

RIETI BBL 2023Jan27 「CHIP WAR」

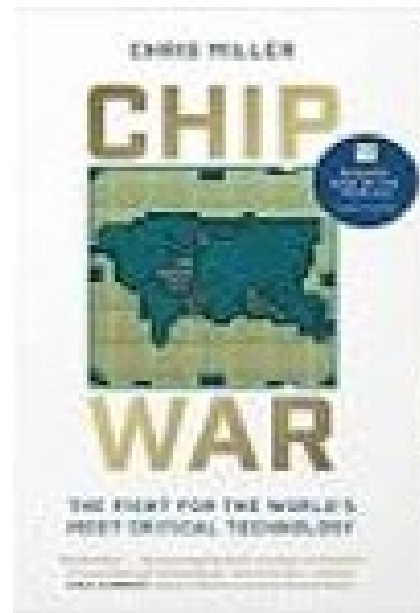
Amazon

5.0 out of 5 stars The essence of the semiconductor industry from an American perspective Reviewed in Japan on November 29, 2022

I have researched and analyzed the semiconductor industry for many years, but I could not understand it. In particular, the Japan-US semiconductor friction was from the Japanese side, and there was no national security perspective. The rise of South Korea, Taiwan, etc. was just as I thought, but I was able to verify it. From the early days of the semiconductor industry to recent topics such as Huawei, US-China friction, and the Taiwanese dilemma. There is also talk of the Soviet Union's semiconductor research, which is not even a topic in Japan. The perspective is not only technology and management strategy, but also multi-faceted, such as finance, military, education, and production. Moore, Andy Grove, of course, but also the founders of TSMC, Morris Chang, SMIC's Richard Chang, Huawei's Mr. Ren, and the founders. Only Mr. Morita, Mr. Kikuchi from Sony, and Mr. Masuoka from Toshiba are Japanese. Talking about Japan is sometimes inaccurate.

English is also relatively easy.

This is a must-read not only for today's semiconductor trends, but also for national and security considerations.



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Hideki Wakabayashi 's Profile

- **Securities Analyst and Fund Manager with over 10 years of Japanese equity Long/Short strategy, Research Analyst with over 20 years experiences include, through More than 20k visits and Interviews,**
- **Experiences of establish of Japanese equity division in JPMorgan Asia, co-establish of Hedge Fund Company.**
- **Has been Created New concepts ” Management center of gravity” and “Natural period” and “Natural figure number”, the concept of own volume scale has been built in Those two axes have been trying to be used for quantitative evaluation for management speed, area of business domain ,and appropriateness for between diversity business and outside environment.**
- **As Fund Manager, Performance of 10 years was 9.7%/y with sharp-ratio 0.93, Sortino-ratio 2.1**
- **As Securities analyst, “Nikkei and II ranking” in 10 years were 5-times No1 in Electronics/Semiconductor sector.**

Regarding flash memory and NAND, it is inaccurate, so please correct it

The person who invented NAND was Mr. Masuoka, a former professor at Tohoku University. Also, it was Toshiba, not Intel, that put it into practical use. At that time, it was called NAND type EEPROM.

Intel's Stephan Lai invented NOR flash memory, known at the time as flash EEPROM.

In addition, since the name at that time was difficult for the stock market to understand, I consulted with Mr. Masuoka and named it flash memory.

In 1989, as an analyst, I predicted for the first time that the size of the flash memory market, including both NAND and NOR types, would reach 300 billion yen in 1995 and 1 trillion yen in 2000. I also explained the impact of flash memory on each company to institutional investors around the world.

Issue to discuss

- 1 Will the Japanese semiconductor industry, especially Rapidus, succeed?
2. I think that Japan, the United States and Europe are strong in power semiconductors, and the industrial structure is different, but what is your prediction?
3. From the perspective of national security, will the management strategy change in the future? Copy-it strategy, License-it strategy, and CHIP-first strategy are disabled
4. What qualities are required of semiconductor managers?
5. In Japan, unlike device makers, manufacturing equipment makers and material makers have maintained their competitive edge. Is there a risk that they will make the wrong choice under the CHIPS Act and lose their competitive edge?
6. What do you think about the impact of chiplets and optoelectronic convergence?

China's aim, Made in China 2025

Vertical integration in China

		Japan	US	EU	Korea	Taiwan	China	
application	P C	Light	Light	Light	Medium	Medium	Dark	
	Smartphone						Dark	
	T V						Dark	
	White goods						Dark	
	Car						Dark	
Assembly factory		Light	Light	Light	Medium	Medium	Dark	
Subcontracting		Light	Light	Light	Medium	Medium	Dark	
Semiconductor / electronic components		Light	Light	Light	Medium	Medium	Dark	
Materials / equipment / EDA, etc.		Light	Light	Light	Medium	Medium	Dark	

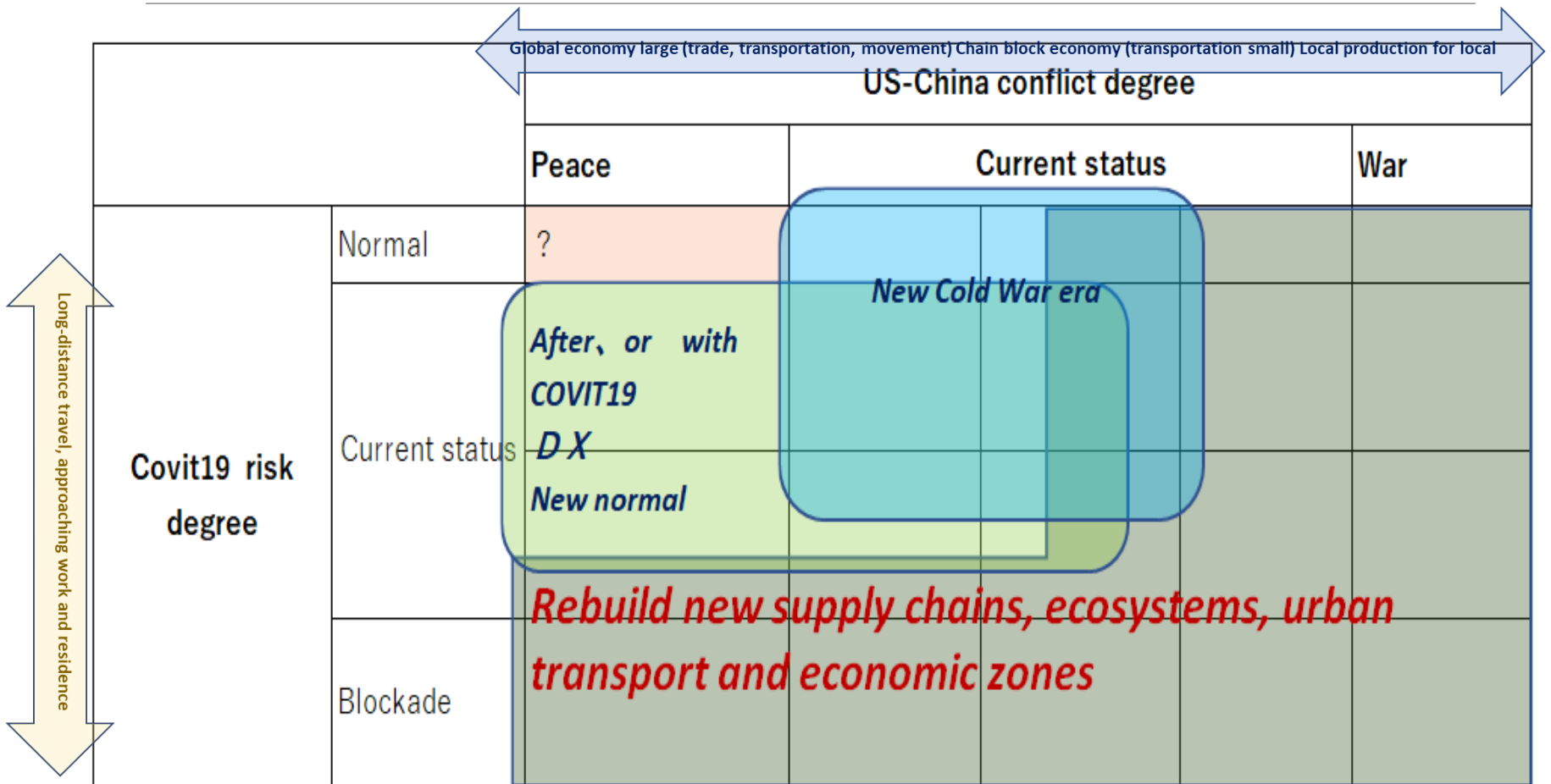
Source : Hideki Wakabayashi2021

World supply chain structure

		Japan	US	EU	Korea	Taiwan	China
application	P C	Light Orange			Yellow		Red
	Smartphone						
	T V						
	White goods						
	Car						
Assembly factory					Yellow		Red
Subcontracting					Yellow		Red
Semiconductor / electronic components					Yellow		Red
Materials / equipment / EDA, etc.					White		Red

Source : Hideki Wakabayashi2021

US-China Conflict Axis and COVIT 19 Axis AC debate and New Cold War debate



Source: Hideki Wakabayashi2021

Transition of global supply chain, hierarchical structure and segregation of each country

	80s US Expectations	80s-90s Japan Actual	90-2020 Actual and US Expectations	China Policy	Expectations
Finance	US	US	US	China (US disappointment)	US
Soft PF	US	Japan (US disappointment)	US		US
Science and Technology	US-Japan Cooperation		US-Korea - Taiwan		US-Japan-Taiwan
Manufacturing	Japan		China		Japan-Taiwan

Source : Hideki Wakabayashi2021

Virtual one company by open innovation

Japan and the United States to collaborate in developing base station technology that is competitive with Huawei

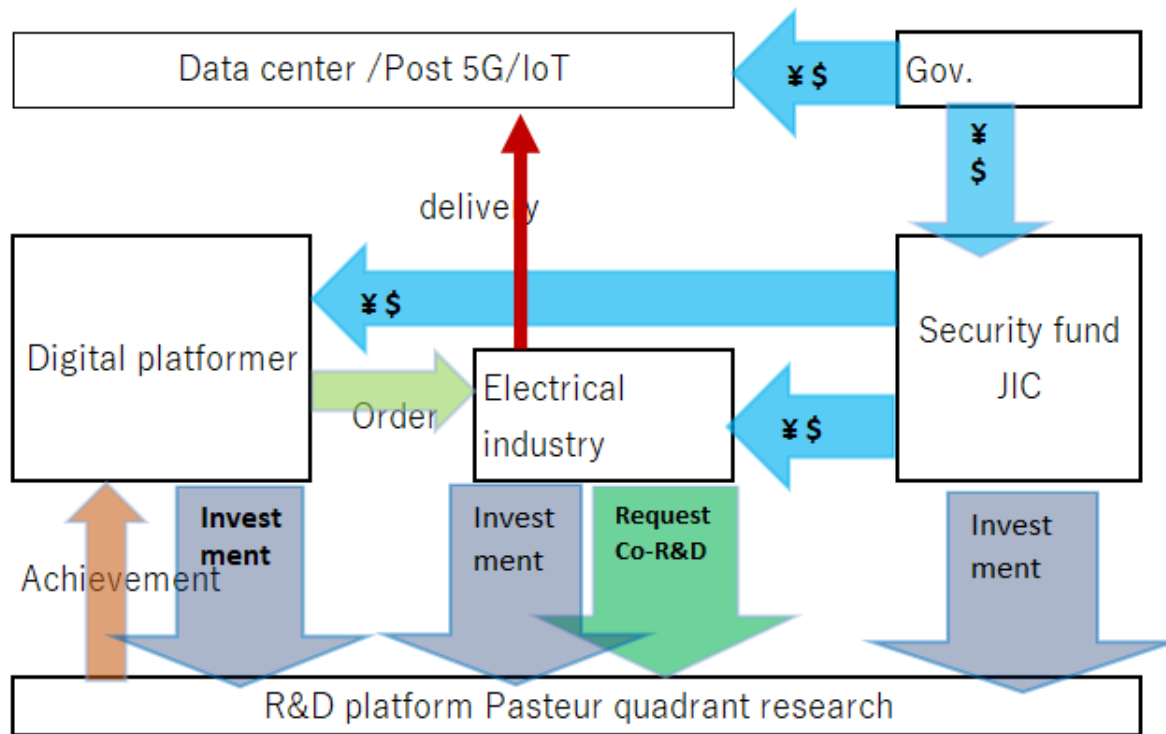
	NTT Japan-US Union Huawei	Huawei
Standards	NTT (DoCoMo), US Carrier, 3GPP	Huawei
System	NEC, Fujitsu, Hitachi, Oki, JRC, Lucent?	Huawei
Fabless	Nvidea, Q-com, Renesas, Socionext etc	Hi Silicon
Devices	Kioxia, Sony, ROHM, etc.	ASSP or ASIC ?
Prototype	Devices and equipment are domestic base foundries	foundries, EMS
Mass-production	devices and equipment, EMS	foundries, EMS

It is necessary for Japan and the United States to collaborate in developing base station technology that is competitive with Huawei, but with 6G, 5G (1) high-speed, large-capacity, (2) low latency and high quality, and (3) advanced simultaneous multipoint connection. In addition to the conversion, elements such as (4) security and (5) cognitive are also required. For this reason, in collaboration with standards organizations such as US Fabless and 3GPP, NTT shows the 6G roadmap that should be, and in it, creates roadmaps at the device level, software level, and device level. An R & D system that devises an architecture, develops processes according to it, sets standards in 2030 and 2025 for practical use, and can also conduct demonstration experiments

Source : Hideki Wakabayashi2021

New R & D platformer concept

Technical requirements are strict, but results are guaranteed



Source : Hideki Wakabayashi2021

Rapidus vs TSMC

GAA FOL

Rapidus+IBM <<< TSMC

BOL

Rapidus+IBM < TSMC

Pkg+chiplet

Rapidus+IBM >= TSMC

COST volume

Rapidus+IBM <<< TSMC

RapidTAT

Rapidus+IBM > TSMC

KSF:chiplet Short TAT by fusion of pre- and post-processes

Coexistence of Rapides and JASM

Added value for low- and medium-volume production
In the mass market, there is the dilemma that China is both biggest rival and biggest customer

