

Taiwan-Korea Further Cooperation Within the Semiconductor Industry

The 45th Joint Conference of
ROC-Korea and Korea-Taiwan Business Councils

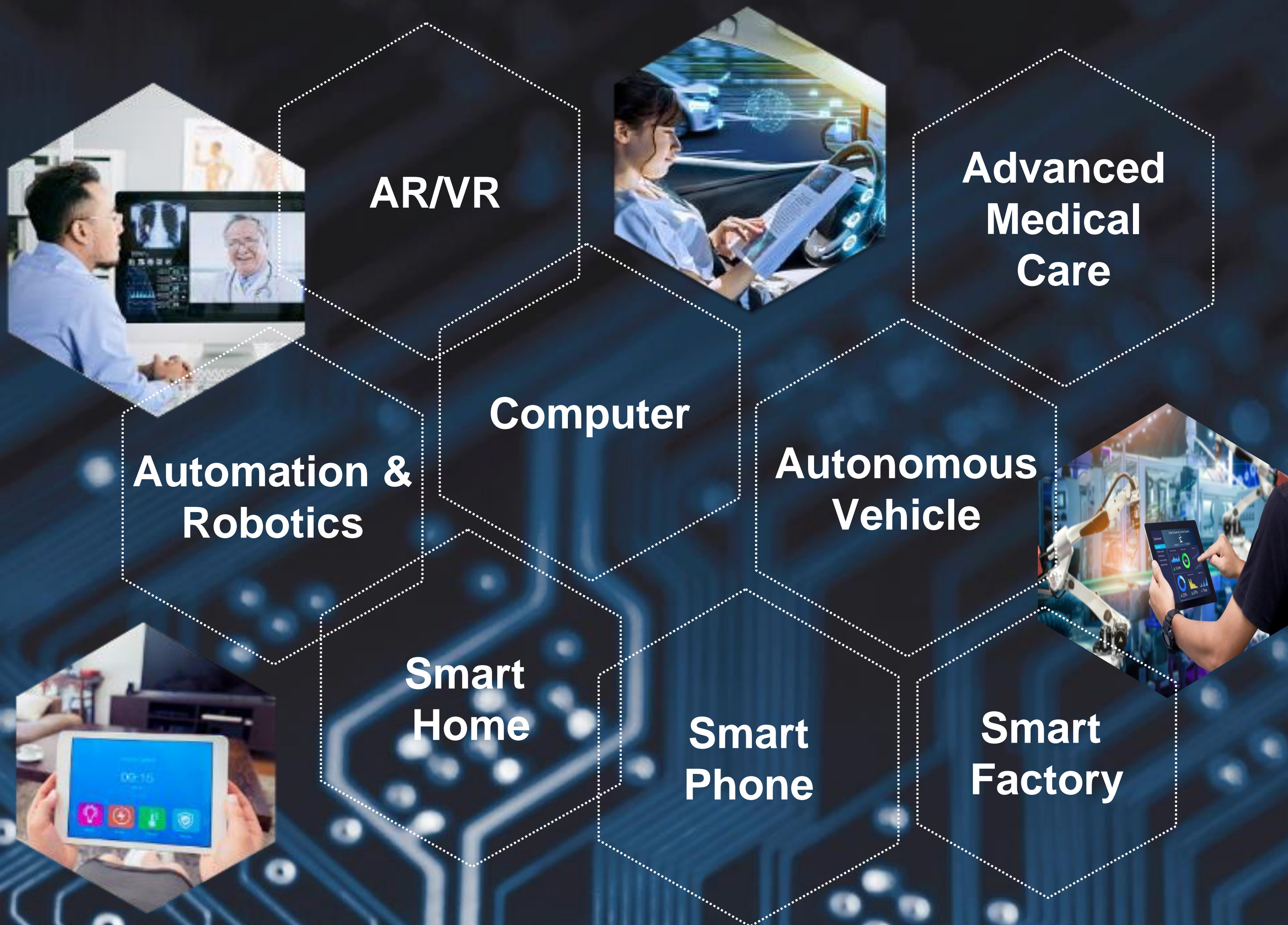
Terry Tsao | Global Chief Marketing Officer and President of Taiwan, SEMI



CONNECT - COLLABORATE - INNOVATE

Copyright © 2021 SEMI All Rights Reserved

Semiconductor is The Core Technology Enabler

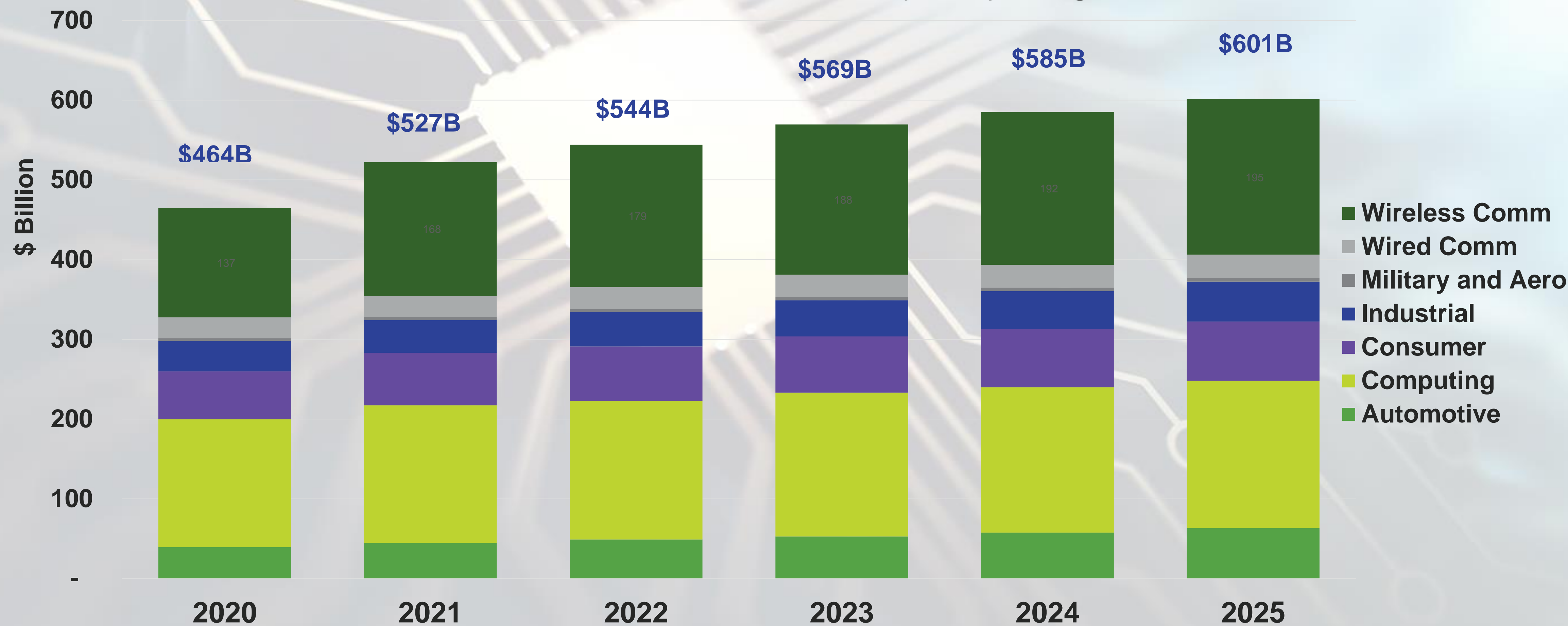


Semiconductor is The New Oil

- Small chips, BIG impact
- Semiconductors are everywhere from 3C (computing, communication, consumer) to healthcare, smart energy and transportation
- Demand for semiconductors will continue to rise

Semiconductor Revenue to Grow at 5% CAGR 2020 to 2025

Semiconductor Forecast by Key Segments



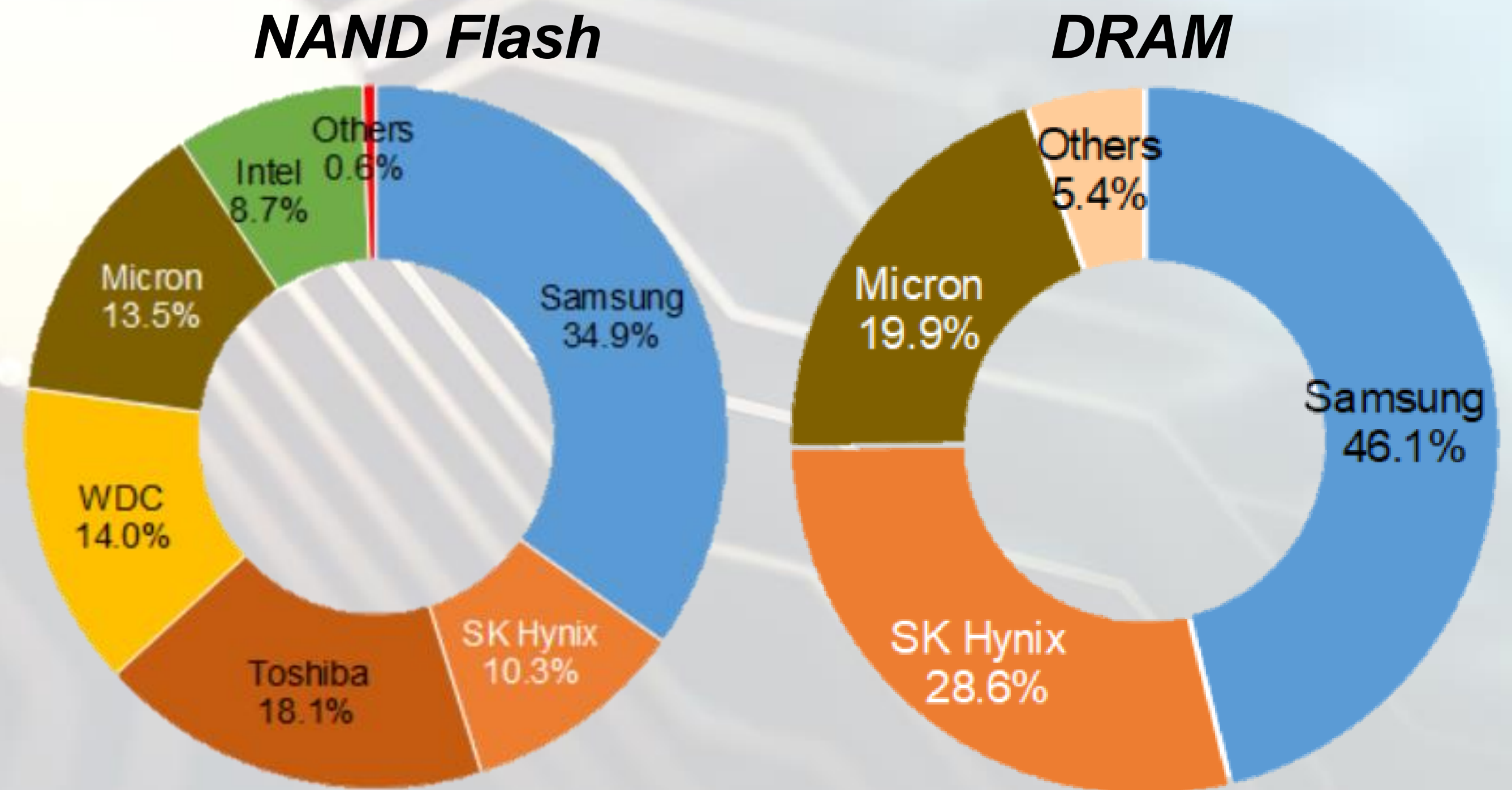
Korea: A Semiconductor Manufacturing Giant

Home to Many Advanced Players in the Semiconductor Industry

- Korean **foundries and OSATs** posted record high in sales in 2021 on the back of strong demand for 5G applications and digital transformation.
- The Korean government revealed the “**K-Semiconductor Strategy**” on May 13, with chip manufacturers such as **Samsung Electronics, SK Hynix** and others pledging investments of over 510 trillion won until 2030. The government has also vowed to support the industry with tax deductions and infrastructure packages.
- Samsung has been able to catch up and move to the frontier in a narrow range of products of this technology-intensive industry within a very short time, now becoming major global players in the world **DRAM market**.
- Samsung has started building a new state-of-the-art manufacturing line at its approximately 2.9 million sq.-meter factory in the city of Pyeongtaek, south of Seoul, slated for completion sometime in the second half of next year. Samsung will make **14-nanometer DRAM** and **5-nanometer logic semiconductors, both based on extreme ultraviolet (EUV) lithography technology**.

Semiconductor Companies of Korea are Global Market Leaders: Account Almost Half of Market Share

**Korea:
A Semiconductor
Manufacturing
Giant**



Semiconductor Companies of Korea are On the Top Worldwide Semiconductor Sales Ranking (1Q21)

**Korea:
A Semiconductor
Manufacturing
Giant**

1Q21 Top 15 Semiconductor Sales Leaders (\$M, Including Foundries)

1Q21 Rank	1Q20 Rank	Company	Headquarters	1Q20 Total IC	1Q20 Total O-S-D	1Q20 Total Semi	1Q21 Total IC	1Q21 Total O-S-D	1Q21 Total Semi	1Q21/1Q20 % Change
1	1	Intel	U.S.	19,508	0	19,508	18,676	0	18,676	-4%
2	2	Samsung	South Korea	14,030	767	14,797	16,152	920	17,072	15%
3	3	TSMC (1)	Taiwan	10,319	0	10,319	12,911	0	12,911	25%
4	4	SK Hynix	South Korea	5,829	210	6,039	7,323	305	7,628	26%
5	5	Micron	U.S.	5,004	0	5,004	6,580	0	6,580	31%
6	7	Qualcomm (2)	U.S.	4,050	0	4,050	6,281	0	6,281	55%
7	6	Broadcom Inc. (2)	U.S.	3,673	409	4,082	4,355	485	4,840	19%
8	9	Nvidia (2)	U.S.	3,074	0	3,074	4,630	0	4,630	51%
9	8	TI	U.S.	2,974	190	3,164	3,793	235	4,028	27%
10	16	MediaTek (2)	Taiwan	2,022	0	2,022	3,849	0	3,849	90%
11	18	AMD (2)	U.S.	1,786	0	1,786	3,445	0	3,445	93%
12	11	Infineon	Europe	1,828	876	2,704	2,170	1,083	3,253	20%
13	10	Apple* (2)	U.S.	2,770	0	2,770	3,080	0	3,080	11%
14	14	ST	Europe	1,483	745	2,228	2,011	994	3,005	35%
15	13	Kioxia	Japan	2,567	0	2,567	2,585	0	2,585	1%
—	—	Top-15 Total		80,917	3,197	84,114	97,841	4,022	101,863	21%

(1) Foundry (2) Fabless

Taiwan Semiconductor Industry Overview

- Taiwan's GDP growth forecast for 2021 to grow 4.64 percent, **largely thanks to upbeat export growth prospects in the semiconductor industry.**
- The expected total output value for 2021 Taiwan's semiconductor sector will break **NT\$4 trillion (US\$140 billion)**. That's an increase of **24.7%** on the previous year.
- **The IC designer sector** reported the highest sequential growth of **17.9 percent in output**, which totaled NT\$306.9 billion in the second quarter 2021.
- The IC testing service segment was second, with a 6.3 percent quarterly increase in production value to NT\$49 billion, followed by the IC manufacturing segment with 5.7 percent growth to NT\$528.4 billion.

Three Directions from Taiwan Government to Bolster Semiconductor Industry

- **National Policy Level**

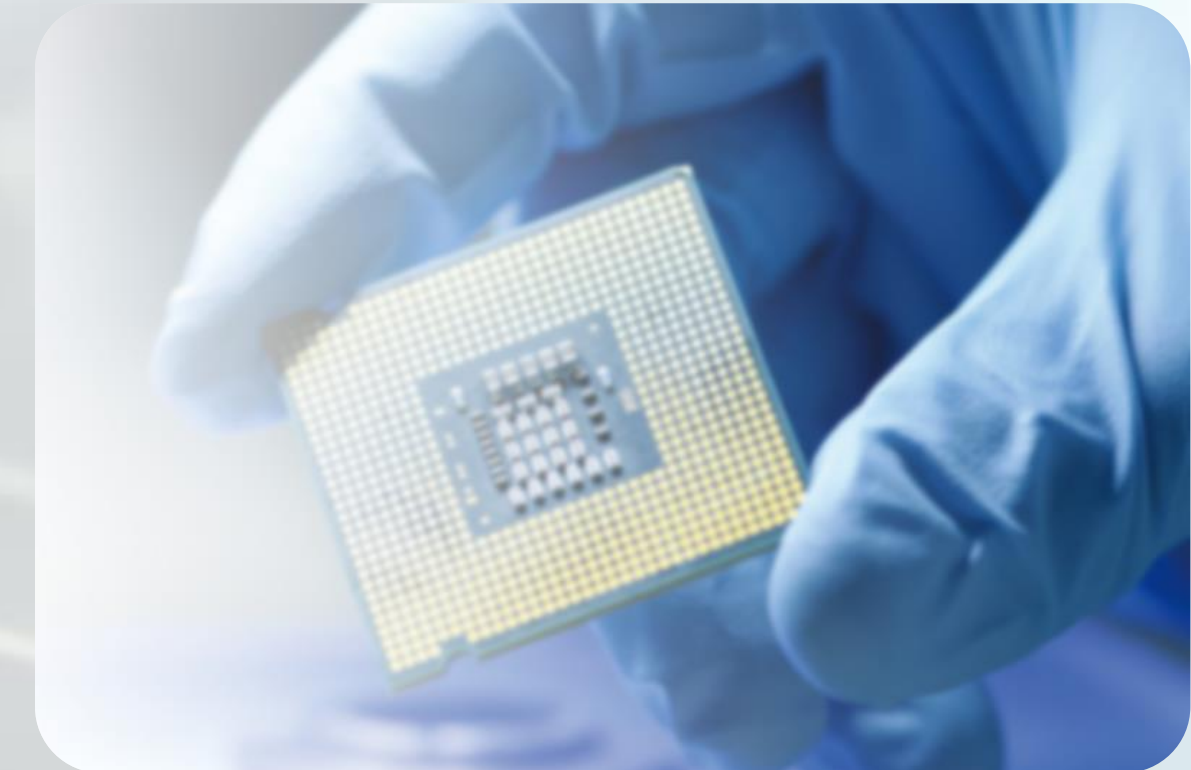
- To establish “Semiconductor Academy” supporting by universities and industry companies for STEM talents development.

- **Industrial Development Level**

- To ensure all the semiconductor companies have adequate access to resources for advanced semiconductor manufacturing ecosystem.

- **Global Competitive Level**

- Ensure to assist foundry to produce less than 1 nanometer chips by 2030.
- Assist Taiwanese equipment suppliers for 300 mm niche equipment.
- Master the autonomy of key semiconductor chemicals and establish a local strategic supply chain.



Source: The Executive Yuan's Board of Science and Technology (BOST)

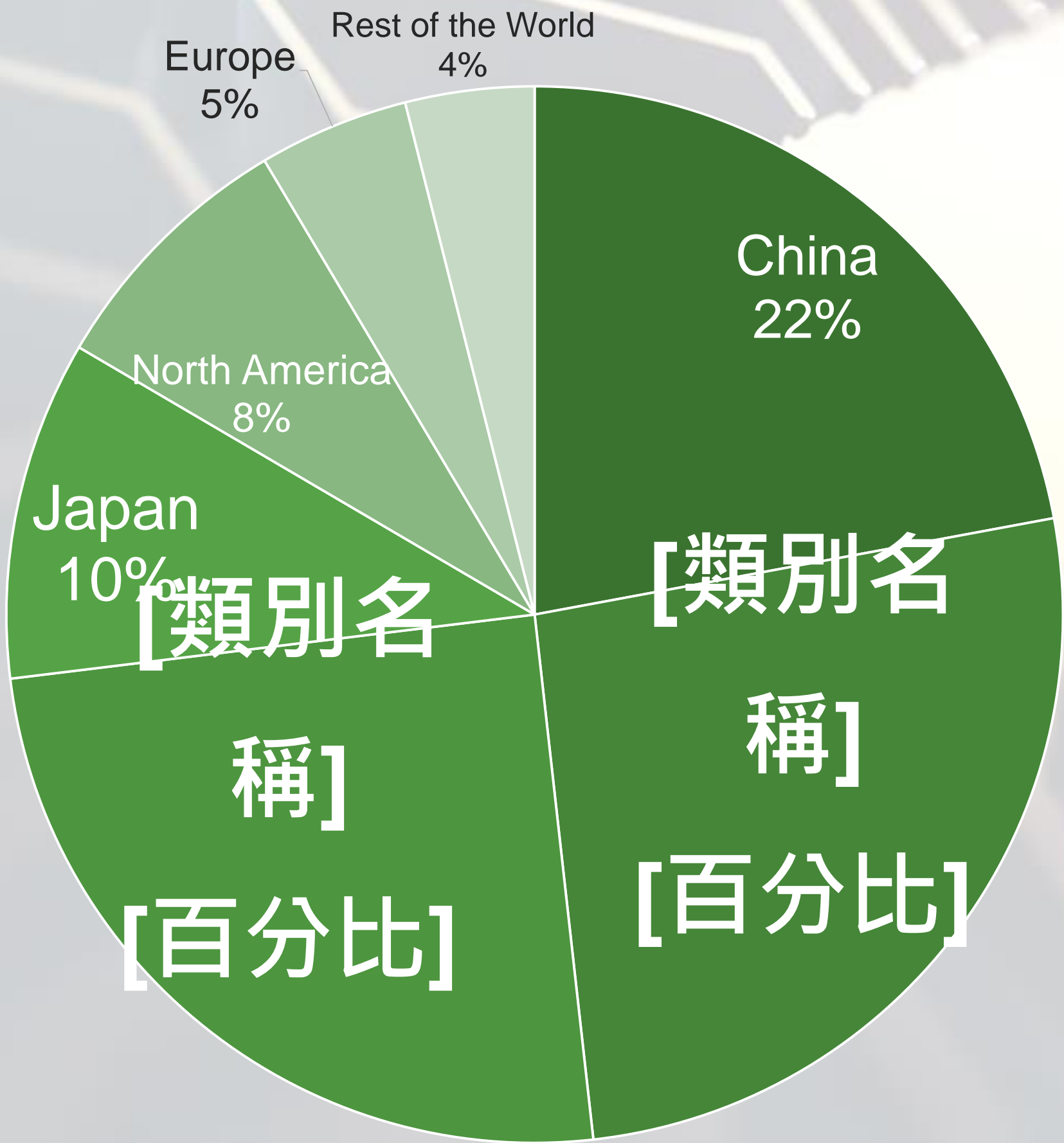
Regional Strengths of Semiconductor Supply Chain

	IC Design	EDA / IP	IDM	Foundry	Memory	OSAT	Equipment/ Materials
Taiwan	●●●	●	○	●●●	●	●●●	○
Korea	●	○	○	●●	●●●	●●	●
US	●●●	●●●	●●●	●	●●●	○	●●●
Europe	○	●	●●	●	○	○	●●
Japan	○	●●	●●	●	●●	●	●●●
China	●●	○	●	●●	●	●●	○

Source: SEMI Industry Research & Statistics

Taiwan and Korea Account Over Half of Global Semiconductor Equipment Market

2021 Equipment Market Forecast

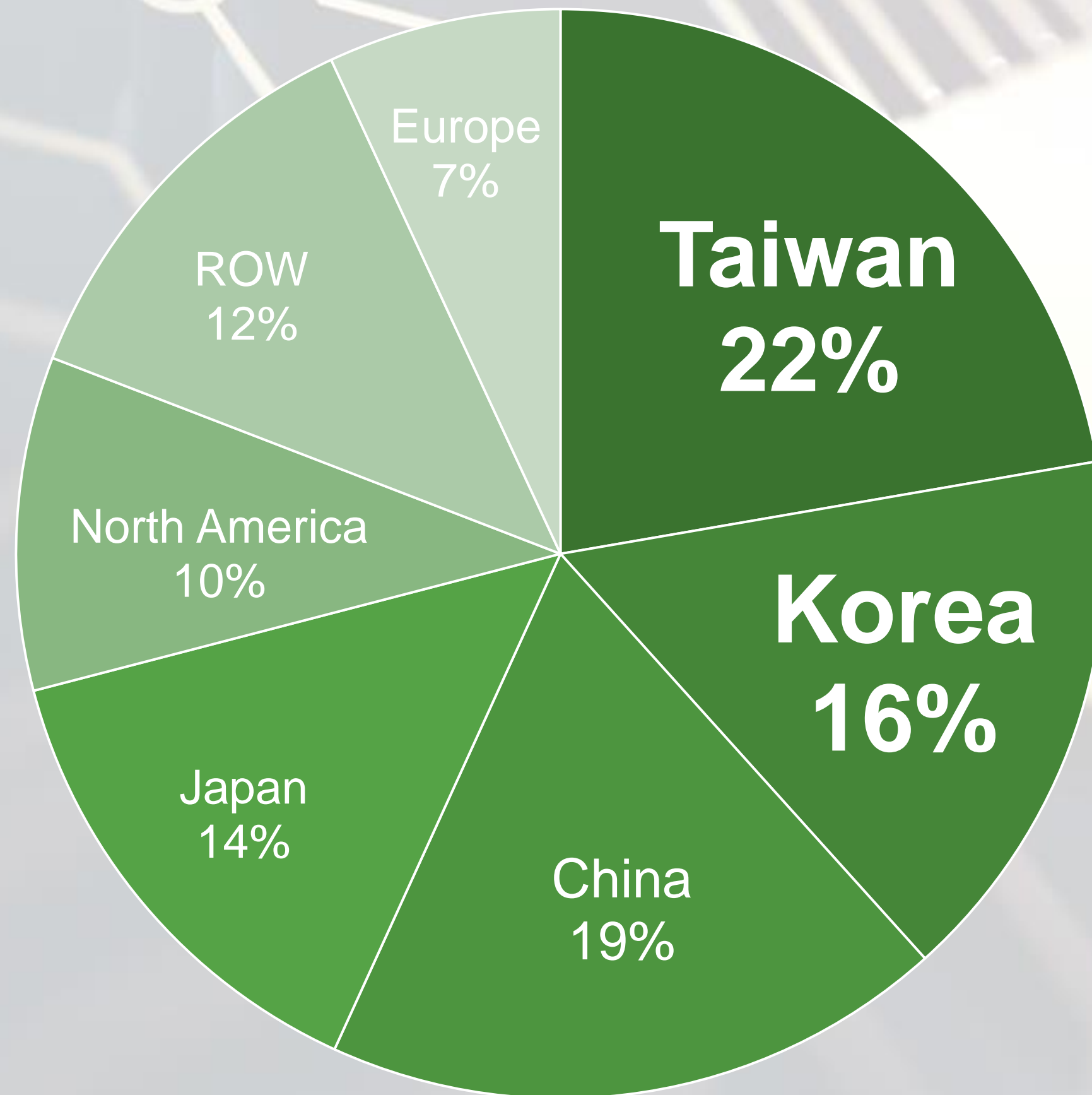


Region	2019	2020	2021F
China	13.45	18.72	16.8
Taiwan	17.12	17.15	20+
Korea	9.97	16.08	18.9
Japan	6.27	7.58	7.9
North America	8.15	6.53	6.1
Europe	2.28	2.64	3.5
ROW	2.52	2.48	3.0
Total	59.75	71.19	77+

Unit: Billions of U.S. Dollars

Source: SEMI Industry Research and Statistics Group

Taiwan and Korea Account Most of Global Semiconductor Materials Market



Unit: Billions of U.S. Dollars

Region	2019	2020F	2021F
Taiwan	11.48	11.83	12.56
Korea	8.90	8.54	9.04
China	8.76	9.34	10.42
Japan	7.74	7.69	7.97
North America	5.64	5.30	5.58
ROW	6.42	6.54	6.89
Europe	3.93	3.71	3.90
Total	52.88	52.94	56.36

Source: SEMI Industry Research and Statistics Group

Ties between Taiwan and Korea in Semiconductor Industry

- **Taiwan-Korea semiconductor industry engagements:**
 - Korea is selling wide range of ICT products to Taiwan market.
 - Korea is purchasing chips and electronic components from Taiwan suppliers.
 - Korea is selling various semiconductor equipment to Taiwan's foundries and OSATs.
- **Engagements on SEMI platform:**
 - SEMI has total **327** Korean members worldwide.
 - The anchor companies with highly engagements for SEMI Taiwan and exhibitors for SEMICON Taiwan are **EO, KohYoung, SEMES, SurplusGLOBAL and Wonik IPS**.
 - Taiwan semiconductor companies have closed relationship with **KOTRA (The Korea Trade-Investment Promotion Agency)** to engage more Korea companies to demonstrate them in SEMICON Taiwan by forming Korea pavilion in 2019.
 - SEMI Taiwan had done a partner search program with a Korea company, Dongjin Semichem, to help find local partners in 2017.



Opportunities for Taiwan-Korea Cooperation

- Deepen the cooperation in more **Taiwan's IC design (Fabless) R&D** to link **Korea's users and applications markets**.
- Facilitate more complementary partnerships, especially in increasing **Taiwan's production capacity** and to prioritize clients in the **Korea automotive sector**.
- Welcome Korean companies to expend **semiconductor equipment and materials operations** in Taiwan.
- Talent exchange especially in academia and research institute.
- More industry information exchange platform or event in the emerging new technology area to facilitate better understanding.



Thank You
