritime trade by region.

Such a network can serve several purposes simultaneously. It provides commercial returns, supports Chinese shipping lines, creates demand for Chinese construction and equipment, and embeds Chinese firms in local regulatory and business environments. It also generates information about cargo flows, terminal performance, shipping customers, and supply-chain patterns. The strategic value lies in the aggregation of these functions. No single concession necessarily produces decisive leverage, but a distributed network can reduce logistical uncertainty for Chinese commerce while increasing Beijing's knowledge of, and presence within, global maritime systems.

The wider lesson is that maritime power can be accumulated through corporate geography. States no longer need to own colonial ports or exercise formal territorial authority to shape trade networks. They can use state-linked firms, long-term concessions, financing, technical standards, and operating contracts. This form of influence is less visible than a naval base and often more acceptable to host governments because it arrives as investment, employment, and infrastructure. Its political character becomes most apparent when commercial decisions intersect with diplomatic disputes, sanctions, strategic rivalry, or military contingency planning.

Industrial Gravitation: Ports as Producers, Not Merely Gateways

A port's contribution cannot be measured only by the cargo crossing its quay. Efficient ports alter the location of economic activity. They reduce transport and inventory costs, attract processing and assembly, support energy and petrochemical facilities, and create specialised service ecosystems. The resulting agglomeration effect can make a port region more economically important than the administrative capital, even while remaining politically subordinate to it.

Rotterdam demonstrates the scale of this effect. The port extends across a roughly 40-kilometre industrial complex and handles about 470 million tonnes of cargo annually attributes more than €45.6 billion in direct and indirect added value to the port, equivalent to approximately 6.2 per cent of the Netherlands' GDP, and associates the ecosystem with roughly 385,000 jobs. The strategic significance is not confined to cargo handling. Rotterdam integrates refineries, chemical plants, LNG terminals, storage, pipelines, inland waterways, rail, road, and European distribution. Its power comes from

the density of connections between the terminal and the continental economy.

Jebel Ali provides a different model. Its strategic value is inseparable from the Jebel Ali Free Zone and Dubai's broader policy of positioning itself between Asian, European, African, and Middle Eastern markets. The combined ecosystem is credited with approximately AED 51.9 billion in contributions to Dubai's real GDP. The port therefore functions as an instrument of diversification: it allows a hydrocarbon-producing region to build logistics, manufacturing, re-export, and service capabilities whose value depends on connectivity rather than domestic resource extraction alone.

Shanghai represents industrial scale. Processing 51.5 million TEUs in 2024, it links the world's largest container throughput to the manufacturing concentration of the Yangtze River Delta. Automated facilities

such as Yangshan Phase IV illustrate how infrastructure, industrial production, and digital systems reinforce one another. High cargo volume justifies advanced automation; automation protects throughput and reliability; reliability attracts shipping services and manufacturers; and the resulting network density further strengthens the port's centrality.

Singapore demonstrates how a small state can convert location and operational excellence into national strategy. The port's significance is not reducible to tonnage. It combines transshipment, bunkering, maritime finance, regulation, ship services, and technology. This combination helps explain why Singapore consistently performs as a leading maritime city despite limited territory and a small domestic market. Its port is effectively a national platform through which external trade, services, and strategic relevance are concentrated.

TABLE 4 – COMPARATIVE PROFILES OF MAJOR PORT HUBS

Global Port / Hub	Key Performance Indicator	Estimated Economic Impact	Strategic Role and Regional Function
Rotterdam (Netherlands)	~470 million tonnes per annum	€45.6 billion added value (~6.2% of national GDP); ~385,000 jobs.	Premier European industrial, chemical, petrochemical, and continental-distribution gateway.
Jebel Ali (UAE)	Largest port in the Middle East	Contributes ~AED 51.9 billion to Dubai's real GDP alongside JAFZA.	Core intercontinental logistics hub bridging East and West; diversification engine.
Shanghai (China)	>51.5 million TEUs (2024)	Anchors the Yangtze River Delta, a primary engine of global manufacturing output.	World's highest-volume container port; intensive investment in smart automation.
Singapore	>30 million TEUs; leading maritime-city position	Vital transshipment hub supporting services, finance, bunkering, and logistics.	Strategic chokepoint gateway and global benchmark for maritime efficiency.

The comparison in Table 4 demonstrates why port significance requires several complementary measures: cargo throughput captures commercial activity, while employment, value added and supporting services reveal its wider economic contribution. Singapore illustrates this distinction particularly clearly. Its June 2026 indicators in Figure 4 combine approximately four million TEUs of container throughput with five million tonnes of bunker sales, highlighting the coexistence of cargo handling and services to visiting vessels within the same maritime economy. These monthly observations complement the broader port profiles, although they are not directly comparable with annual throughput or national economic impact estimates. Their analytical significance lies in the interaction between these functions: the strategic value of maritime infrastructure depends on the commercial and institutional ecosystem through which activity at the quay generates wider economic benefits.

FIG 4 Port of Singapore: key indicators, June 2026

KEY PORT INDICATOR	JUNE 2026	YEAR ON YEAR
Vessel arrivals M GT	280	▲ 6.5%
Vessel arrivals number	11,520	▲ 6.3%
Container throughput M TEUs	4	▲ 3.2%
Cargo throughput M tonnes	49	▼ 1.4%
Total bunker sales M tonnes	5	▲ 1.6%

Source: Maritime and Port Authority of Singapore. Bunker sales include delayed submissions declared by suppliers.

The comparative cases reveal three distinct sources of industrial port power. Rotterdam derives strength from continental hinterland depth and industrial integration. Jebel Ali derives strength from free-zone governance and interregional connectivity. Shanghai derives strength from manufacturing scale and technological throughput. Singapore derives strength from transshipment centrality and a dense maritime services ecosystem. No single model can be copied mechanically. The strategic requirement is alignment between the port's physical capabilities, the national economic model, and the markets it is intended to serve.

This point is often missed in infrastructure policy. Governments may finance a deep-water port in the expectation that trade will automatically follow. Yet a port without cargo-generating industry, predictable regulation, efficient customs, reliable land transport, and shipping-line confidence can become an expensive enclave. Port power is produced by integration. The terminal must be connected to a hinterland capable of generating or absorbing cargo, to financial and legal institutions that reduce transaction risk, and to a state strategy that gives private actors confidence in long-term use.

Foreign Direct Investment and the Port as an Instrument of Statecraft

The acquisition, financing, management, and operation of ports have moved from the margins of commercial policy to the centre of strategic competition. Foreign direct investment in a port is rarely a simple transfer of capital. It creates a long-duration relationship involving land, infrastructure, labour, data, regulation, and access. Because concessions often last for decades, the political assumptions embedded in the original contract may outlive the government that signed it and the market conditions on which it was based.

Port investment generates influence through several mechanisms. The first is financial dependence: a host state may rely on an external lender or operator for construction, refinancing, or expansion. The second is operational dependence: the terminal may rely on foreign management systems, equipment, technical expertise, or shipping-line relationships. The third is informational dependence: operators may gain detailed visibility over cargo, clients, schedules, and supply-chain vulnerabilities. The fourth is standards dependence: software, cranes, customs interfaces, and security systems can bind the port to a particular vendor ecosystem. The fifth is political dependence: a government may become reluctant to challenge the

investing state if doing so threatens employment, revenue, future financing, or access to trade.

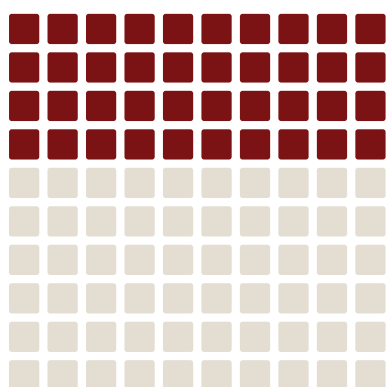
Chinese commercial expansion provides the most extensive contemporary example, but the underlying model is not uniquely Chinese. DP World, PSA International, APM Terminals, Hutchison, MSC's Terminal Investment Limited, Adani Ports, and other major operators also build transnational portfolios. Some are state-owned or closely linked to national policy; others are private but strategically significant because of their scale. The concentration of terminal operation means that a relatively small number of corporate actors mediate a large share of container flows.

The available estimate indicates that the seven leading global terminal operators control roughly 40

per cent of the market. This concentration has two opposite effects. On one hand, global operators can mobilise capital, transfer expertise, introduce advanced systems, and connect a local terminal to international shipping networks. On the other, concentration reduces the number of alternative partners available to host states and can place commercially sensitive infrastructure under actors whose corporate interests are linked to external governments or global shipping alliances. The relevant policy question is therefore not whether a foreign operation is inherently dangerous but whether the host state retains sufficient regulatory, technical, and contractual capacity to manage the relationship.

FIG 5 Concentration among global terminal operators

ONE SQUARE = ONE PER CENT OF GLOBAL CAPACITY



40 %

of global container-terminal capacity is operated by the seven largest operators

■ Top seven global terminal operators
■ All other operators

Source: Drewry. Estimated share of global container-terminal capacity operated by the seven largest operators.

Chinese Port Numbers

The evidence base uses three prominent numerical descriptions of Chinese-linked port activity. They should be read as complementary rather than contradictory. The figure of 133 ports in 67 countries refers to a broad commercial footprint involving several Chinese state-owned and private firms. The visual assessment of 96 PRC-operated ports in 53 countries represents a narrower network definition. The estimate of at least 91 active projects with physical

potential for naval use is narrower again because it is filtered through a strategic and military criterion. A fourth figure—78 ports across 32 African states—describes the regional footprint of Chinese state-owned enterprises on that continent.

133 PORTS IN 67 COUNTRIES – COMMERCIAL REACH	96 PRC-OPERATED PORTS IN 53 COUNTRIES	91 PROJECTS WITH PHYSICAL NAVAL POTENTIAL	78 PORTS ACROSS 32 AFRICAN STATES
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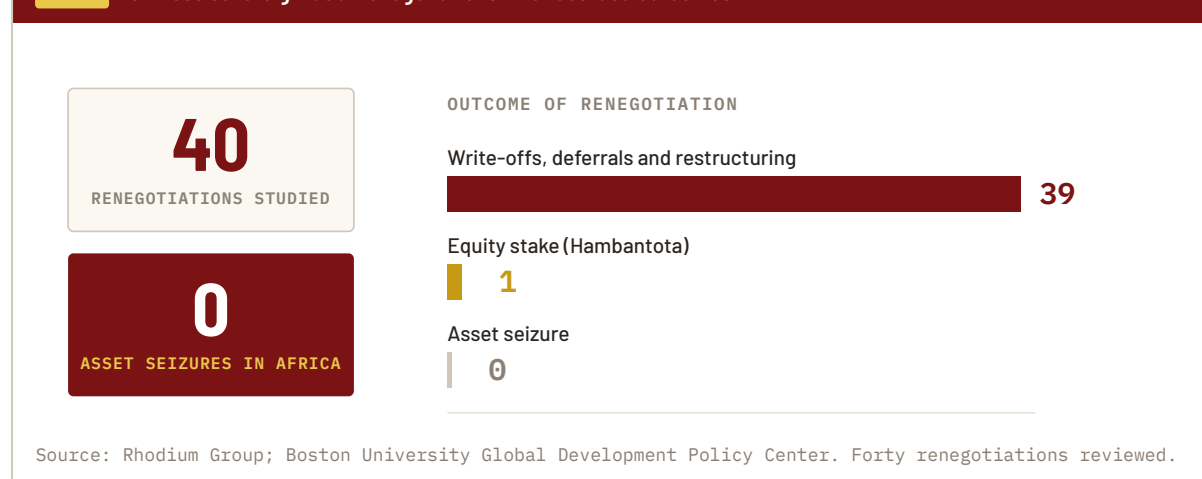
These figures illuminate different aspects of the same phenomenon. The broadest count measures commercial reach. The narrower operating-network count measures managerial presence. The dual-use count measures latent military utility. The African count measures geographic concentration. Treating all four as a single number would create false precision; distinguishing them shows how strategic influence can be built in layers.

This layered approach also prevents overstatement. A Chinese-linked contract does not establish that Beijing can order a host state to deny access to another country. A port with naval-suitable dimensions is not automatically a military base. A commercial operator may have data visibility without sovereign authority. At the same time, the

absence of formal authority does not mean the relationship is strategically irrelevant. Personnel, equipment, schedules, financing, and political ties can create access options and situational awareness that become more valuable under crisis conditions.

The “debt-trap diplomacy” debate has often reduced complex port relationships to a single claim: that China deliberately offers unsustainable loans, waits for default, and then seizes the asset. The evidence does not support this as a general model. Research on Chinese debt renegotiations finds restructuring, deferment, and write-offs to be far more common than asset confiscation. The graphic summarising forty renegotiations’ records thirty-nine cases of write-offs, deferrals, or restructuring; one equity-related outcome; and no asset seizures in Africa.

FIG 6 Chinese sovereign-debt renegotiations: the recorded outcomes



Hambantota is central to the debate because Sri Lanka granted a 99-year lease to China Merchants Port Holdings in 2017. Yet it emphasises that the project was promoted by Sri Lankan leaders pursuing domestic economic and political objectives. The subsequent transaction occurred within a broader foreign-exchange and sovereign-debt crisis rather than through a simple foreclosure on the port loan. Chinese debt represented roughly 6 per cent of Sri

Lanka’s GDP, while international sovereign bonds, structural economic weaknesses, and domestic policy failures also contributed to the crisis.

The evidence further indicates that Chinese development finance is fragmented across state banks, enterprises, ministries, and local interests. This fragmentation is relevant because it complicates the idea of a perfectly coordinated, decades-long

plan to entrap sovereign borrowers. The Belt and Road Initiative also served domestic Chinese economic needs, including the deployment of industrial overcapacity and very large foreign-exchange reserves that had reached approximately \$4 trillion by 2014. Recipient governments and local elites retained agency; they selected projects, negotiated contracts, and sometimes used infrastructure for electoral or patronage purposes. The reference to Malaysia's 1MDB scandal similarly underlines that local corruption and governance failures can be decisive drivers of debt distress.

Rejecting the universal debt-trap thesis, however, should not lead to the opposite error of treating long-term port concessions as strategically neutral. The real risks are more subtle and, in some cases, more durable than confiscation. A host government may retain the flag and the legal title while losing practical autonomy over operations, expansion, technical systems, or commercially sensitive information. A lender or operator may not need to seize an asset if the host state becomes dependent on continued financing, expertise, shipping connections, or political goodwill.

A more useful risk model distinguishes five categories. Financial risk concerns debt service,

currency exposure, and refinancing. Contractual risk concerns concession length, dispute settlement, revenue guarantees, and renegotiation clauses. Operational risk concerns dependence on foreign management, equipment, software, and maintenance. Sovereignty risk concerns the host state's ability to inspect, regulate, intervene, and protect data. Strategic-option risk concerns whether the infrastructure can support intelligence, military logistics, or access during a crisis. These risks can exist separately. A financially sustainable port may still create data or strategic dependence; a poorly performing port may have little commercial value but significant positional utility.

The mature policy response is therefore neither blanket rejection nor unconditional acceptance of foreign capital. States require the capacity to value concessions accurately, model traffic realistically, publish core contractual terms, preserve emergency powers, protect port data, require interoperability, and maintain alternative operators and routes. The purpose of scrutiny is not to prevent investment but to ensure that the state does not exchange short-term infrastructure gains for long-term strategic rigidity.

Economic Coercion

Port control can create coercive options that do not require an overt blockade. An operator or state can influence the speed and cost of trade through berthing priorities, inspection intensity, customs practices, maintenance schedules, service availability, tariff structures, data access, and routing decisions. In tightly coupled supply chains, marginal delays at a major gateway can have effects far beyond the port itself. The strategic value lies in plausibility and deniability: commercial or technical explanations may conceal political pressure, and the target may struggle to prove deliberate coercion.

The discussion of pressure against states that challenge Beijing's political red lines illustrate the broader logic even where the precise mechanism differs from case to case. A state with influence across shipping, terminal operation, financing, and markets can impose costs without announcing a formal sanction. Conversely, labour unrest at major United States ports demonstrates that disruption need not originate from a foreign actor to become strategically exploitable. Adversaries can time diplomatic or commercial pressure to coincide with domestic bottlenecks, magnifying the effect of an existing vulnerability.

Economic coercion through ports is most effective when three conditions coincide: the target has limited alternative gateways; inventories are low or production is time-sensitive; and the coercing actor can influence multiple points in the logistics chain. This reinforces the importance of redundancy. Diversifying suppliers while leaving imports dependent on the same terminal does not eliminate vulnerability. Friendshoring and nearshoring reduce exposure only if the physical gateways, shipping connections, data systems, and operators are also diversified.

The Re-Politicisation of Port Finance

Western states and their partners have begun to treat port finance as a strategic policy field rather than a purely commercial matter. The advisory mechanisms that help partner governments evaluate infrastructure contracts, improve transparency, and avoid concessions that create excessive external access. It also cites cases in Myanmar and Croatia where alternative advice or financing affected decisions concerning strategically relevant port projects.

India and the United Arab Emirates provide additional models of state-linked commercial expansion. Adani Ports' participation in the acquisition of Haifa Port as part of a wider effort to strengthen the India-Middle East-Europe corridor and balance the presence of a nearby Chinese-operated facility. DP World's global network similarly illustrates how a commercially successful operator can become an extension of national connectivity strategy. These cases show that competition with China is not simply a confrontation between governments. It is also a contest among port operators, shipping companies, investors, standards, and corridor visions.

The strategic implication is that port finance has become a form of long-term positioning. A terminal concession can outlast a defence agreement, a government coalition, or a period of diplomatic tension. It embeds an external actor in the economic life of the host state and gives that actor a reason to maintain political relationships. For host governments, the challenge is to capture capital and expertise without allowing any single partner to become irreplaceable. For investing states, the objective is to transform commercial presence into reliable access and influence without provoking the resistance associated with overt military expansion.

Geography as a
Strategic Asset
**Ports and Maritime
Chokepoints**

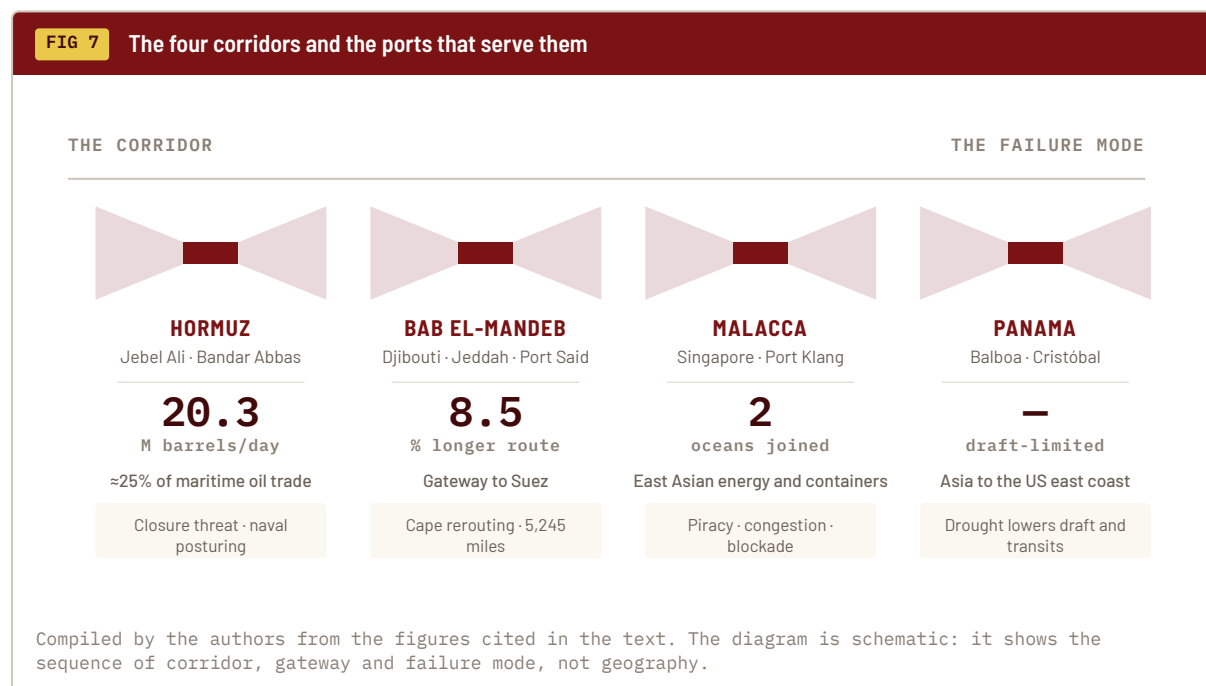
Positional Power in a Networked Economy

Unlike technology, finance, or corporate ownership, geography cannot be relocated. A port near a major maritime chokepoint possesses a positional advantage created by the physical structure of the earth: narrow passages, canal systems, islands, coastlines, and the limited number of commercially viable routes between ocean basins. This advantage is durable, but it is not absolute. A state may occupy the coastline without controlling all passage; an adjacent port may support traffic without possessing legal authority to suspend it; and alternative routes, pipelines, or political coalitions may reduce the value of coercion. Strategic analysis

must therefore distinguish proximity, capacity, influence, and legal control.

Chokepoints matter because they compress global flows into confined spaces. The Strait of Hormuz, Bab el-Mandeb, the Suez Canal, the Strait of Malacca, and the Panama Canal each connect large economic regions while offering limited practical alternatives. Ports situated around these corridors become service nodes, monitoring points, naval support locations, commercial gateways, and potential instruments of denial. Their value derives not only from what they handle directly but also from the wider traffic whose movement depends on the corridor.

FIG 7 The four corridors and the ports that serve them



The corridor relationships outlined in Figure 7 reveal that maritime vulnerability operates through distinct mechanisms, each with different implications for the ports serving the affected route. Security threats can raise insurance costs and redirect traffic, whereas physical capacity constraints can restrict vessel loading, reduce transit availability and generate congestion. The strategic importance of an adjacent port therefore depends partly on its ability to sustain essential services, accommodate displaced activity or support alternative connections when the corridor comes under pressure. Table 5 develops this comparison by associating each passage with its principal gateways and specific vulnerabilities. Read together, the two exhibits provide a basis for assessing exposure and response capacity, while preserving the distinction between a port's geographical proximity to a chokepoint and the authority or capability required to influence passage through it.

TABLE 5 – MAJOR MARITIME CHOKEPOINTS AND ADJACENT STRATEGIC PORTS

Maritime Chokepoint	Adjacent Strategic Port(s)	Estimated Share / Strategic Function	Recent Disruption or Vulnerability
Strait of Hormuz	Jebel Ali (UAE); Bandar Abbas (Iran)	~20.3 million barrels/day; ~25% of maritime oil trade.	Threats of closure historically raise crude-price risk and generate intense naval posturing.
Bab el-Mandeb / Red Sea	Djibouti; Jeddah; Port Said	Gateway to Suez and critical to Asia–Europe trade.	Rerouting around the Cape added ~8.5% distance (5,245 miles) and increased ton-mile demand.
Strait of Malacca	Singapore; Port Klang (Malaysia)	Connects the Indian and Pacific Oceans; vital to East Asian energy and container imports.	Exposed to piracy, congestion, accidents, and strategic-blockade concerns.
Panama Canal	Balboa; Cristóbal (Panama)	Major route between Asia and the eastern United States.	Drought lowers draft and transit capacity, forcing diversion and raising logistics costs.

The strategic effect of a chokepoint is frequently misunderstood as a binary choice between open and closed. In practice, coercion can operate along a spectrum. Traffic may continue while facing heightened inspection, harassment, delay, navigation risk, military signalling, or the threat of inter-

diction. Shipping companies may reroute before a formal closure occurs because the expected cost of remaining has become too high. The actor exercising influence over the corridor may, therefore, achieve a strategic effect without physically stopping every vessel.

The Strait of Hormuz: Energy Concentration and Strategic Asymmetry

The Strait of Hormuz is the most concentrated energy chokepoint. The principal estimate places daily flows at about 20.3 million barrels of crude oil and petroleum products, representing approximately 25 per cent of maritime oil trade. The 2025 chart totals 19.87 million barrels per day; strategically, both figures indicate that roughly 20 million barrels per day are exposed to a narrow maritime passage.

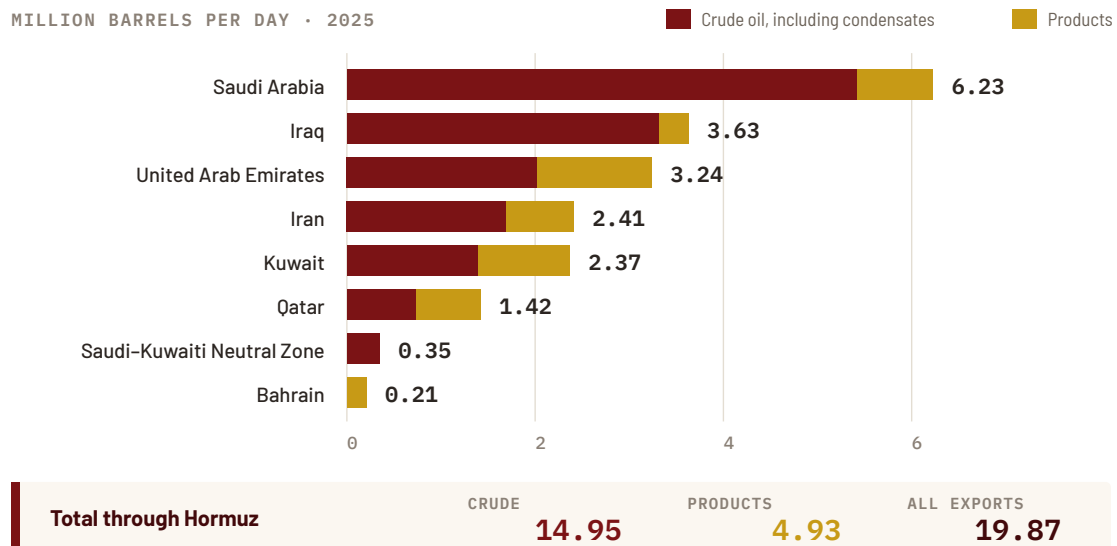
The distribution of flows matters as much as the total. Saudi Arabia accounts for 6.23 million barrels per day in the chart; Iraq, 3.63 million; the United Arab Emirates, 3.24 million; Iran, 2.41 million; Kuwait, 2.37 million; Qatar, 1.43 million; Bahrain, 0.21 million; and the Saudi-Kuwaiti Neutral Zone, 0.35 million. This means that a crisis in the strait is not an isolated Iranian-Gulf confrontation. It affects the export capacity of multiple producers and the energy security of importers across Asia and beyond.

Iran derives strategic leverage from geography, coastal military capabilities, and the ability to create uncertainty around transit. Yet the leverage is asymmetric rather than unlimited. Iran also depends on the same maritime environment for its own trade and exports. A prolonged closure would invite economic, diplomatic, and military responses while imposing costs on Tehran and neighbouring states. The more realistic coercive instrument is therefore the capacity to threaten, harass, delay, or selectively disrupt traffic, raising the expected cost of passage and forcing other actors to devote naval, diplomatic, and commercial resources to maintaining access.

Ports around the strait shape both vulnerability and adaptation. Jebel Ali and Khalifa remain major Gulf gateways, while Fujairah's location outside the strait provides the United Arab Emirates with a degree of strategic redundancy. The shift of selected energy and maritime functions toward Fujairah, is an example of

infrastructure designed to reduce exposure to a single geographic corridor. It does not eliminate dependence on Hormuz for all trade, but it changes the crisis calculus by creating an external outlet and supporting storage, bunkering, and export options beyond the confined Gulf waters.

FIG 8 Crude oil and product exports through the Strait of Hormuz



Source: IEA, full year 2025. Million barrels per day.

This illustrates a general principle: states cannot move chokepoints, but they can re-engineer their exposure. Pipelines, alternative ports, strategic reserves, diversified shipping arrangements, and emergency routing can reduce the proportion of

national activity placed at risk. Such investments may appear inefficient in normal times because they duplicate capacity. Their value is revealed during crisis, when redundancy becomes a form of strategic insurance.

Bab el-Mandeb and Suez: The Cost of Distance

The Bab el-Mandeb and Suez systems link the Indian Ocean and the Mediterranean, making them central to Asia-Europe trade. The Red Sea disruption demonstrates that the strategic effect of insecurity is not limited to vessels directly attacked. Major carriers rerouted around the Cape of Good Hope, increasing average distance by approximately 8.5 per cent to 5,245 miles in 2024. Tonne-mile demand rose by 5.9 per cent even though actual cargo volume increased by only 2.2 per cent.

These figures reveal the hidden power of distance. When the route lengthens, the same ship carries fewer annual voyages. More vessels, fuel, crews,

maintenance, and working capital are required to move the same quantity of cargo. Equipment and containers spend longer in transit, reducing their effective availability. Schedules become less reliable, and inventory planning becomes more difficult. The economic effect therefore emerges even when trade continues, and no formal blockade is imposed.

Ports around the Red Sea and Gulf of Aden occupy different roles within this system. Djibouti sits near the southern entrance and combines commercial infrastructure with an unusually dense military presence. Jeddah serves the Saudi economy and Red Sea trade. Port Said anchors the northern entrance to the Suez Canal. The strategic value of these ports derives partly from servicing normal

flows and partly from their ability to support naval protection, diversion, repair, bunkering, transshipment, and crisis management.

The Red Sea example also shows how non-state actors can exploit the same geography that traditionally empowered states. A comparatively limited force does not need to control the entire corridor in a conventional naval sense. It needs only to create sufficient risk that commercial actors alter behaviour. This is a Corbettian form of sea denial: influence is exercised locally and temporarily, but the economic consequences become global because shipping networks are interconnected.

For states dependent on Suez revenues or regional port activity, this creates a strategic dilemma. Military escalation may be required to restore confidence, yet escalation can increase risk perceptions and extend the disruption. Diplomatic restraint may reduce immediate confrontation, yet prolonged insecurity can normalise rerouting and encourage supply chains to adapt around the corridor. Port strategy must therefore be integrated with maritime security, intelligence, insurance-market confidence, and diplomatic crisis management.

Malacca: Centrality, Congestion, and the Search for Alternatives

The Strait of Malacca connects the Indian and Pacific Oceans and is indispensable to East Asian energy and container flows. Singapore and Port Klang benefit directly from this geography, but their importance rests on more than adjacency. They provide the capacity, reliability, services, and network connections that turn a narrow passage into a global logistics system. The chokepoint generates potential; port performance converts that potential into durable centrality.

Malacca also illustrates the vulnerability created by dependence on a narrow route. Concerns over piracy, congestion, accidents, and strategic blockade have encouraged discussion of alternative corridors and overland connections. Gwadar's proposed role as an outlet linked to western China is framed as

partly as a means of reducing dependence on the strait. The economic and logistical feasibility of any alternative depends on cost, capacity, terrain, political stability, and the ability to match the scale of maritime transport. Even where alternatives cannot replace Malacca, they may still provide limited resilience for high-priority cargo or strategic contingencies.

The concept of bypass therefore requires discipline. A corridor that carries only a small fraction of normal trade does not eliminate chokepoint dependence. Its strategic value lies in option value: the ability to maintain selected flows, complicate an adversary's planning, or reduce the consequences of temporary disruption. States often invest in such options not because they expect them to be the cheapest route in peacetime but because they alter the range of choices available during crises.

Panama: Climate as a Constraint on Strategic Geography

The Panama Canal demonstrates that chokepoint vulnerability can arise from environmental limits rather than armed conflict. Drought and reduced water availability can restrict vessel draught and daily transits, force cargo diversion and increase logistics costs. The canal's strategic position remains unchanged, but its usable capacity becomes variable. This is an important distinction: geographic assets can be permanent while operational access is contingent on climate, maintenance, infrastructure condition, and water management.

For ports at Balboa and Cristóbal, canal capacity directly affects traffic and strategic relevance. For shippers connecting Asia with the eastern United States, reduced capacity changes route economics and may redirect cargo toward other gateways or land bridges. The lesson extends to all ports: strategic value depends on the resilience of the entire corridor, including natural systems. Dredging, breakwaters, locks, fresh-water supply, energy, and approach channels can be as decisive as terminal equipment.

The Mechanics of Chokepoint Coercion

Chokepoint power operates through a sequence rather than a single event. The initial trigger may be a threat, military deployment, attack, accident, legal dispute, or environmental restriction. Commercial actors then reassess risk and schedules. Shipping lines may slow, reroute, reduce calls, or impose surcharges. Ports experience congestion or underutilisation, while cargo owners increase inventories or search for alternative suppliers. The resulting rise in time and transport requirements affects prices, production, and fiscal balances. Political pressure then returns to capitals, which must decide whether to negotiate, escort, retaliate, subsidise, or restructure trade.

This sequence explains why the state controlling or influencing a chokepoint does not need absolute

command of the sea to generate leverage. It needs the credible ability to alter expectations. Conversely, the state seeking to protect access does not need to eliminate every threat; it needs to restore sufficient confidence that commercial traffic resumes. The strategic contest is therefore fought simultaneously in the physical corridor; shipping-company risk calculations; legal claims; diplomatic messaging; and naval posture.

Ports are critical within this sequence because they are the points at which rerouting becomes operational. Alternative ports require spare berth capacity, customs readiness, storage, inland transport, labour, and compatible systems. A theoretical diversion route is not a real contingency plan unless the receiving port can process the displaced cargo. Resilience planning must therefore be measured in practical throughput and restoration time, not in the number of ports shown on a map.

Geography Is Durable; Dependence Is a Policy Choice

The fixed nature of chokepoints can create fatalism, as though states have no choice but to accept vulnerability. Geography defines the problem, but policy determines exposure. Multi-port systems, external-coast terminals, pipelines, strategic stockpiles, intermodal corridors, reciprocal access agreements, and pre-negotiated emergency procedures can distribute risk.

The objective is not full independence from the maritime network, which is neither realistic nor economically desirable. It is controlled interdependence: benefiting from central routes while retaining enough redundancy to prevent a local disruption from becoming a national collapse. This is where the capital and port must operate as a single strategic system. The capital allocates resources, negotiates access, and sets emergency powers; the port provides the physical capacity through which those decisions become effective.

Connectivity,
Digitalisation, and
**Systemic
Vulnerability**

Connectivity as a Source of Strategic Power

A port is valuable not because ships can physically enter it, but because it sits inside a network of routes, schedules, commercial relationships, and inland connections. Connectivity determines the number of markets that can be reached, the frequency and reliability of services, and the ease with which cargo can move between sea and land. A geographically well-positioned port can underperform if it lacks these relationships. A port with strong network centrality can exercise influence far beyond the size of its domestic economy.

Singapore is the clearest example. Its location near the Strait of Malacca provides a natural advantage, yet location alone cannot explain its position. The port converts geography into power through transshipment capacity, rapid vessel turnaround, bunkering, information exchange, regulation, and maritime

services. The June 2026 performance chart records vessel arrivals of 280 million gross tonnes and 11,520 vessels, approximately 4 million TEUs of container throughput, 49 million tonnes of cargo, and 5 million tonnes of bunker sales. The indicators show that the port's strategic role is multidimensional: it serves ships, cargo, fuel markets, and global schedules at the same time.

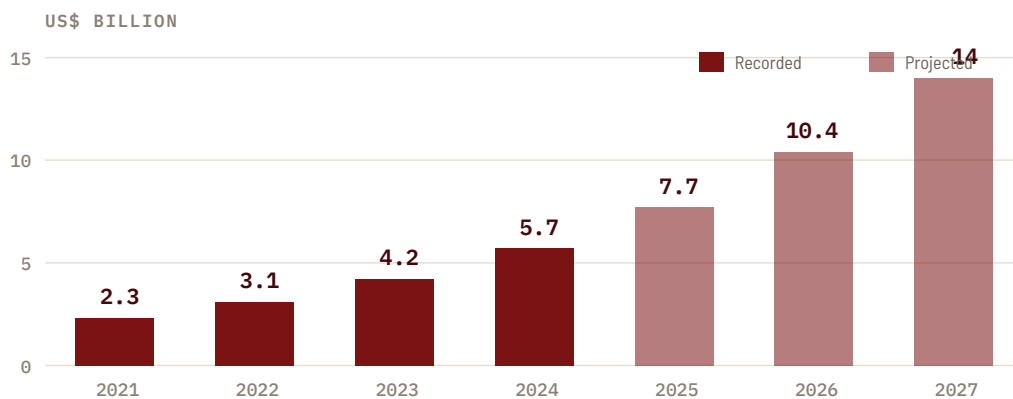
Connectivity also has a diplomatic effect. States and firms with large volumes moving through a port acquire a stake in its stability. The host government gains relevance because disruption would affect external actors. This creates a form of structural influence that differs from coercion. The port becomes important because others need it to remain open, efficient, and politically predictable. Yet this influence is conditional on performance. If reliability deteriorates or costs become uncompetitive, shipping networks can gradually shift toward alternative hubs.

The Smart Port as an Operational System

Digitalisation has become a principal means of defending network position. Modern ports use automation, robotics, artificial intelligence, 5G connectivity, sensors, digital twins, and terminal operating systems to coordinate vessels, cranes, containers, trucks, trains, storage, customs, and security. The objective is not technology for its own sake. It is to reduce uncertainty and increase the amount of cargo that can move through a fixed physical footprint.

The Tuas Port in Singapore highlights event-driven architecture: a system in which vessel arrivals, container movements, and equipment-status changes trigger real-time information exchange across interconnected platforms. This type of architecture replaces sequential, manual coordination with continuous machine-readable updates. When implemented effectively, it can shorten waiting time, improve yard planning, reduce unproductive moves, and make the port more predictable to shipping lines and cargo owners.

Predictability is strategically important because ports compete on more than nominal capacity. A terminal that can handle a theoretical volume but produces irregular delays is less valuable than one with slightly lower capacity and consistently reliable performance. Digital systems help transform physical infrastructure into dependable service. They also allow ports to integrate with customs, freight forwarders, rail operators, warehouses, and shipping alliances, creating a wider logistics ecosystem.

FIG 9 The global smart-port market, 2021-2027

Source: STC. US\$ billion, at a compound annual growth rate of about 35 per cent. Values from 2025 are projected.

The smart-port market graphic projects an increase from \$2.3 billion in 2021 to \$14 billion in 2027, with a compound annual growth rate of approximately 35 per cent. A separate estimate identifies a distinct port-automation solutions market valued at \$6.8 billion in 2025 and projected to reach \$14.7 billion by 2034. These estimates should not be merged because they describe different market boundaries. Together, however, they support the same strategic conclusion: digital and automated capability is becoming a core component of port competitiveness and resilience.

Automation can reduce exposure to labour shortages, human error, and repetitive operational bottlenecks. Automated guided vehicles, ship-to-shore cranes, and machine-learning-supported terminal systems can maintain throughput during periods of stress. Yet automation does not remove human dependence. It shifts dependence toward software engineers, maintenance providers, electricity, communications, system integration, and specialised vendors. A port may become less vulnerable to a conventional strike while becoming more vulnerable to a cyber incident or supplier failure.

Data as a Strategic Commodity

The digital port does not merely move cargo more efficiently; it produces a detailed picture of economic activity. Terminal systems record vessel schedules, container origins and destinations, cargo owners, dwell times, inspection patterns, equipment status, and inland movements. Aggregated across multiple terminals, this information can reveal trade dependencies, industrial rhythms, supply-chain bottlenecks, and the commercial behaviour of firms and states.

This creates a form of informational power. An operator with access to port data can improve commercial

decisions, but the same information may also have strategic value. It can indicate which industries depend on particular imports, where inventories are concentrated, which shipping lines serve military or dual-use cargo, and how quickly a state can reroute trade. The strategic concern is not that every operator will misuse data, but that data governance often receives less scrutiny than physical ownership even though the information layer may be more transferable and easier to aggregate.

Ports are also linked to subsea cable infrastructure. Coastal gateways frequently coincide with cable landing zones and telecommunications networks that carry the overwhelming majority of

international data traffic. This overlap creates a double strategic role: the port is a node in both physical and digital circulation. The same coastal area may host container terminals, energy infrastructure, naval facilities, cable landings, and data centres. Protecting the port therefore requires coordination across institutions that are often regulated separately.

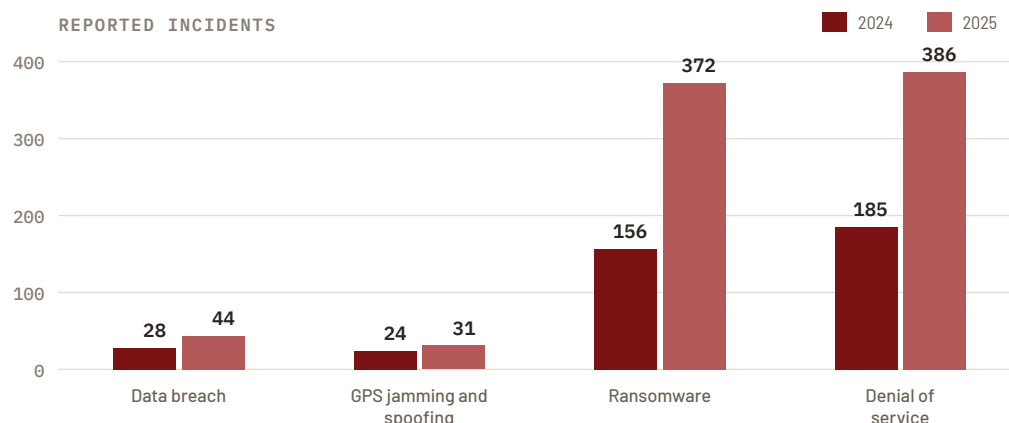
Artificial intelligence and digital twins increase the value of this data because they can model flows, predict congestion, allocate resources, and identify anomalies. They also increase dependence on data quality and system integrity. A corrupted dataset or manipulated sensor can produce decisions that appear technically rational while degrading operations. Cybersecurity in a smart port is therefore not only a matter of confidentiality; it is a matter of operational truth.

Cyber Risk: From Information Loss to Physical Disruption

The attack surface of a modern port is unusually wide. It includes corporate information technology, operational technology, cranes, gates, access-control systems, navigation interfaces, communications, sensors, internet-of-things devices, third-party logistics platforms, customs links, and remote maintenance connections. New technology is often integrated with legacy systems that were not designed for hostile network environments. Weak authentication, unpatched equipment, vendor access, and poor segmentation can allow an intrusion to move from administrative systems into operational processes.

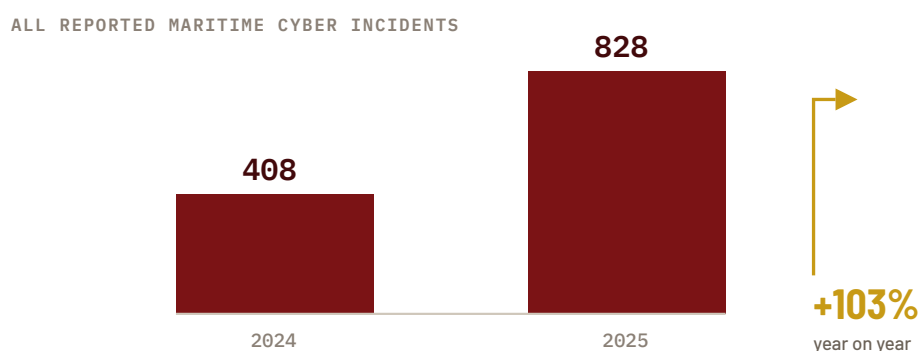
The threat set includes several classes of threat: data breaches, ransomware, distributed denial-of-service attacks, GPS jamming and spoofing, sabotage through suppliers, and compromise of navigation or safety systems. The consequences extend beyond stolen information. A cyberattack can prevent containers from being located, stop gates from processing trucks, disrupt crane operations, corrupt manifests, delay customs release, or create unsafe vessel movements. Because major ports operate continuously and at high density, even a short interruption can generate a backlog that takes much longer to clear.

The evidence cites a 400 per cent increase in cyberattacks against ports between February and May 2020 and 64 incidents in 2023. The Safety4Sea graphics then depict a sharp rise between 2024 and 2025. The first breaks incidents into data breaches, GPS jamming or spoofing, ransomware, and distributed denial-of-service attacks. Its category totals are 393 for 2024 and 833 for 2025. The second graphic reports aggregate totals of 408 and 828. Because the categories and totals are not identical, they should not be combined into one time series without the underlying methodology. Their proper use is directional: both indicate a substantial rise in reported maritime cyber incidents and a growing concentration in ransomware and denial-of-service activity.

FIG 10 Reported maritime cyber incidents by type, 2024–2025


Source: Safety4Sea. Category totals are 393 for 2024 and 833 for 2025.

The predominance of ransomware and denial-of-service incidents in Figure 10 places operational continuity at the centre of the maritime cyber-risk assessment. Such attacks can undermine access to the systems that coordinate cargo movements, documentation and terminal services, creating disruption beyond the initially affected organisation. Figure 11 broadens the perspective to aggregate reporting, showing an increase from 408 incidents in 2024 to 828 in 2025, approximately 103 per cent. However, these aggregate figures do not reconcile with the category totals in Figure 10 and should therefore be treated as a separate series. Both indicate rising reported activity, but neither directly measures successful attacks, port shutdowns or economic losses. The strategic implication is to assess exposure through the criticality of affected functions and the capacity to restore them, alongside incident frequency.

FIG 11 Aggregate maritime cyber incidents, 2024–2025


Source: Safety4Sea. These aggregate totals – 408 and 828 – do not match the sum of the categories in Figure 10; the two series should be read directionally, not merged.

The strategic implication is that cyber resilience must be designed into the port rather than added after digitalisation. Critical systems require segmentation, strong identity controls, offline recovery capability, tested manual procedures, vendor-risk management, redundant communica-

tions, and exercises that include shipping lines, customs, police, naval authorities, and inland transport operators. Technical protection alone is insufficient if the port community has no agreed crisis command structure.

Cyber defence also raises a sovereignty question. If core terminal software, cloud services, cranes, scanners, or communications are supplied and maintained by foreign firms, the host state may lack full visibility into vulnerabilities and dependencies. The issue is not solved by excluding foreign technol-

ogy; most ports rely on international vendors. It is managed through source-code access where appropriate, contractual audit rights, data localisation or controlled transfer, interoperability, and the ability to operate critical functions when external support is unavailable.

Hyper-Concentration and the Efficiency-Resilience Paradox

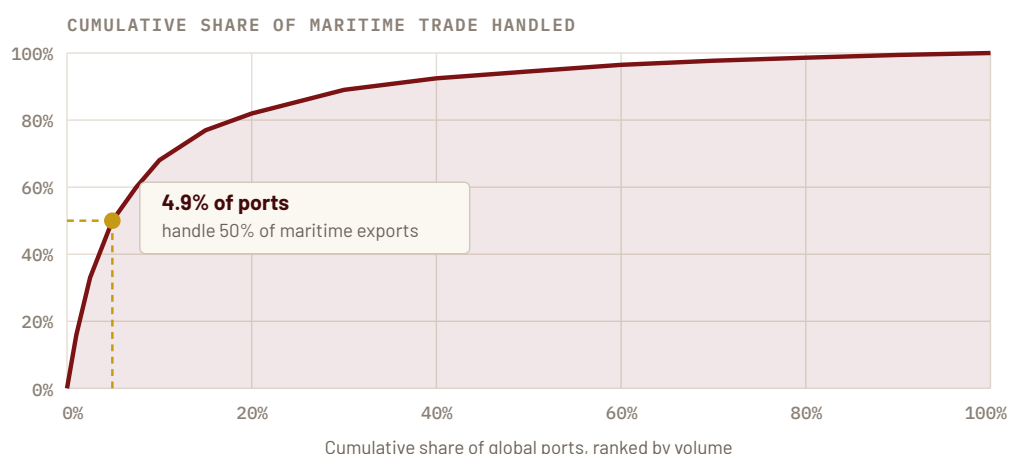
The global port network is highly concentrated. The cited network research indicates that 4.9 per cent of ports handle 50 per cent of maritime exports and 6.3 per cent handle 50 per cent of maritime imports. The top ten ports influence approximately 9.3 per cent of global economic output, while Shanghai alone is associated with about 1.7 per cent. These figures reveal a network in which a small number of nodes have effects far beyond their local economies.

4.9% OF PORTS HANDLE HALF OF MARITIME EXPORTS	6.3% OF PORTS HANDLE HALF OF MARITIME IMPORTS	9.3% OF GLOBAL OUTPUT TIED TO THE TOP TEN PORTS	43.5% PEAK RELIANCE ON ONE NATIONAL GATEWAY
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Concentration is the product of efficiency. Shipping lines prefer hubs that can handle large vessels, offer frequent connections, and process cargo quickly. Cargo attracts services, and services attract more cargo, creating a self-reinforcing core-periphery

structure. The same process that lowers average transport cost also creates systemic dependence. When a core port fails, peripheral ports may lack the capacity, equipment, labour, or inland links to absorb the displaced volume.

FIG 12 Concentration in the global maritime network



Source: Verschuur, Koks and Hall. Cumulative distribution reconstructed from the reported thresholds.

The COVID-19 period demonstrated how local congestion can propagate through global production. Labour shortages, changing consumption patterns, vessel bunching, container imbalances, and rigid hinterland systems caused delays and freight-rate volatility. The Shanghai Containerised Freight Index became a visible barometer of this stress. The lesson is not that global trade should be de-concentrated entirely; concentration produces real efficiency. The lesson is that efficiency without redundancy creates fragility.

For individual states, dependence may become existential. The evidence identifies cases in which up to 43.5 per cent of domestic economic activity relies on a single maritime gateway. The same evidence notes that 82 per cent of global trade in mining and quarrying depends on maritime transport. A state with one dominant port may experience faster economic paralysis than a larger multi-port state because cargo cannot be redistributed across alternative coasts or corridors.

TABLE 6 – STRUCTURAL PORT DEPENDENCE AND NATIONAL RESILIENCE

State Profile	Structural Dependency	Vulnerability / Strategic Resilience	Examples
Highly dependent / functionally single-port state	Up to 43.5% of total economic activity may rely on one maritime gateway.	Extreme systemic vulnerability and limited compatible redundancy; disruption can produce rapid paralysis.	Iceland (Reykjavik); Malta (Marsaxlokk); Mauritius (Port Louis).
Diversified / multi-port state	Maritime trade is distributed across several coasts and major port systems.	Higher resilience when cargo can be rerouted to terminals with compatible capacity and hinterland links.	United States; China.

The comparison between single-port and multi-port states should not be interpreted mechanically. A country may have several ports on paper but remain dependent on one terminal for containers, energy, or a particular industrial sector. True redundancy requires compatible capacity. An alternative port must have sufficient draft, cranes, storage, customs, labour, road and rail links, and shipping services. Resilience is therefore commodity-specific and function-specific, not merely geographic.

The Port as a System of Systems

A port can be operational while the port system is failing. Vessels may berth, yet cargo remains trapped because roads are congested, rail capacity is unavailable, customs systems are offline, or warehouses are full. Conversely, a terminal may be damaged while the national system remains resilient because alternative ports and inland corridors absorb the flow. Strategic assessment must therefore move beyond the perimeter fence.

The port system includes at least six interdependent elements. The first is marine access: channels, pilots, tugs, anchorages, and navigation safety. The second is terminal capacity: berths, cranes, yards, fuel, repair, and handling equipment. The third is the hinterland: roads, railways, pipelines, inland ports, warehouses, and industrial zones. The fourth is the digital layer: cargo data, customs, scheduling,

communications, and operational technology. The fifth is governance: concessions, regulation, labour, tariffs, security responsibilities, and emergency authorities. The sixth is external support: electricity, water, telecommunications, finance, insurance, and access to replacement equipment.

A disruption in any one element can reduce the effective capacity of the whole. This is why headline throughput figures can be misleading during crisis planning. The relevant measure is not maximum annual capacity but sustained priority throughput under degraded conditions. A port capable of handling millions of TEUs in normal operations may be unable to process critical food, fuel, or military cargo if one digital or inland dependency fails.

Climate Risk and the Fixed Geography of Ports

Ports are physically tied to coastlines, estuaries, river mouths, and low-lying industrial areas. Unlike many government functions, they cannot be relocated quickly or cheaply. Sea-level rise, storm surge, extreme weather, heat, sedimentation, and changing water availability therefore create long-term strategic risk. The Panama Canal example shows how climate can constrain a corridor before catastrophic physical damage occurs: reduced water availability lowers draft and transit capacity, altering route economics.

The same logic applies to coastal terminals. A port may remain intact while access roads flood, power substations fail, workers cannot reach the site, or

waves close the approach channel. Climate adaptation must therefore cover the wider logistics zone, not only seawalls and quays. It may require elevated electrical systems, protected data facilities, redundant power and water, revised design standards, improved drainage, and alternative inland routes.

Climate risk also affects investment horizons. Port assets and concessions are designed for decades. Decisions made today about elevation, berth design, land reclamation, and industrial zoning lock in future exposure. Underinvestment in resilience can create a hidden sovereign liability, while overbuilding without realistic traffic can create fiscal strain. The capital must therefore integrate climate scenarios into port finance and national security planning rather than treating adaptation as a separate environmental programme.

A Strategic Doctrine of Port Resilience

The evidence supports a resilience doctrine built around five principles. The first is redundancy: alternative ports, berths, power supplies, communications, and inland routes. The second is recoverability: tested procedures for restoring critical functions, including manual operations and prioritised cargo. The third is visibility: real-time understanding of vessel, cargo, equipment, and hinterland status. The fourth is interoperability: the ability to shift operations across terminals, operators, and systems without becoming trapped by proprietary technology. The fifth is governance under stress: clear authority to coordinate public and private actors during disruption.

Resilience is expensive because it requires spare capacity and duplication that may appear inefficient in normal conditions. Yet the concentration data demonstrate that the cost of failure is not local. A state that treats port resilience as a commercial responsibility alone underestimates the public consequences of disruption. The strategic port should be regulated as critical national infrastructure while preserving enough commercial flexibility to remain competitive.

The Geopolitics of
Access
**Sea Power, Law, and
Deterrence**

Mahan, Corbett, and the Strategic Meaning of the Port

Classical sea-power theory remains useful because it explains why ports matter in different ways. Alfred Thayer Mahan understood maritime power through command of sea lines of communication, commercial strength, concentrated fleets, and secure bases. In this framework, ports are the logistical foundations of naval power. Fleets require fuel, ammunition, maintenance, repair, crews, intelligence, and protected anchorages. A state may possess capable ships, but without a network of ports it cannot sustain operations far from home.

Julian Corbett offered a more conditional understanding. Sea control is rarely absolute or permanent; it is exercised locally and for specific purposes. The objective of maritime strategy is to secure communications, support operations on land, and deny the opponent the use of selected routes. Ports are therefore not only fleet bases. They are nodes through which temporary control, blockade, logistics, and joint operations can be organised. This perspective is particularly relevant to contemporary chokepoints, where limited forces can create strategic effects without defeating an adversary's entire navy.

Admiral Jackie Fisher's identification of Singapore, the Cape of Good Hope, Alexandria, Gibraltar, and Dover as "keys that lock up the world" captures the convergence of Mahanian and Corbettian logic. Each location combines a port with a constrained route between larger maritime spaces. Control or reliable access allows fleets to sustain themselves and allows states to regulate, protect, or threaten movement. The enduring importance of these sites confirms that technology has changed the means of maritime power without eliminating the strategic value of position.

Contemporary Chinese strategy, in this analytical framing, combines both traditions. The expansion of a blue-water fleet reflects a Mahanian concern with naval capability and presence. The development of commercial stakes and logistics nodes along sea lines of communication reflects a Corbettian concern with access, sustainment, and positional influence. The same synthesis is visible in established United States and allied networks, although the legal and political basis differs. The strategic competition is therefore not only about the number of warships. It is about which fleets can obtain fuel, repair, information, and political permission across the wider maritime system.

Legal Geography: Why Proximity Does Not Equal Authority

The physical value of a port is conditioned by the legal regime governing surrounding waters. The 1982 United Nations Convention on the Law of the Sea extended the territorial sea to twelve nautical miles, bringing many important straits within coastal-state jurisdiction. Without a special regime, this expansion could have allowed states to treat internationally essential passages as ordinary territorial waters. Part III of UNCLOS created the compromise of transit passage.

Transit passage grants ships and aircraft a non-suspendable right of continuous and expeditious movement through straits used for international

navigation between areas of the high seas or exclusive economic zones. The regime includes warships and state aircraft; submarines may transit submerged, and aircraft may overfly. Coastal states retain authority to adopt safety and environmental rules, but they may not use those rules to deny or substantially hamper passage.

This legal structure limits the ability of a straight-adjacent state to convert geography into absolute closure. It does not eliminate strategic leverage. Coastal states still possess enforcement capabilities, domestic laws, ports, naval forces, sensors, and the ability to create factual uncertainty. Yet the distinction between lawful regulation and unlawful obstruction affects diplomacy, coalition building,

commercial confidence, and the legitimacy of countermeasures. Law is therefore part of the operational environment rather than an external constraint on strategy.

Ports are central to this legal geography because they are the sites where abstract rights become practical access. Port entry is not identical to passage through a strait. A ship may possess a right

to transit while lacking a right to berth, refuel, repair, load cargo, or receive services. Host states can therefore influence naval and commercial operations through port-access decisions even when they cannot lawfully close the wider corridor. This distinction gives political capitals significant authority over the strategic use of port infrastructure.

Hormuz and the Utility of Legal Ambiguity

The Strait of Hormuz meets the geographic criteria for transit passage under UNCLOS Articles 37 and 38. Iran, however, has not ratified UNCLOS and has argued for a more restrictive interpretation based on innocent passage. Innocent passage gives coastal states wider regulatory latitude and does not provide the same explicit protection for submerged submarine transit or military overflight. This difference creates legal ambiguity that can be used in grey-zone competition.

Ambiguity is strategically useful because it allows actions to be framed as law enforcement rather than coercion. Inspections, warnings, temporary detention, route instructions, or challenges to foreign vessels can be justified through domestic regulation even when external actors regard them as harassment. The immediate objective may not be to establish a definitive legal interpretation. It may be to impose delay, demonstrate presence, collect

information, or signal that passage can become contested.

The opposing response is also legal as well as military. States seeking to preserve transit passage emphasise customary international law, freedom of navigation, and the international character of the strait. Naval escorts and patrols are intended not only to protect vessels but also to demonstrate that restrictive claims will not be accepted in practice. The result is a contest in which legal argument, operational behaviour, and port access reinforce one another.

For nearby ports, this means that strategic value extends beyond cargo. They can support surveillance, patrols, logistics, repair, and coalition presence. Ports outside the strait may become more valuable because they reduce exposure to contested waters. The legal dispute therefore changes infrastructure incentives and can accelerate investment in alternative gateways such as Fujairah.

The Montreux Convention and Treaty-Governed Access

The Turkish Straits illustrate a different form of legal power. The Bosphorus and Dardanelles are governed by the 1936 Montreux Convention, which guarantees civilian passage in peacetime while imposing detailed restrictions on warships, particularly those of non-Black Sea powers. Advance notification, tonnage limits, ship-size restrictions, and limits on the duration of stay shape which naval forces can enter and remain in the Black Sea. In wartime or when

Turkey considers itself threatened, Ankara possesses wider authority to restrict belligerent naval passage.

The strategic effect is to make Turkey an arbiter of naval access. Geography gives the state the physical position; the treaty gives it internationally recognised discretion. Ports around the straits support this role by enabling monitoring, enforcement, logistics, and maritime administration. The Turkish case demonstrates that the power of a chokepoint

may be strengthened, not weakened, by law when a treaty formalises the coastal state's authority.

Montreux also shows why legal regimes cannot be treated as interchangeable. UNCLOS transit passage aims to protect continuous global mobility. Montreux reflects a specific historical settlement

that differentiates between commercial and military traffic and between regional and non-regional navies. Strategic planners must therefore understand the exact legal instrument governing each corridor rather than relying on a general concept of freedom of navigation.

Lawfare, Port State Control, and Administrative Leverage

The most effective use of maritime law is often administrative rather than dramatic. Port states possess authority over safety inspections, environmental compliance, customs, immigration, sanctions enforcement, cargo documentation, and security procedures. These powers are legitimate and necessary, yet their application can have strategic consequences. Selective intensity, procedural delay, or regulatory uncertainty can increase the cost of using a port without an explicit denial of access.

This creates a field of lawfare in which legal processes are used to shape commercial and military behaviour. A state may deny entry to a sanctioned vessel, impose conditions on cargo handling, restrict repair services, or require disclosures that expose commercial information. An operator may be formally private while acting within a regulatory environment shaped by national policy. The distinction between commercial choice and state action can become intentionally blurred.

The same mechanisms can protect strategic autonomy. Investment-screening laws, data-protection rules, security clearances, emergency intervention powers, and concession conditions allow capitals to regulate foreign participation without expropriation. Legal preparedness is therefore a component of port resilience. A state that has not defined its authority before crisis may discover that long-term contracts, arbitration clauses, or fragmented institutional responsibilities constrain action when access becomes politically sensitive.

Deterrence Through Access and Denial

Ports contribute to deterrence in two directions. Access enables a state or alliance to sustain naval presence, protect shipping, and demonstrate the capacity to reinforce a theatre. Denial threatens an adversary's logistics, trade, or freedom of manoeuvre. The same port may support both functions depending on who controls it and under what conditions.

Deterrence is strongest when access is credible before crisis. A nominal agreement that has never been exercised may fail under political pressure. Regular commercial calls, joint exercises, maintenance arrangements, pre-positioned equipment, and interoperable procedures increase confidence that the port can support operations. Conversely, an adversary may seek to weaken deterrence by acquiring commercial influence, mobilising local opposition, exploiting legal disputes, or creating uncertainty over whether access will be granted.

The central legal-strategic lesson is that ports sit at the intersection of sovereignty and network dependence. The host state retains decisive authority, but its choices are constrained by treaties, commercial obligations, alliance expectations, and the economic consequences of disruption. Control is therefore neither purely territorial nor purely legal. It is the capacity to align law, infrastructure, political permission, and operational capability at the moment access is contested.

Dual-Use Infrastructure and the Maritime **Grey Zone**

The Commercial–Military Continuum

The distinction between a commercial port and a naval base is no longer binary. Modern terminals can possess infrastructure that is economically justified in peacetime and militarily useful in crisis: deep-water access, long reinforced berths, heavy-lift cranes, secure storage, fuel, workshops, communications, and rapid connections to roads, railways, and pipelines. The same characteristics that allow a port to receive larger container ships or bulk carriers can enable it to support destroyers, amphibious vessels, auxiliaries, or submarines.

This does not mean that every deep-water terminal is a covert military installation. Capability, access, and intent must be separated. A port may be physically capable of supporting a navy but legally unavailable. A foreign operator may manage a termi-

nal without authority to admit warships. A host government may permit a short logistics call without agreeing to a permanent presence. A formal base adds dedicated command, security, personnel, munitions, and sovereign arrangements that ordinary commercial access does not provide. Strategic concern arises from the possibility that these layers can be assembled incrementally.

The most useful concept is latent military option value. Commercial investment can reduce the time, cost, and political difficulty of obtaining future naval support. Existing staff understand the facility; physical dimensions are known; supply chains and maintenance relationships already exist; data can be collected; and the host government has an established economic relationship with the investing actor. In a crisis, these advantages may not guarantee access, but they improve the investor's position compared with a state that has no presence at all.

China's Maritime Expansion and Military–Civil Fusion

China's military-civil fusion framework is treated as the clearest contemporary expression of this continuum. Chinese state-owned enterprises build, finance, or operate commercial infrastructure while the People's Liberation Army Navy develops the capacity for sustained operations beyond China's immediate waters. The strategic logic is not that every project must become a base. It is that civilian infrastructure should, where possible, avoid excluding future military use and should contribute to national strategic capacity.

China's overseas port footprint provides scale to this approach. The data identify 78 ports across 32 African countries involving Chinese state-owned enterprises, more than 40 projects in Latin America and the Caribbean, and at least 91 active port projects assessed as possessing physical potential for naval use. These figures describe different scopes but reveal a broad geographic distribution. The resulting network offers commercial presence

along sea lines of communication connecting Chinese trade with energy suppliers, markets, and strategic waterways.

Djibouti provides the strongest evidence of operational conversion. Chinese state-owned enterprises financed and operated commercial infrastructure near the Bab el-Mandeb, and China established its first official overseas military base there in 2017. The base is located approximately six miles from a major United States installation. Its position allows the PLAN to support anti-piracy operations, protect shipping, sustain deployments in the Indian Ocean, assist evacuation or peacekeeping missions, and maintain a presence near the Red Sea gateway.

Djibouti should not be treated as proof that all Chinese commercial ports will follow the same path. Its host government has deliberately accommodated multiple foreign militaries and monetised its strategic geography. It is nevertheless an important precedent because it demonstrates that commercial investment, logistics requirements, host-state incentives, and military access can converge. The case changes the burden of analysis: dual-use concerns can no longer be dismissed as purely hypothetical, but each facility still requires individual assessment.

Strategic Port Cases: Different Forms of Option Value

Gwadar is important because of its location in Pakistan and its conceptual connection to an overland corridor toward western China. In strategic discourse, it offers the possibility of reducing exclusive dependence on the Strait of Malacca and of supporting Chinese access to the Arabian Sea. Its actual military value

depends on infrastructure, security, traffic, inland transport, host-state permission, and the economic viability of the corridor. The port's significance therefore lies partly in realised capacity and partly in the options it creates.

TABLE 7 – SELECTED DUAL-USE AND STRATEGICALLY SENSITIVE PORTS

Strategic Port	Host Nation	Investing / Operating Entity	Dual-Use or Geopolitical Implications
Djibouti (Doraleh)	Djibouti	China Merchants Port / PLA Navy	Adjacent to China's first overseas military base and positioned at the Bab el-Mandeb gateway.
Gwadar	Pakistan	Chinese state-owned enterprises	Potential overland link toward western China; deep-water infrastructure with latent naval utility.
Hambantota	Sri Lanka	China Merchants Port	Long concession and Indian Ocean location; central to debt and strategic-access debate.
Darwin	Australia	Landbridge Group (China)	A 99-year lease generated security concern because of proximity to US–Australian military activity.

Hambantota occupies a strategic position in the Indian Ocean and is operated under a long-term Chinese lease. The debt debate has often overshadowed the operational question. The critical issue is not whether the lease resulted from a pre-planned seizure but what rights, information, infrastructure, and relationships the concession creates over time. A commercially underperforming port can still retain strategic value if it offers location, deep water, storage, or potential support to vessels transiting the Indian Ocean.

Ream in Cambodia is cited as another node attracting concern over possible Chinese military access. Its relevance derives from proximity to the South China Sea and the broader question of whether commercial and security cooperation can produce an exclusive or semi-exclusive presence. As with other cases, analysis must distinguish construction

characteristics, access patterns, host-state statements, and observed military activity.

Darwin presents a different political context. A 99-year lease to the Chinese Landbridge Group generated security concerns because the port is near United States–Australian military training activity. Australia retains sovereignty and defence authority, yet the controversy illustrates how a commercial agreement can become strategically sensitive after the surrounding security environment changes. Long concession periods create this problem: contracts signed under one threat perception may be judged differently a decade later.

These cases should not be compressed into a single narrative. Djibouti is an acknowledged military base adjacent to commercial infrastructure. Gwadar is a strategic corridor project with latent naval relevance. Hambantota combines a long concession

with an Indian Ocean location. Ream concerns possible security access. Darwin concerns foreign commercial operations within an allied defence

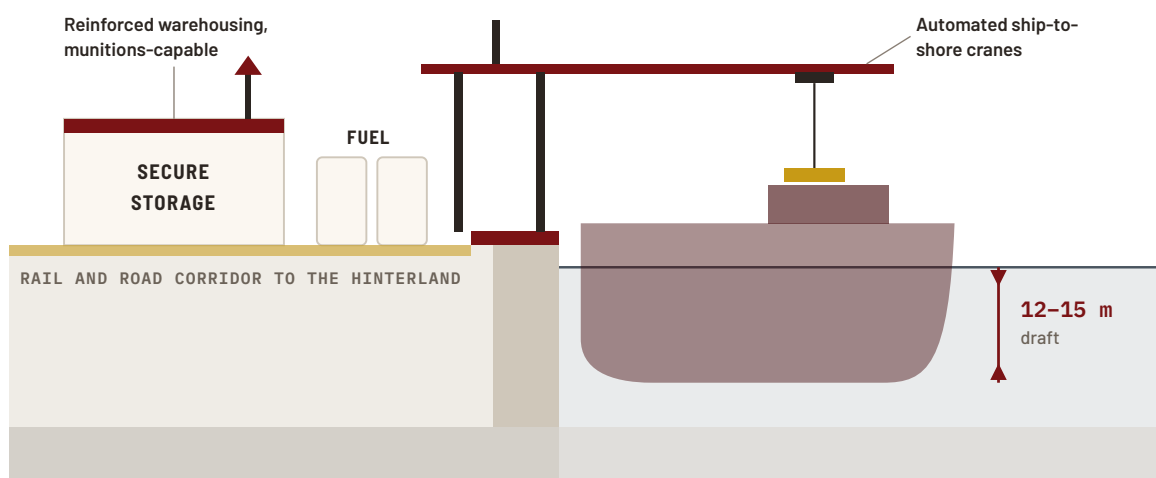
environment. The common factor is not a proven plan of militarisation, but the interaction between commercial rights and strategic geography.

Engineering Indicators of Dual Use

Physical design provides more reliable evidence than political rhetoric. The physical evidence includes deep-water berths with drafts of 12 to 15 metres, sufficient for large naval vessels exceeding 12,000 tonnes, including the PLAN's Type 055 guided-missile destroyers. Berths longer than 245 metres, reinforced concrete structures, high-capacity cranes, secure warehouses, fuel systems, and repair facilities increase the range of vessels and cargo a terminal can support.

No single feature proves military intent. Deep draft may be required for container ships or bulk carriers; reinforced quays support commercial loading; automated cranes improve productivity; and warehouses are normal port infrastructure. The analytical value lies in the combination of features and their relationship to observed access. A port becomes more strategically significant when naval-suitable dimensions coincide with controlled areas, secure fuel, communications, maintenance, storage that can be isolated, and repeated military visits.

FIG 13 The anatomy of a dual-use port



None of these features alone proves military intent – the combination does. above 245 m · reinforced apron · secure communications · isolable areas

Compiled by the authors from the engineering indicators discussed in the text.

The inland network is equally important. The infrastructure network includes links such as the Standard Gauge Railway from Mombasa to Nairobi and the Benguela Railway in Angola. A port connected to rail and road corridors can support influence beyond the coastline, moving commercial goods, personnel, equipment, and potentially military supplies into the interior. The strategic unit is therefore the port-corridor complex, not the waterfront alone.

This insight complicates conventional defence analysis. A naval base is visible and politically explicit. A dual-use logistics network is distributed across commercial entities and infrastructure projects. Its military value may emerge from cumulative compatibility rather than from a single secret facility. Analysts must therefore examine berth dimensions, ownership, data systems, fuel contracts, warehouse control, rail links, local security arrangements, and patterns of vessel calls together.

Allied Port Networks: A Different Institutional Model

The United States and NATO also depend on extensive port networks across the Mediterranean, the Gulf, Japan, South Korea, and other allied regions. Their global maritime reach would be impossible without access to foreign infrastructure. This comparison is essential because dual-use logistics is not uniquely Chinese. All blue-water navies require commercial shipyards, fuel, repair, and host-nation support beyond dedicated bases.

The strategic difference lies primarily in institutional form and transparency. Allied access is generally embedded in defence treaties, status agreements, host-state consent, exercises, and publicly recognised military relationships. Chinese commercial-first expansion often creates uncertainty over whether future military access is intended, possible, or negotiable. The uncertainty can generate a security dilemma: host states may see investment and development, while rival states see

a distributed logistics architecture that could support power projection.

Neither model is free from political risk. Treaty allies can restrict access when domestic politics change. Commercial relationships can fail to produce military permission in crisis. Formal bases are secure but highly visible and potentially vulnerable; dispersed commercial access is less assured but offers flexibility and lower political cost. A capable maritime strategy often combines dedicated bases, allied facilities, commercial contracts, and replenishment at sea.

For host states, the key issue is strategic autonomy. A government may welcome investment and military cooperation while seeking to avoid exclusive dependence on one external power. It can preserve autonomy by diversifying operators, limiting exclusivity, separating commercial and military zones, retaining security authority, auditing digital systems, and defining in advance the conditions under which foreign state vessels may receive support.

The Grey Zone Beyond the Port

Dual-use activity extends beyond fixed infrastructure. The evidence describes Chinese oceanographic and survey vessels operating across the Indian Ocean, the South Pacific, waters near Vietnam, and areas east of Taiwan. Vessels such as Shi Yan 6, Shen Hai Yi Hao, Lan Hai 201, Haiyang Dizhi 8, and Xiang Yang Hong 6 conduct activities that can produce legitimate scientific and commercial data while also generating information relevant to naval operations.

Bathymetric surveys map seabed depth and terrain, which are important for submarine navigation, anti-submarine warfare, cable routes, and amphibious planning. Measurements of currents, salinity, temperature, and electromagnetic conditions can improve underwater detection and operational modelling. The dual-use character lies in the data, not necessarily in the outward appearance of the vessel. A research mission can be scientifically valid and strategically useful at the same time.

A CSIS assessment cited here indicates that more than 80 per cent of active Chinese research vessels displayed suspect behaviour or organisational links suggesting involvement in advancing Beijing's

geopolitical agenda. The significance of this activity is its position below the threshold of armed conflict. Survey vessels can enter or approach sensitive waters under scientific or commercial justification,

Ports support this grey-zone activity by providing replenishment, repair, crew changes, permissions, and data transfer. A commercial port relationship may therefore enable mobile intelligence collection even when no permanent naval presence exists. The strategic network consists of ships, ports, research institutions, companies, and state agencies whose formal roles remain distinct, but whose capabilities can be mutually reinforcing.

collect data, test responses, and normalise presence without triggering the reaction associated with a warship.

Indicators for Strategic Assessment

A disciplined dual-use assessment should examine evidence across five categories. The first is physical suitability: depth, berth length, structural strength, fuel, repair, storage, and access control. The second is institutional linkage: ownership, financing, operator relationships, military-civil policies, and government ties. The third is usage: naval visits, replenishment, security restrictions, exercises, and patterns of access. The fourth is network integration: nearby chokepoints, inland corridors, communications, and relations to other nodes. The fifth is political permissibility: host-state alignment, legal agreements, domestic opposition, and crisis decision-making.

Analysts should resist both alarmism and complacency. Labelling every foreign-operated terminal a military base weakens credibility and obscures genuine cases. Treating all commercial infrastructure as neutral ignores the way strategy uses existing capacity. The appropriate judgement is probabilistic: what military functions could the port support, how quickly could they be activated, what political decisions would be required, and what evidence indicates that such use is being prepared or exercised?

Infrastructure as Deterrence, Leverage, and Vulnerability

Dual-use infrastructure can deter attacks by demonstrating that a state or alliance can sustain forces in a region. It can create leverage by making access conditional. It can also create vulnerability by exposing host states to espionage, sabotage, political pressure, or external attack. A port that supports foreign military logistics may become a target even if its normal function is commercial. Conversely, excluding all dual-use capability may leave a state unable to reinforce or protect its own maritime routes.

The strategic objective is not to eliminate dual use, which is inherent in modern logistics. It is to govern it. Capitals must decide who may operate critical infrastructure, what data can be accessed, how military calls are authorised, which areas remain under national security control, and how emergency intervention will occur. Ports provide the capacity; political authority determines whose strategy that capacity serves.

Strategic Synthesis
**Ports, Capitals, and
National Power**

Why the Port Can Become More Immediately Decisive

The comparison between ports and capitals becomes meaningful only when a specific function and time horizon are identified. A political capital is the source of lawful authority and national command. A port is a concentration of material dependency. During a diplomatic dispute, the capital may be the decisive arena. During a fuel interruption, industrial stoppage, naval reinforcement, or food-supply emergency, the port may become more immediately consequential because its failure produces effects measured in hours and days rather than in institutional cycles.

This immediacy is strongest in five types of state. The first is the trade-dependent economy whose exports, imports, and public revenue are concentrated in maritime flows. The second is the single-port or functionally single-port state, where alterna-

tive terminals cannot handle the same cargo. The third is the energy-importing or energy-exporting state dependent on a chokepoint. The fourth is the archipelagic or geographically constrained state for which maritime transport is the principal form of domestic and external connectivity. The fifth is the expeditionary military power whose overseas operations depend on access to logistics nodes beyond its own territory.

In these circumstances, the port can become the state's operational centre of gravity. This does not mean that capturing or disabling one terminal automatically defeats the state. It means that the port is a node whose loss can rapidly degrade multiple national functions at once. The significance depends on redundancy, stockpiles, alternative routes, and restoration capacity. A diversified state may absorb disruption; a concentrated state may face immediate paralysis.

Why the Capital Remains Strategically Superior in Sovereign Terms

Ports possess capability but not independent legitimacy. They cannot define national interest, change concession law, authorise military access, mobilise fiscal resources, negotiate transit rights, or decide whether commercial disruption justifies escalation. These powers remain in the political capital. Even the most globally connected port depends on the state for security, regulation, diplomacy, currency, infrastructure finance, and crisis authority.

The capital also determines whether port power serves national strategy or private interest. Without effective governance, a port may become an enclave whose revenues, data, and contracts benefit a narrow coalition while national vulnerability grows. Foreign investment may be accepted without a clear security assessment. Capacity may be expanded without realistic traffic. Digital systems may be purchased without sovereign access to data. Military-suitable infrastructure may emerge without defined rules for foreign use. The port is therefore not a substitute for the state; it is a test of state capacity.

The table reinforces the central judgement. Political capitals and strategic ports possess different forms of leverage. Capitals operate through law, diplomacy, fiscal policy, regulation, and command. Ports operate through access, throughput, physical denial, network centrality, and operational information. Their vulnerabilities are likewise different. A capital can suffer institutional paralysis or attacks on governance networks; a port can suffer blockade, labour disruption, cyberattack, equipment failure, or climate damage. National resilience depends on preventing a failure in one centre from disabling the other.

TABLE 8 – POLITICAL CAPITALS AND STRATEGIC PORTS: DISTINCT FUNCTIONS OF POWER

Dimension of Power	Political Capital	Strategic Port / Functional Capital
Primary function	Legislative, diplomatic, fiscal, bureaucratic, and military command.	Logistics, physical trade, industrial production, energy access, and naval sustainment.
Source of leverage	Treaties, sanctions, regulation, taxation, currency, and command authority.	Chokepoints, throughput, tariff execution, material denial, network centrality, and access.
Global connectivity	Embassies, multilateral forums, central banks, financial regulators, and alliances.	Shipping alliances, terminal operators, intermodal corridors, free zones, and FDI clusters.
Time sensitivity	Usually acts through institutional and political decision cycles.	Disruption can affect inventories, fuel, production, and schedules within hours or days.
Principal vulnerability	Institutional paralysis, political fracture, or cyberattack on governance networks.	Blockade, congestion, labour disruption, cyberattack, equipment failure, and climate damage.
Substitutability	Continuity-of-government arrangements can relocate selected functions, but legitimacy remains centralised.	Alternative ports can absorb flows only when they possess compatible draft, equipment, data, and hinterland capacity.
Crisis consequence	Loss threatens legitimacy, national command, diplomacy, and administrative continuity.	Loss threatens material supply, exports, revenue, industrial continuity, and military logistics.

The Port-Capital System

The most useful strategic unit is the port-capital system: the institutional and physical relationship through which sovereign decisions are converted into flows and flows are converted into national power. A strong system has several characteristics. Port policy is integrated into national security and industrial strategy. Ownership and concessions are transparent enough for the state to understand its dependencies. Critical data is protected. Military and commercial access are governed by clear rules. Alternative terminals and corridors are prepared for disruption. Legal authorities can intervene without destroying investor confidence. Public and private actors exercise together.

A weak system displays the opposite pattern. The capital treats the port as a municipal or commercial issue until a crisis occurs. Ministries divide responsibility without a single command structure. Operators hold essential information that the state cannot access. Concession contracts limit emergency action. Customs, security, naval authorities, and terminal management use incompatible systems. Alternative ports exist nominally but cannot handle the displaced cargo. In such a state, the port's apparent efficiency conceals strategic fragility.

The port-capital system also shapes foreign policy. A state with diversified and resilient gateways can resist coercion more confidently because the cost of disruption is manageable. A state with concentrated dependence may adopt diplomatic caution not because it agrees with the external power, but because it cannot afford interruption. Economic statecraft therefore begins at home: autonomy depends on the infrastructure and governance that allow the state to absorb pressure.

Conclusion

Conclusion

The geography of power has shifted seaward, but it has not abandoned the state. Seaports have evolved from transport nodes into complex strategic systems where trade, industry, finance, data, law, and military logistics converge. Their importance rests on the scale of maritime dependence, the concentration of global flows, the fixed value of chokepoints, the rise of transnational terminal operators, the digitalisation of logistics, and the growing overlap between commercial and naval infrastructure.

The evidence shows the material scale of this transformation. Maritime transport carries roughly four-fifths of global trade by volume. Container ports process a disproportionate share of commercial value. A handful of terminals mediate half of global maritime exports and imports. Rotterdam, Jebel Ali, Shanghai, and Singapore demonstrate how ports can organise national and regional economies. Hormuz and the Red Sea demonstrate how narrow corridors convert local risk into global cost. Cyber incidents and climate stress demonstrate that the same centrality that creates power also creates vulnerability. Djibouti and other dual-use cases demonstrate that commercial infrastructure can generate military option value without following a single model of basing or control.

The most important analytical correction is to move beyond simple binaries. Foreign investment is neither automatically benign nor automatically a debt trap. A commercial port is neither necessarily civilian nor necessarily a covert base. Legal sovereignty does not always produce operational autonomy, and foreign operation does not automatically eliminate host-state control. Strategic assessment must identify the precise combination of rights, capabilities, dependencies, and alternatives present in each case.

The concept of the port as a functional capital captures the new reality while preserving the distinction between capacity and authority. The port concentrates the state's physical connection to the world. The capital concentrates the legal and political capacity to govern that connection. When the two are integrated, maritime infrastructure becomes a source of prosperity, resilience, and strategic reach. When they are disconnected, the port can become a single point of failure, an instrument of external leverage, or a powerful asset without coherent national purpose.

The decisive competition of the twenty-first century will therefore not be fought only over territory, fleets, or diplomatic alignments. It will also be fought over who finances ports, who operates terminals, who owns the data, who can reroute cargo, who can sustain naval forces, and who can keep critical gateways functioning under pressure. The state that secures these capabilities does not replace its capital with a port. It transforms the port into the operational expression of sovereign power.

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COLOPHON

About this study

This study asks whether the seaport has displaced the political capital as the decisive site of national power, and answers that it has not: the two form a single unit of analysis, and a state's strength depends on whether they are integrated or disconnected. It was prepared at Al Habtoor Research Centre on a research cut-off of 26 August 2026.

Every quantitative claim carries the institution that published it and the period it describes. Figures that are projections rather than measurements are identified as projections at every appearance. Where two credible sources disagree, both are given and the disagreement is named rather than resolved – the aggregate and category totals for maritime cyber incidents in Figures 10 and 11 are the clearest case, and the captions say so. Two exhibits depart from the sources they summarise because the underlying coordinates are not public; each says so in its own caption.

The study contains 13 figures and 8 tables, listed on their own page in the front matter together with the abbreviations used and a glossary of the terms particular to its subject. Sources are listed alphabetically and numbered at the end. Corrections and questions may be addressed to the Centre.

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