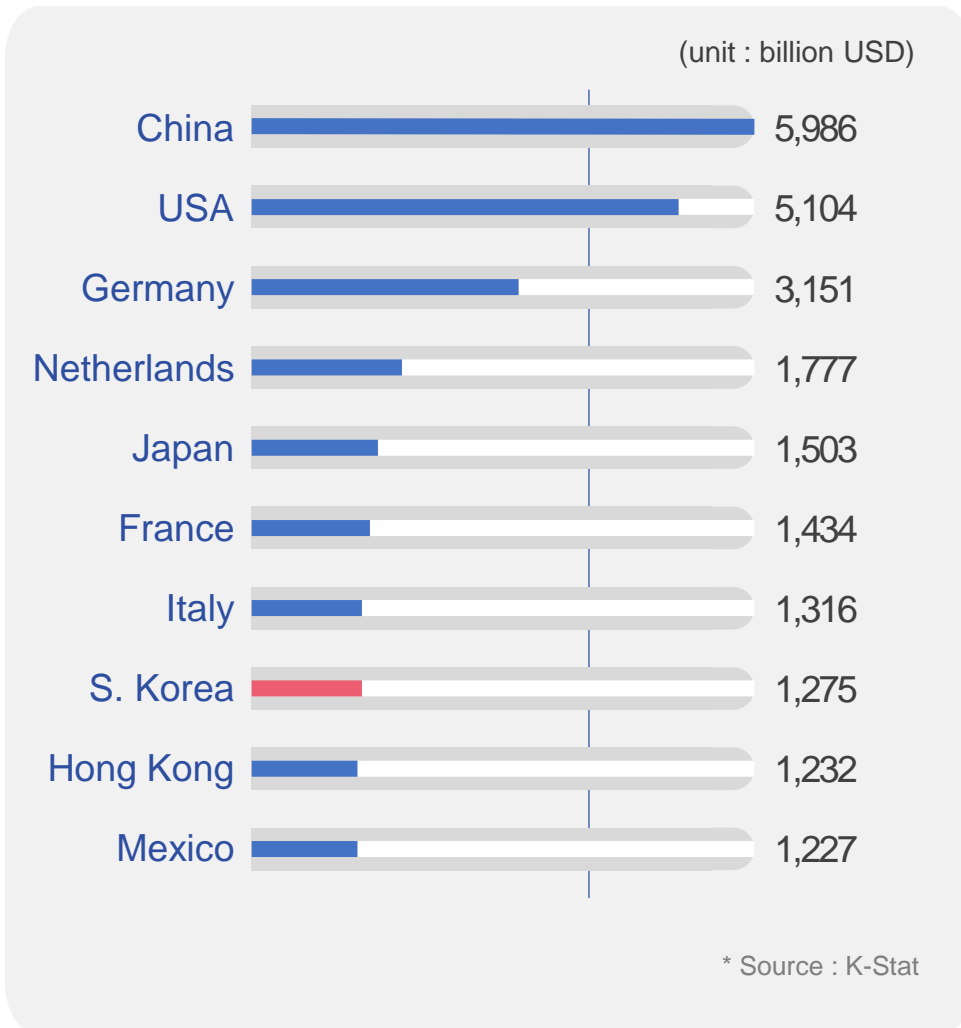


2024 IAPH World Ports Sustainability Program

Korean-made Port Crane Initiative



Top 10 Trading country (2023)

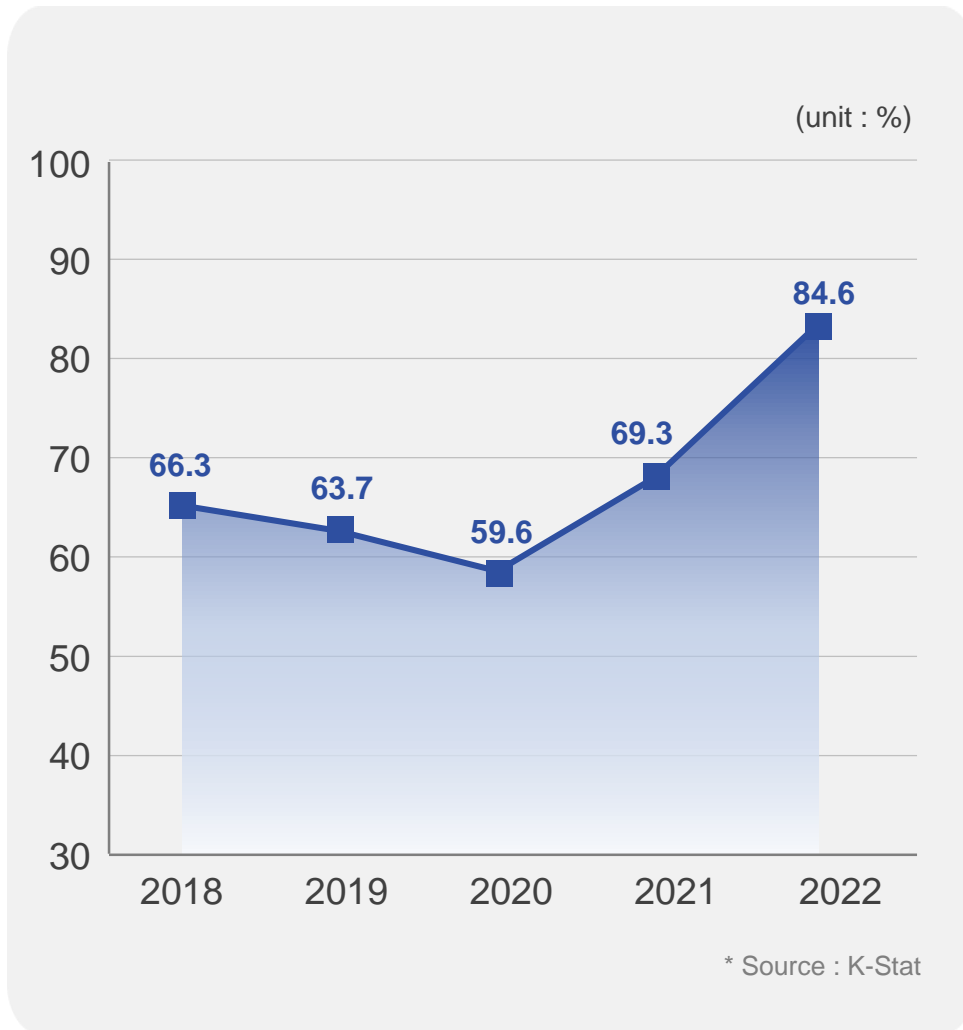


» S. Korea is one of the most biggest trading countries in the world.

» S. Korea traded 1,275 billion USD in the year of 2023

- Export : 632 billion USD
- Import : 643 billion USD

Trade / GDP in S. Korea



» Trade has been playing critical role in the economy of S. Korea.

» The share of Trade / GDP has been steeply growing in the recent years.

(in million USD)

	2020	2021	2022
Trade	980,131	1,259,493	1,414,955
GDP	1,644,610	1,817,690	1,673,260
%	59.6%	69.3%	84.6%

Geopolitical location of S. Korea



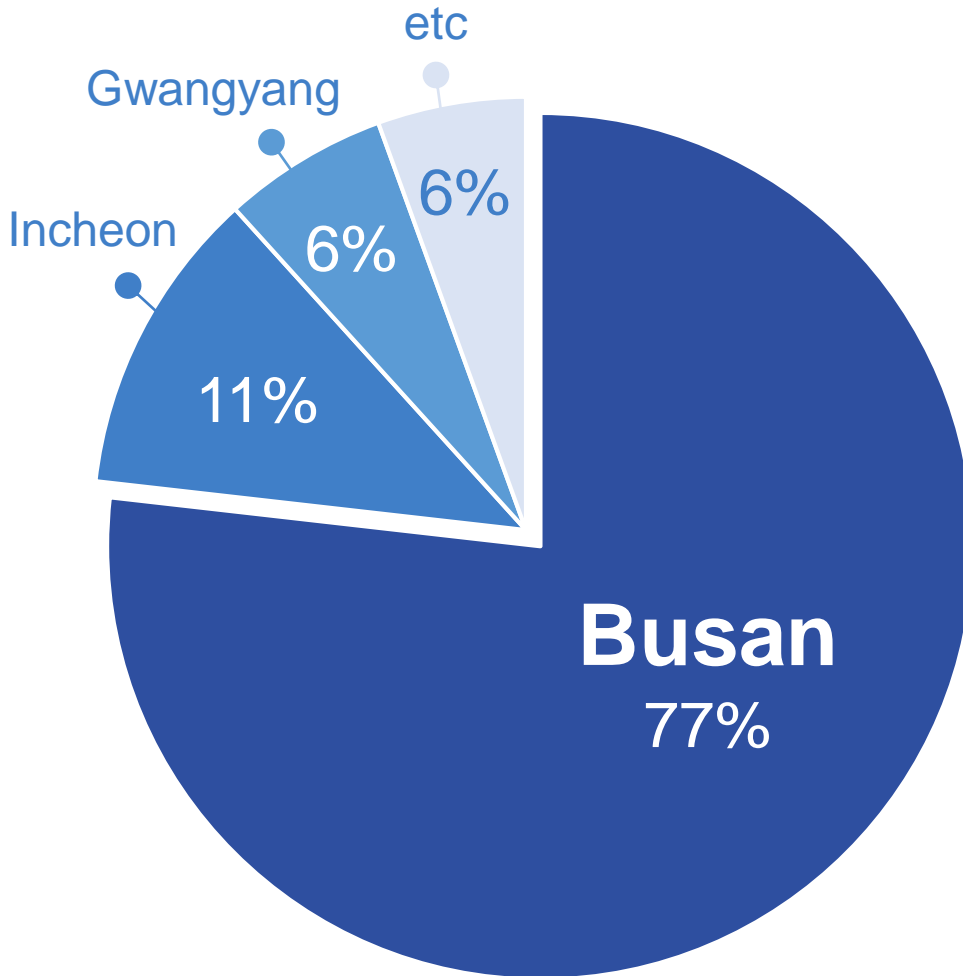
➤ Due to its geopolitical location, trade can only be done by Sea & Air

➤ 99.9% of the trade volume is done by sea which means, S. Korea economy is heavily dependent on seaports.

Volume of trade(Ton)	2023
Airports	1,085,060
Seaports	760,419,758

* Source : K-Stat

Container volume of ports in S. Korea



» Port of Busan dominates the volume handling 77% of whole container volume of S. Korea

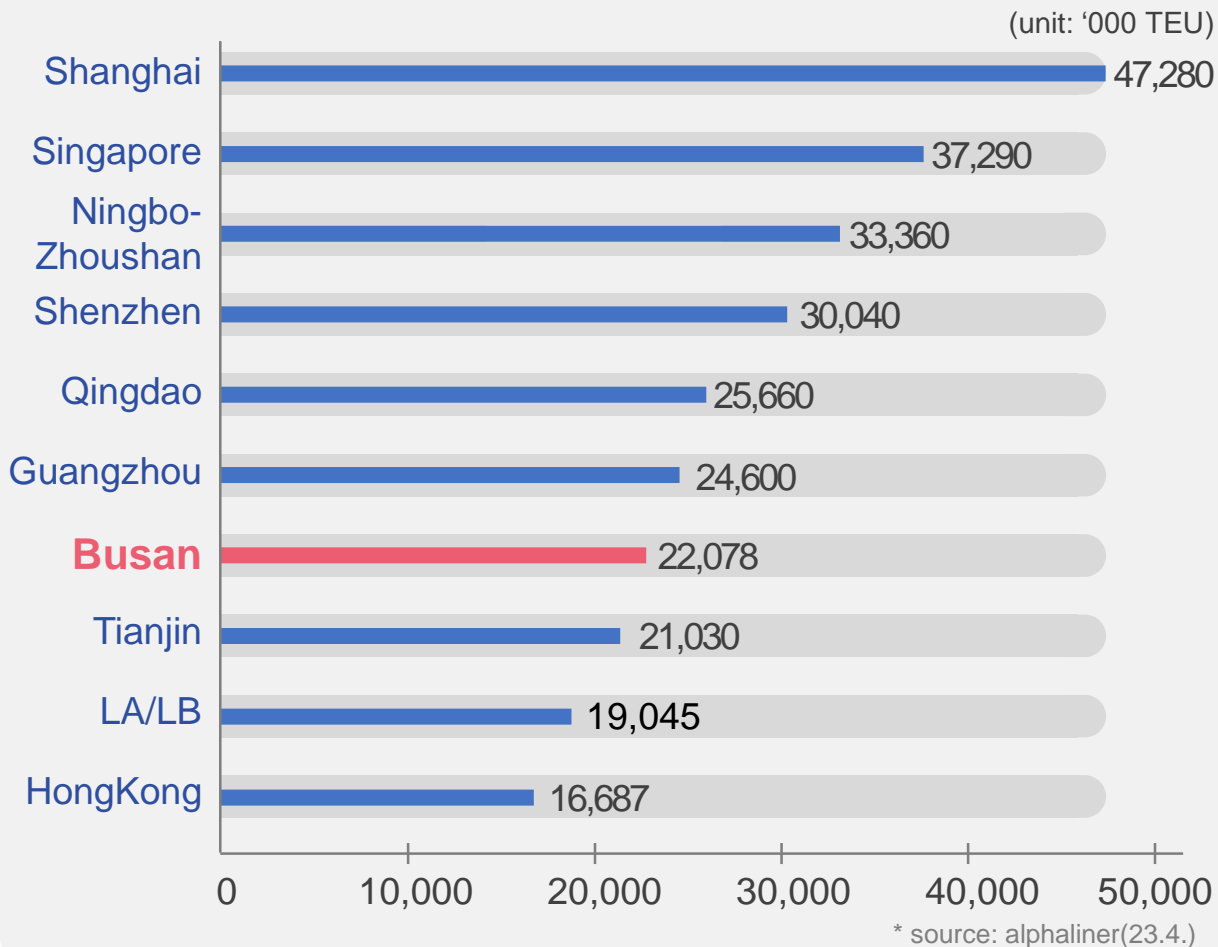
» S. Korea handles 30 million TEU in 2023 and Busan solely handles 23 million TEU

» The role of Port of Busan in trade has also been increasing in years.

75.6% (2021) ▶ 76.60% (2022) ▶ **76.8%** (2023)

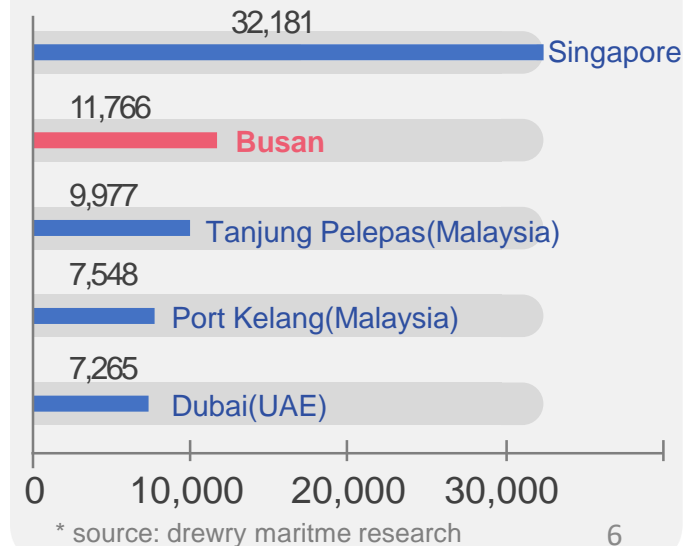
The 7th busiest container port in the world

World's Top 10 CNTR Ports Ranking(2022)



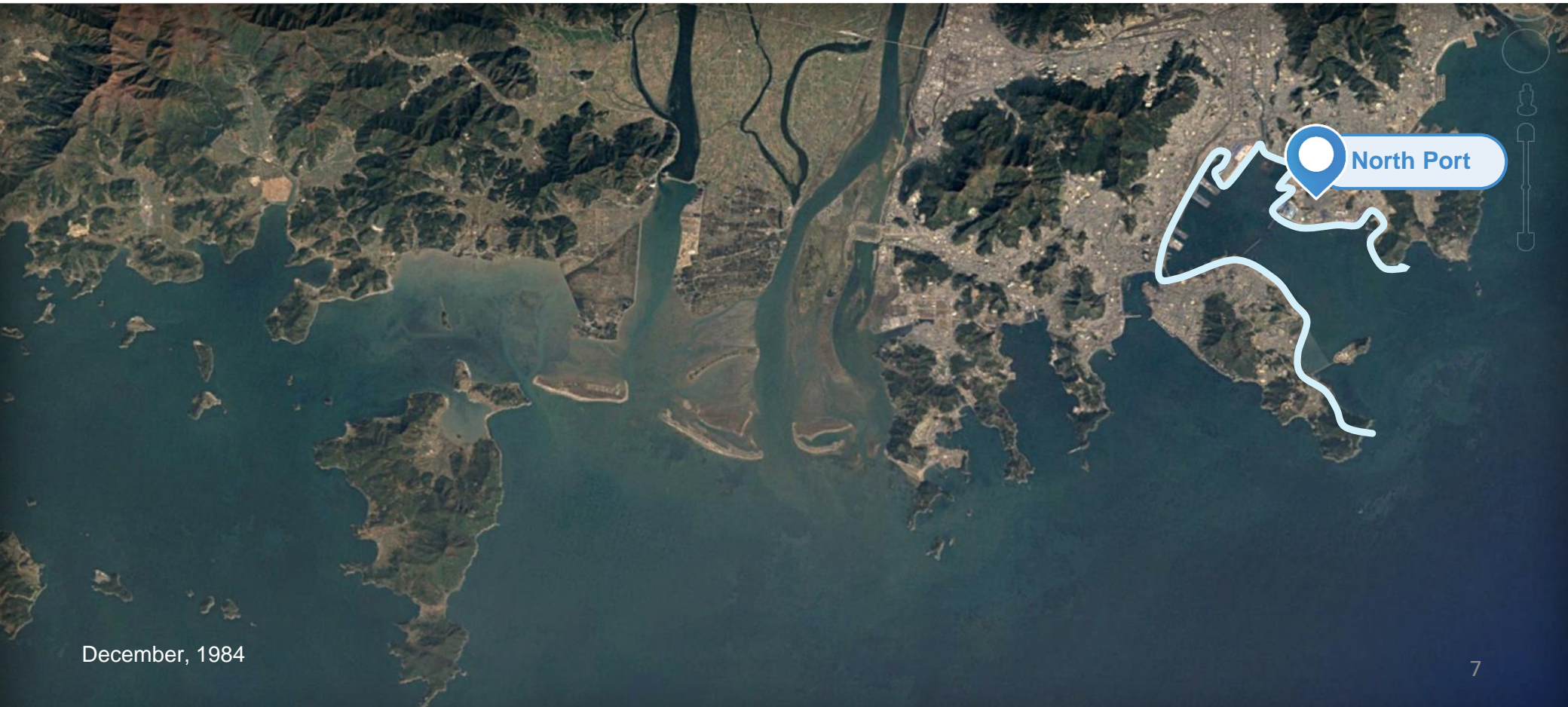
» With this concentrated volume, Port of Busan has been successfully competing in global market, attracting T/S(transshipment) containers.

World's Top 5 T/S Ports Ranking



North Port

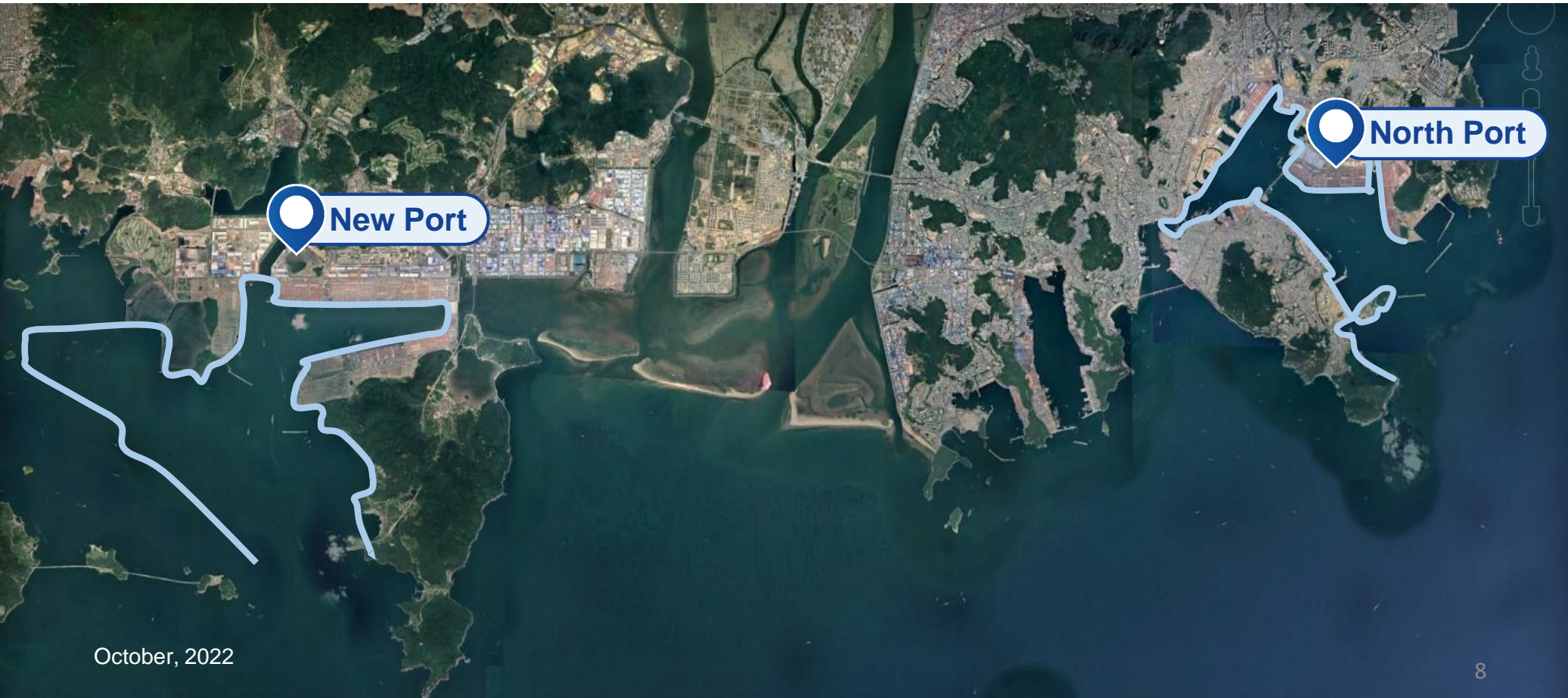
- » Port of Busan started operating from 1978 with North Port
- » North Port handles 6.8 million TEU in 2023, which accounts 29.6% of throughput.



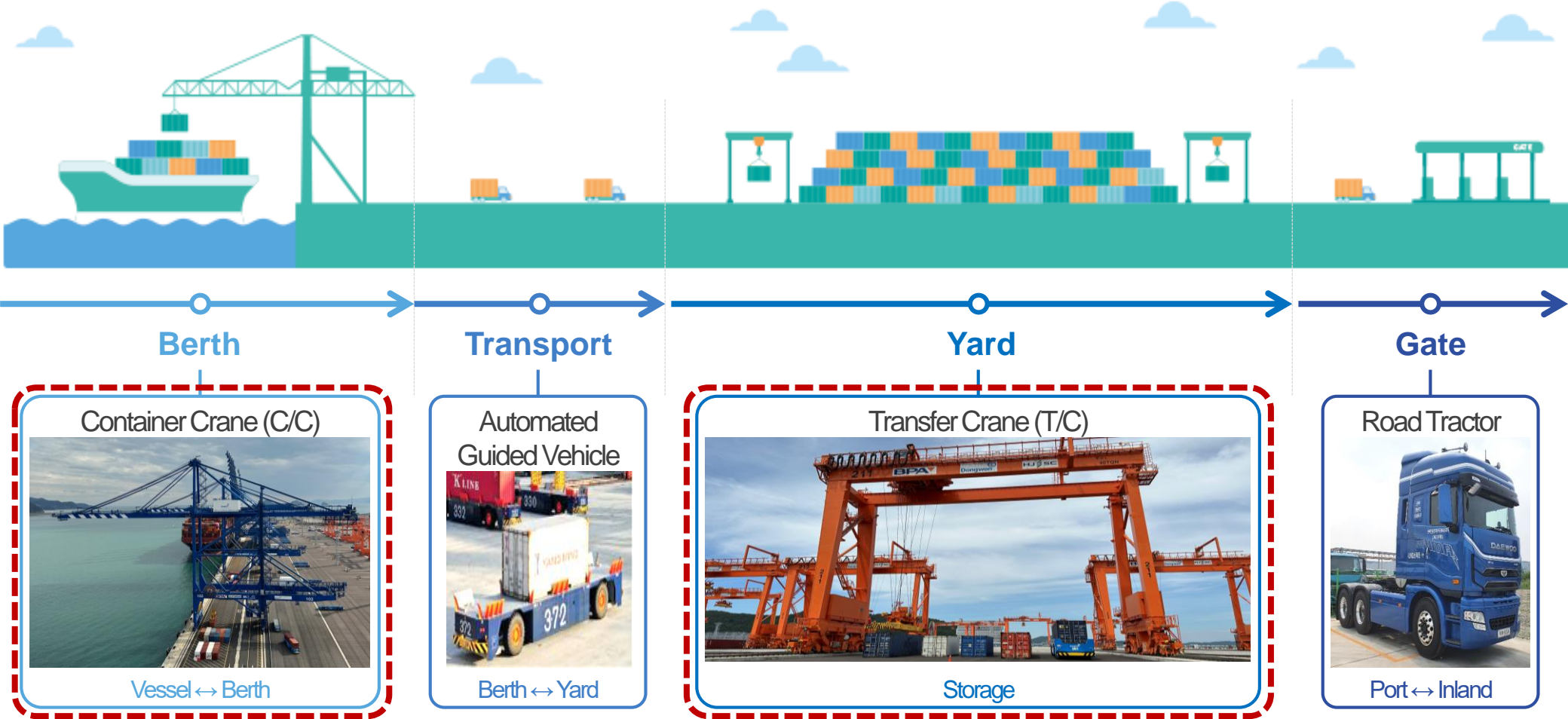
December, 1984

New Port

- New Port started operating from 2006, to respond container volume growth.
- New Port handles 16.3 million TEU in 2023, which accounts 70.4% of throughput.



October, 2022



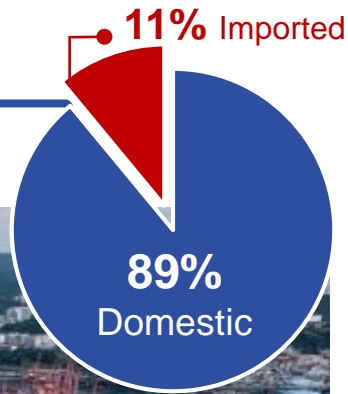
- » In container port, there are many port handling equipment. **5,870** in Korea and **3,022** in Busan.
- » Among them, **cranes** are critical assets for port operation and development.
- » However, Korea is losing its manufacturing business.

Market monopoly of imported cranes

- » Busan Ports used domestic cranes in the past, in North Port
- » However, imported ones are dominating the market in New Port.

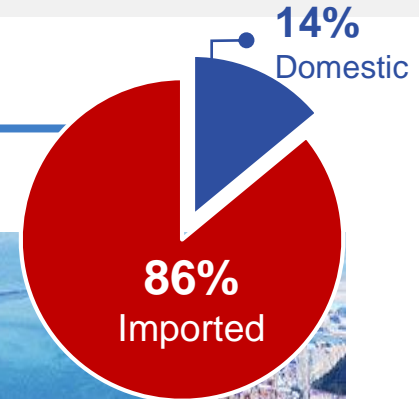
North Port

172 cranes = 49 C/C, 123 T/C



New Port

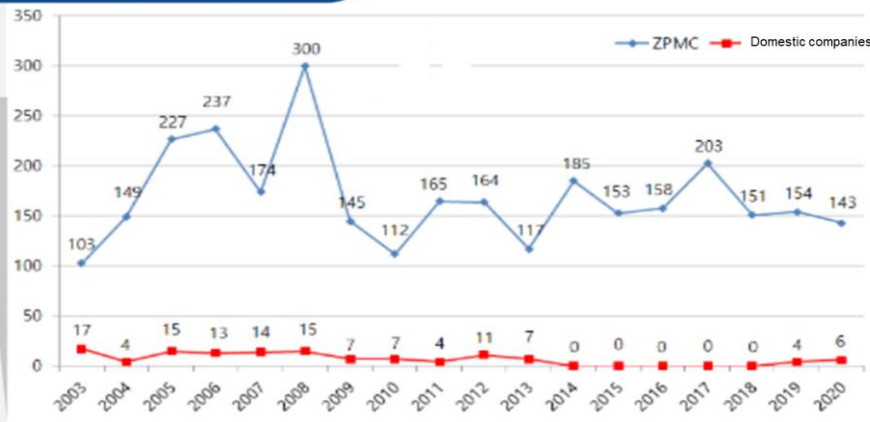
370 cranes = 83 C/C, 287 T/C



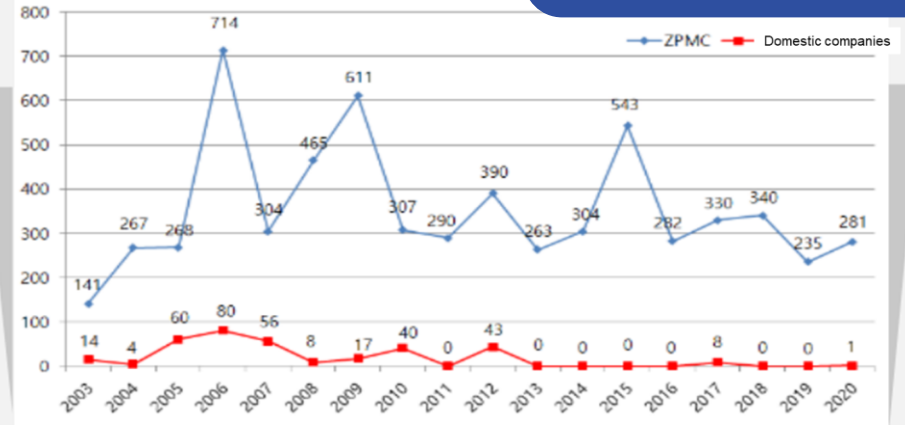
Erosion of competitiveness

- » Domestic manufacturers has lost their market, not only in Busan but globally.
- » They might lose their ability to build cranes since it has been long they build none.
- » Essential to check domestic core technology to build cranes and parts.

Container crane



Transfer crane



Needs to build safe & sustainable port

- » (Workforce) Witnessing workforce decrease due to aging & low work condition.
- » (Safety) Awareness in safety in line with the enforcements of the Serious Accident Punishment Act
- » (Local economy) Decline in quality jobs within region along with the concentration in the capital area

Port workers changes in past 10 years

	2010	2012	2014	2016	2018	2020	CAGR
Total	6,092	6,111	6,076	6,230	5,989	5,639	-0.8
Busan	1,291	1,180	1,097	1,048	947	826	-4.4
Incheon	116	116	115	121	117	117	0.1
Ulsan	883	877	873	854	836	783	-1.2
Kwangyang	584	577	564	703	687	661	1.2
Pohang	950	949	961	935	835	805	-1.6
Masan	592	619	611	611	551	527	-1.2
Daesan	487	483	485	485	499	464	-0.5
Mokpo	358	352	377	396	392	377	0.5
Donghae	329	349	374	394	409	384	1.6
Jeju	314	379	343	396	426	398	2.4
Pyeongtaek	188	230	276	287	290	297	4.7

Source : Korea Port Logistics Association

Working conditions of port workers



2018~2022

Phase 1

R&D
(Core parts)



2020~2026

Phase 2

Implementation of
localized crane



2024 ~

Phase 3

Share & spread



“To achieve 80% of localization rate of crane parts”

Assessment on cranes & parts in Busan Port

Manufacturers in Busan port

Manufacturer	Cranes	Flag
ZPMC	257	China
Doosan	91	Domestic
Hanjin	47	Domestic
Samsung	38	Domestic
Hyundai	17	Domestic
Daewoo	5	Domestic
Buil	3	Domestic
HDHM	8	China
MITSUBISHI	3	Japan
MITSUI	1	Japan
Total	470	

Flags of crane parts

Parts	Domestic	Imported	Total	% of Domestic
Mechanical Part	3,627	7,749	11,376	31.9%
Electrical Part	3,682	6,624	10,306	35.7%
Total	7,309	14,373	21,682	33.7%

» **ZPMC dominates crane market in Busan.**

- 54.7% of cranes are made by ZPMC.
- Only 42.8% of cranes are domestic.

» **Crane parts have lower competitiveness.**

- 33.7% of crane parts are domestic.

Assessment on cranes & parts in Busan Port

No.	Parts	YoY market share of domestic parts				부품단가 (만원)	Importance Level
		1980 ~ 1989년	1990 ~ 1999	2000 ~ 2009	2010 ~ 2018		
1	RAIL CLAMP DEVICE	0%	0%	0%	0%	1,500	Low
2	EMERGENCY BRAKE	0%	0%	0%	0%	3,000	Low
3	ELEVATOR	0%	0%	0%	0%	20,000	Low
4	SPREADER	0%	0%	0%	0%	7,000	Medium
5	BRAKE	0%	0%	8%	0%	1,000	Medium
6	HYD' BUFFER	100%	18%	25%	5%	100	Low
7	SERVICE HOIST	25%	100%	22%	20%	3,000	Low
8	GEAR COUPLING	100%	100%	24%	5%	150	Medium
9	DRUM COUPLING	100%	100%	27%	5%	500	High
10	WIRE ROPE	100%	100%	100%	100%	300	High
11	WHEEL	100%	100%	27%	5%	100	High
12	WIRE DRUM	100%	100%	27%	5%	Exp 100	Low
13	SHEAVE	100%	100%	27%	5%	Price 50	Low
14	자동 LUBRICATION	N/A	0%	12%	5%	10,000	Low
15	BOOM LATCH	N/A	100%	18%	5%	500	High
16	HEAD BLOCK	100%	18%	27%	5%	2,000	High
17	REDUCER	100%	100%	27%	5%	5,000	High
18	TLS SYSTEM	100%	100%	18%	60%	10,000	Medium
19	유압장치	100%	100%	49%	100%	1,000	Low
20	MOTOR	0%	0%	0%	0%	5,000	Medium
21	SPREADER CABLE REEL	N/A	0%	0%	0%	2,500	High
22	DRIVE	0%	0%	0%	0%	3,000	Medium
23	PLC	0%	18%	0%	0%	20,000	Medium
24	GANTRY CABLE REEL	N/A	18%	0%	0%	9,000	High
25	선박충돌장치	N/A	18%	19%	0%	150	Low
26	보행자충돌장치	N/A	0%	15%	0%	1,000	Low

» Scrutinize all 41 parts in crane.

- localization rate, price, importance

Importance Level

- High : Operation stops for 1+ day if the part malfunctions.
- Medium : Operation stops less than a day if the part malfunctions.
- Low : Operation doesn't need to stop.

» Examine which part to localize.

Looking for **localizable** parts with,

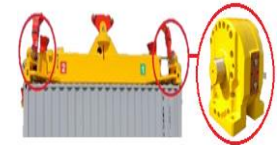
- Low market share
- High price
- High importance level

» Chose to localize **spreader & cable reel**

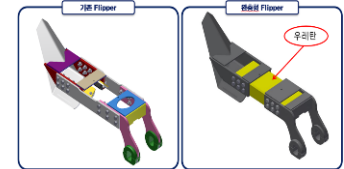
Develop & localize key components of cranes



Localization of spreader



Development of actuator



Development of flipper

Localization of cable reel



Fiber optic slip ring



Drum assembly

Slip ring (POWER)



Control Panel (Inverter)






Reducer



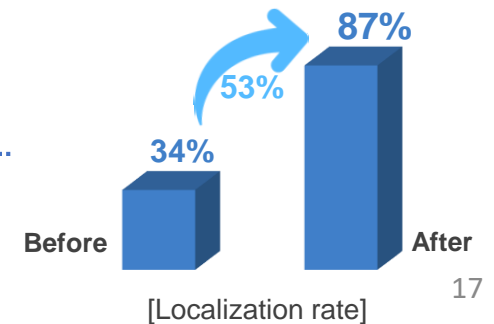
Guide Assembly

Procurement of domestically produced cranes

Place	Busan New Port terminal 2-5
Cost	250 million USD
Manufacturer	
Partners	Up to 100 local Small Medium Enterprises
Cranes	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>X 9</p> <p>Container Crane</p> <ul style="list-style-type: none"> · Fully automated(double-trolley) </div> <div style="text-align: center;">  <p>X 46</p> <p>Transfer crane</p> <ul style="list-style-type: none"> · Fully automated </div> </div>

➤➤ Completed nation's first fully automated & localized container terminal

➤➤ Achieving 87% localization of crane parts



Site location





September, 2020



February, 2024



Achievements

Achievements 01 >> Built a framework for fostering the domestic industry

- Reintroducing domestic crane after a 20-year hiatus, serving as a catalyst for building a smart port centered on domestic technology

Achievements 02 >> Completed nation's first fully-automated container terminal

- Successfully established a fully automated terminal 3 years ahead of the government's plan

Achievements 03 >> Established safe & sustainable port

- Achieving the lowest levels of GHG emission in domestic ports by fully electrified terminal
- Minimizing the risk of accidents by fully automating the terminal

Achievement 04 >> Expand the initiative to new terminal, 2-6

- 2-6 is expected to start operating from 2027



Economic multiplier effect



Production Inducement
458M USD



Value-added Inducement
151M USD



Employment Inducement
2,386 ppl

Expected impact in industry



Localization
38M USD



Maintenance
3M USD(yearly)