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## Conference Paper

Techno-nationalism/-globalism/-socialism over information and communication technology (ICT): The International Political Economy of U.S.-China Technological Hegemony and EU's Social Shaping

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***Techno-nationalism/-globalism/-socialism  
over information and communication technology (ICT) :  
The International Political Economy of U.S.-China  
Technological Hegemony and EU's Social Shaping***

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[Abstract] The struggle for technological supremacy between the U.S. and China that has emerged over the 5G mobile network has spread to various aspects of the international community, ranging from issues of national security to the protection of personal information. Originally, information and communication technology were closely related to national military technology, and it can be said that the development of this technological field has changed the form of warfare in the past world wars and in the postwar Cold War structure. Today, this field is being extended to include not only outer space but also cyberspace as a new area of conflict.

On the other hand, in the economic realm as well, real space is becoming more integrated with virtual space, and as virtual space is swallowing up real space, VR, AR, and the world of the metaverse are becoming more expansive.

This struggle for hegemony over the information and communication technology (ICT) domain is transcending national frameworks and revealing a structure in which global markets incorporate local climates, creating geopolitical and economic conflicts of principles and values. Bloomer (2021) describes a geopolitical situation in which big tech companies are emerging as players in the U.S.-China conflict and the world order, where "globalism" (Apple, Google, Facebook) and "nationalism" (Amazon, Microsoft / Alibaba, ByteDance, Huawei) and "techno-utopianism" (Tesla). In addition to these players, however, suppliers of digital products, services, and information flows to build information and telecommunications infrastructures include Ericsson and Nokia in Europe, Samsung in Korea, Huawei in China, and the semiconductor industry supply chain in Taiwan, as well as in Europe, the United States, Japan, and China. The supply chain of Taiwan's semiconductor industry, along with those of Europe, the U.S., Japan, and China, is also influencing techno-nationalism.

This paper analyzes and discusses the balance of power among nations over

technological hegemony in the industrial ecology and geopolitical economics power structure issues of information and communication technology using an international political economy approach.

*Key Words: Technological Hegemony, International Political Economy, Structural Powers, “Big Tech (Platformers)”, GPT (General Purpose Technology), “Technosocialism”*

## **1. Introduction: G7 Hiroshima Summit 2023 and Geo-Political Economy**

The G7 summit meeting was held in Hiroshima, Japan, May 19-22 this year. Prior to the summit, ministerial meetings of the 0 section were held in various parts of Japan, and other ministerial meetings are scheduled to be held after the summit later this year. The invited countries for this summit include Australia, a member of QUAD, India (Presidency of G20), the Presidency of the Union of Comoros (Presidency of African Union (AU)), which is a member of IPEF, and Indonesia (Presidency of ASEAN), which is a member of the ASEAN Council. Indonesia (Presidency of ASEAN), other G20 members Korea, Vietnam and Brazil, plus Cook Islands (Presidency of Pacific Islands Forum: PIF), as well as guest countries PIF), and Ukraine as a guest country. These participating countries are in contrast to the countries participating in the "One Belt, One Road" project led by China. During the same period, China also held a summit meeting with five Central Asian countries in Xi'an, China, where it expressed its opposition to interference in the region's internal affairs and its wariness of Western involvement. Incidentally, these Central Asian countries of the former Soviet Union are also those that have increased their exports to Russia amid tightening sanctions against Russia. On the other hand, on May 13, prior to the G7 summit, the EU and Sweden, which holds the presidency, held an informal Indo-Pacific ministerial meeting in Stockholm, where they presented their strategy toward China, including security sharing and reducing dependence on China in the supply chain (de-risking rather than decoupling).

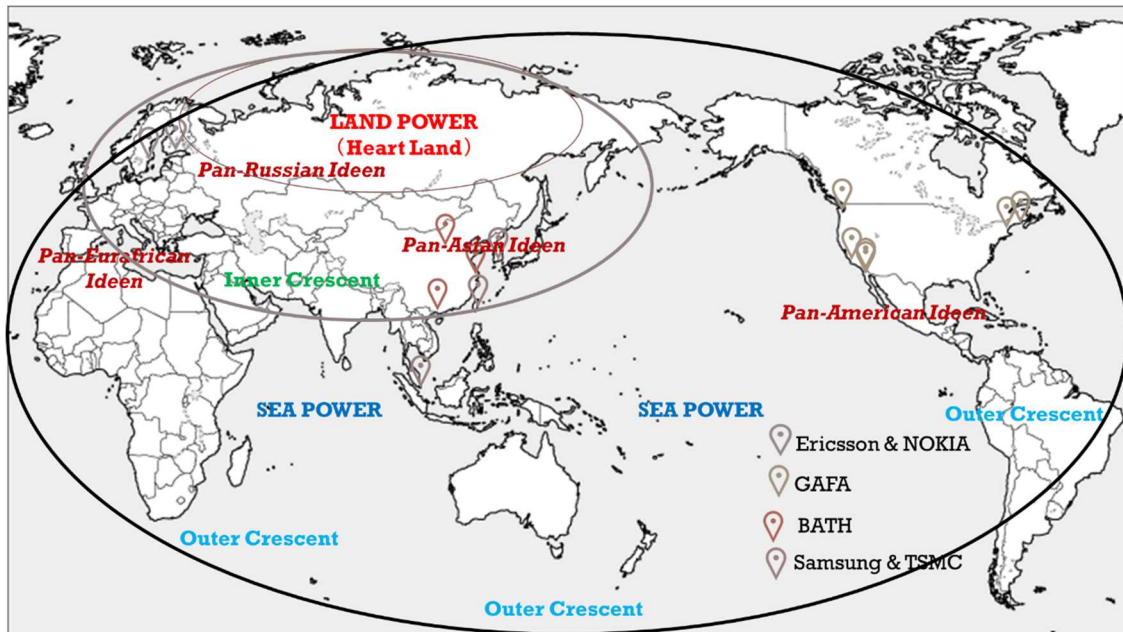


Figure.1 World Map of Two Major Geopolitics with selected ICT companies

How should we view this structure of geopolitical confrontation? Geopolitics so far has two sources, and their confrontation is suddenly attracting a lot of attention. These two different geopolitics are Anglo-American geopolitics, which has its origin in the geography of Harford Mackinder, and Continental geopolitics, which has its origin in Haushofer. These worldviews provide one perspective for understanding international affairs today. The G7, which is made up of countries formerly in the Western camp, is trying to adopt a strategy of containing land power (land states) with an alliance network of sea power (maritime states) based on Anglo-American geopolitics, both vis-à-vis Russia and China. Russia, on the other hand, has invaded Ukraine in an attempt to secure a wide area of sovereignty. China's stance is a delicate one from the perspective of geopolitics, but as an "amphibian" as suggested by Spykman's theory, China has an overwhelming presence on the continent and has a coastal area with access to the vast ocean but has suffered from erosion by external forces both in the central part of the continent and in the ocean. However, today, it is the "world's factory". Today, however, it has acquired an economic presence as the "world's factory," and is also a threat to the economic security of the region as it seeks to gain hegemony in terms of scientific and technological capabilities.

Taking these geopolitical perspectives into account, I would like to look at the conflict structure between sea power and land power that emerged through the G7 Hiroshima Summit, and the struggle for technological hegemony between the countries

located in the "rimland" (inner crescent) of the Eurasian continent, which lies between the two, in the field of information and communications technology (ICT). strategies in the field of information and communication technology (ICT). From there, we will examine the state of the global information society.

Table 1. Comparison of Anglo-American and Continental Geopolitics

Two Schools of Geopolitics	Anglo-American (Sea Power) Geopolitics	Continental (Land Power) Geopolitics
Major Scholars	Mackinder, H.J. and Spykman, Nicholas J.	Haushofer, Karl Ernst and Schmitt, Carl
World View	Dualistic worldview (Sea and Land)	Pluralistic worldview (Sphere)
Key Words	Heartland, Sea Power, Land Power, Rimland, Bridge Head, Inner/Outer Crescents	'Lebensraum' (Living space, habitat), 'Pan-Ideen', 'Geopolitik' (Geopolitics)
Key Concepts and Orientations	Emphasis on geographical conditions: Oriented toward freedom of the seas and containment of continental nations by maritime nations	Emphasis on sovereignty of major powers (Organistic theory of the state): Oriented toward an order based on the existence of multiple wide-area blocs
Policy	Alliance network strategy	Pan-Ideen expansionist strategy

Source: Shinoda, Hideaki (2023) *Geopolitics of Wars (Japanese edition)*, Tokyo: Kodansha.

In addition, during the ministerial meeting held prior to the summit, the Digital and Tech Ministers' Meeting put forward a statement on the creation of guidelines for AI safety, the facilitation of data distribution, and maintaining the reliability of the Internet.

## 2. The International Political Economy of Information and Communication Technology (ICT)

This chapter views the structure of the U.S.-China confrontation as an offensive and defense over technological hegemony over ICT, and, as an approach to international political economy, reads it from the four sources of structural power in international relations between states and markets (security - national defense, production - economy, finance - credit, knowledge - technology) to discuss the future of big-tech companies and the state of the world order. The discussion will focus on the future of big tech companies and the state of the world order by drawing a geopolitical matrix of major countries that determine the world order and major ICT companies that operate domestically and internationally from those countries, and by clarifying the competitive strategies of countries and companies to create an environment (market) and link values globally within the economic ecosystem of ICT. We will clarify the competitive advantage

strategies of countries and companies in the economic ecosystem of information and communication technology. Furthermore, by introducing a social shaping perspective on how to embrace ICTs in society, the potential of techno-socialism will be clarified from the European strategy, and the ideological potential of ICTs as a General Purpose Technology (GPT) will be discussed, where the four sources of structural power in international relations and the issues of contention in ICT policies and strategies are as follows.

#### Four Sources of Structural Power:

- 2-1. **Security:** Who offer others protection against the violent conflict threat can exercise power in other non-security matters like the distribution of food or the administration of justice.

The international regime after World War II was colored by the East-West confrontation structure of the Cold War between the United States and the Soviet Union in the system of permanent members (the United States, the Soviet Union, the United Kingdom, France, and China) in the United Nations. And the North Atlantic Treaty Organization (NATO) and the Warsaw Treaty Organization formed respectively, as mechanisms for mutual military assistance among member states based on the right of collective self-defense stipulated in the Charter of the United Nations. In the Cold War arms race, the U.S. and the Soviet Union also competed in space development. On the other hand, military technology has contributed to the development of information and communications technology, from space exploration to computer technology, satellite communications, the Internet, and mobile communications, and today there is growing concern that civilian technology will be used for military purposes. Semiconductors, as a GPT that can be used not only for civilian purposes but also for a wide range of military applications, are the killer technology of modern society, and having the ability to develop and manufacture them directly or indirectly has become an essential condition for national competitive advantage.

In this regard, how to establish supply chains and sales and distribution networks in today's globalized supply chain is an important element in risk management. During the Cold War, the Coordinating Committee for Multilateral Export Controls (COCOM) was established among the major capitalist countries to control (or embargo) the export of military technology and strategic materials to communist

countries, Japan and Australia joined NATO members except for Iceland, and exports of carbide materials, high-performance CPUs, and cryptographic devices that could be used to make weapons were banned or restricted. After the end of the Cold War, the restrictions were substantially eased at the end of 1991 and dissolved in March 1994, and the Arms Export Controls Agreement was succeeded by the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (Wassenaar Arrangement).

However, the rise of China and the sophistication of its information and telecommunications network have led to new bans and restrictions on imports and exports between countries. The U.S. under President Trump's administration has launched The Clean Network project in 2020, calling on allies to review their use of Huawei and ZTE telecommunications equipment, and fearing that the government of the People's Republic of China is stealing American personal information and trade secrets through Chinese companies such as ByteDance, which operates TikTok, and Tencent, which operates WeChat, Cyber defense is gaining momentum.

This was also the case at the G7 Hiroshima Summit's Digital Technology Ministerial Meeting, where the importance of "Secure and Resilient Digital Infrastructure" and "Internet Governance" were discussed. The importance of "Secure and Resilient Digital Infrastructure" and "Internet Governance" was also confirmed and emphasized at the Digital and Tech Ministerial Meeting. The Science and Technology Ministerial Communiqué also emphasized, as in the previous Summit, concerns about the destructive Direct Ascent Assault Satellite Test (DA-ASAT), regarding the promotion of the safe and sustainable use of outer space.

**2-2. Production:** Who decides what shall be produced, by whom, by what means and with what combination of land, labor, capital, and technology and how each shall be rewarded.

Structural changes in international relations over production have increased the discussion on reducing the risk of external dependence (especially on China) as a side reaction to the development of global value chains (GVCs). In particular, the presence of Taiwanese firms in relation to semiconductor-related production, supply, and procurement has attracted attention, and has also become an international political and economic issue in relation to the state of Sino-Taiwanese relations.

In particular, Japan, the U.S., and Europe are all trying to attract TSMC, a foundry specializing in the manufacture of semiconductor chips, in order to reduce the risk of supply networks to meet demand in the region. In addition, the other leading semiconductor manufacturer, Samsung of South Korea, is expanding its base of operations in Seoul, while Samsung itself is establishing a base in Yokosuka, Japan, to develop materials and equipment for the development of advanced products.

Table 2. Major Companies in the Semiconductor Equipment Industry and Expansion of Offices in Korea

Rank	Company	H.O.	Market Share (2021)	Details of Investment in Korea	Place (est. year)
1	AMAT	US	22.50%	New R&D Center	Gyeonggi-do (within a couple of years)
2	ASML	NL	20.50%	New Technical Support Center	Hwaseong City, Gyeonggi (2024)
3	Tokyo Electron	JP	17.00%	Expansion of R&D Center	Hwaseong City, Gyeonggi (2024)
4	Lam Research	US	14.20%	New R&D Center	Yongin City, Gyeonggi (2022)
5	KLA	US	6.70%	New Technical Training Center	Yongin City, Gyeonggi (2023)
6	ASMPT	SG	3.30%		
7	SCREEN Holdings	JP	2.70%		
8	Hitachi (High Tech)	JP	2.10%		
9	Canon	JP	1.80%		
10	KOKUSAI Electronic	JP	1.50%		

Source: NIKKEI (2023/05/24) and deallab [ <https://deallab.info/semiconductor-equipment/> ] (2023/01/28)

Table 3. Top 10 Semiconductor Vendors by Revenue, Worldwide, 2022 (Millions of U.S. Dollars)

2022 Rank	2021 Rank	Vendor	2022 Revenue	2022 Market Share (%)	2021 Revenue	2021-2022 Growth (%)	H.O.	Main Products
1	1	Samsung Electronics	65,585	10.9	73,197	-10.4	KR	Memory Chips: DRAM, NAND (1)
2	2	Intel	58,373	9.7	72,536	-19.5	US	CPU
3	3	SK Hynix	36,229	6	37,192	-2.6	KR	Memory Chips: DRAM, NAND (2)
4	5	Qualcomm	34,748	5.8	27,093	28.3	US	Telecommunication Chips
5	4	Micron Technologies	27,566	4.6	28,624	-3.7	US	Memory Chips: DRAM, NAND (3)
6	6	Broadcom	23,811	4	18,793	26.7	US	Wireless
7	10	AMD	23,285	3.9	16,299	42.9	US	Design for CPU -> TSMC
8	8	Texas Instruments	18,812	3.1	17,272	8.9	US	
9	7	MediaTek	18,233	3	17,617	3.5	TW	5G
10	11	Apple	17,551	2.9	14,580	20.4	US	
		Others (outside top 10)	277,501	46.1	271,749	2.1		
		Total Market	601,694	100	594,952	1.1		

Source: Gartner (January 2023) [ <https://www.gartner.com/en/newsroom/press-releases/2023-01-17-gartner-says-worldwide-semiconductor-revenue-grew-one-percent-in-2022> ]



Table 4. Top 10 Companies by Semiconductor Design TAM(total available market), Worldwide, 2022 (Millions of U.S. Dollars)

2022 Rank	2021 Rank	Company	2022 Spending	2022 Market Share (%)	2021 Spending	2021-2022 Growth (%)
1	1	Apple	67,056	11.1	68,851	-2.6
2	2	Samsung Electronics	46,065	7.7	45,091	2.2
3	3	Lenovo	21,031	3.5	25,410	-17.2
4	5	Dell Technologies	18,304	3.0	20,977	-12.7
5	4	BBK Electronics	18,082	3.0	21,810	-17.1
6	6	Xiaomi	14,602	2.4	16,465	-11.3
7	7	Huawei	12,075	2.0	14,977	-19.4
8	8	HP Inc.	11,291	1.9	13,927	-18.9
9	10	Sony	7,975	1.3	6,847	16.5
10	9	Hon Hai Precision	7,531	1.3	8,028	-6.2
		Others (outside top 10)	377,680	62.8	352,568	7.1
		Total Market	601,694	100.0	594,952	1.1

Source: Gartner (February 2023) [ <https://www.gartner.com/en/newsroom/press-releases/2023-02-06-gartner-says-top-10-semiconductor-buyers-decreased-chip-spending-by-seven-percent-in-2022> ]

This "blocking" of semiconductor production through "friendshoring" has been in the works since China announced its innovation strategy in 2015, when it put forward its semiconductor and other industrial policies in "China Manufacturing 2025," and since then, the U.S. has been requesting that its allies restrict exports, including Chinese DRAM makers JHICC (2018) and Huawei (2019), and semiconductor contract manufacturer SMIC (2020). In 2022, the U.S. will pass the CHIP plus CHIPS and Science Act, a law to strengthen its semiconductor manufacturing capacity, and the economic blockade has become clear. Related to this, in 2023, the U.S. will request Japanese and Dutch semiconductor equipment manufacturers to restrict their exports to China, while China has imposed restrictions on imports of U.S. Micron semiconductor memory, and the U.S. has requested Korean semiconductor manufacturers (Samsung Electronics and SK Hynix) not to accept orders from China's semiconductor shortage. The US has also requested Korean semiconductor manufacturers (Samsung Electronics and SK Hynix) not to accept

orders from China's semiconductor shortage. The EU is also trying to attract semiconductor companies through the European Semiconductor Act, starting with Infineon Technology of the U.S. The expansion of power costs is also a stumbling block, but U.S. companies Intel and Wolfspeed are planning to invest in Germany.

On the other hand, Taiwanese ICT vendors, concerned about the U.S.-China conflict, are trying to decentralize their manufacturing bases from China to Vietnam, Malaysia, Thailand, India, and Mexico, in accordance with the wishes of their customers, U.S. companies, i.e. Apple (NIKKEI 2023/04/29).

In the past, international competition over semiconductors was based on final consumer goods in a full-set type of inter-industry competition among countries based on their national innovation systems. As trade imbalances began to emerge, companies were required to shift to local production in the consuming countries, and they began to occupy a part of the regional innovation system as well as to shift to local production through foreign direct investment, by making full use of the global value chain, each company specialized in its own field of competitive advantage. However, the growing dependence on the Chinese economy has increased economic security risks, and it is here that the supply chain has been forced to rethink its political economy.

In response, China, which is concerned about a shortage of semiconductors, launched a 1 trillion-yuan (US\$143billion) industry support program in late 2022 to boost its own semiconductor production capacity. The U.S. added new Chinese semiconductor manufacturers to the entity list in October 2022. These included memory semiconductor maker YMTC and AI chip designer Cambricon Technologies, thus preventing the purchase of semiconductors and manufacturing equipment made with U.S. technology.

**2-3. Finance** – the control of credit – ... whoever can so gain the confidence of others in their ability to create credit will control a capitalist – or indeed a socialist – economy.

The post-World War II financial system was structured by the International Monetary Fund (IMF), which was the dual arm of the Bretton Woods system and the GATT, which was responsible for the trade system, and the "financial structure-credit supply mechanism" was provided by rules governing trade liberalization and exchange rates among major currencies. The IMF provided the "financial structure-credit supply

mechanism" with rules for trade liberalization and exchange rate controls among major currencies. Under this system, international interbank transactions were supported by the Society for Worldwide Interbank Financial Telecommunication (SWIFT), established in 1973, and its payment and settlement network system SWIFT. More than 11,000 financial institutions from over 200 countries and regions participate in SWIFT, and remittance information cannot be transmitted, and international transfers cannot be made without going through the SWIFT network. It is estimated that the amount of settlement is approximately 5 to 6 trillion dollars (550 to 660 trillion yen) per day (in 2020), making SWIFT the de facto international standard (Kiuchi, T., 2022). In January 2022, 40% of international payments were made in US dollars, 37% in European EUROS, 6% in British pounds sterling, and 3% each in Chinese yuan and Japanese yen. In addition, 59% of the world's foreign exchange reserves are in US dollars, 20% in EUROS, 6% in Japanese yen, 5% in British pounds sterling, and 3% in Chinese yuan (ASAHI 2022/03/21).

However, transactions through the "International Interbank Settlement System (CIPS)" introduced by the People's Bank of China (PBC) are rapidly expanding, and the improved status of the renminbi cannot hide its upsetting role as the reserve currency for the US dollar. China is also actively introducing a "digital renminbi," as legal digital currency incorporating blockchain technology, and the existence of an international remittance network with a different settlement system from SWIFT could reduce the effectiveness of economic and financial sanctions by the US (NIKKEI 2023/05/05). Meanwhile, in China, QR code payment services and WeChat Payment, a mobile payment and digital wallet service offered by Alibaba Group that allows customers to make payments in the Chinese currency "Renminbi," are rapidly expanding and gaining ground in electronic payments.

In addition, the private trading of crypto assets (cryptocurrencies) could provide a loophole for money laundering and economic sanctions, and the G7 Hiroshima Summit of Finance Ministers and the Central Bank will also address the strengthening of regulation and monitoring of crypto asset trading. They welcome the IMF's ongoing work on the Central Bank Digital Currencies (CBDCs) Handbook and believe that a strong global payments system is an important foundation for our economic and financial activities, they welcome the ongoing IMF work on the "Handbook on CBDCs" and look forward to the first set of deliverables to be published by the 2023 Annual Meetings of the World Bank and IMF.

**2-4. Knowledge:** Whoever can develop or acquire and to deny the access of others to a kind of knowledge respected and sought by others; and whoever can control the channels by which it is communicated to those given access to it, will exercise a very special kind of structural power. – knowledge is power –

- The knowledge most sought after for the acquisition of relational power and to reinforce other kinds of structural power (i.e. in security matters, in production and in finance) is technology.

The symbol of knowledge-driven technology can be seen in the dizzying development of information and communication technology today, and the economic friction between the U.S. and China has become apparent in the struggle for technological supremacy over ICT. In particular, the rise of Huawei in the fifth generation of mobile communications, a social infrastructure, has been the focus of much attention and has become the subject of sanctions in global transactions. In addition, the penetration of social media has increased the influence of information, and both the U.S. and China have been restricting each other's platforms and services and evolving their own. Specifically, GAFAM and BATH+B are facing off, and the development of AI chip sets in the semiconductor industry, as well as the development competition over generative AI, is sparking a race to develop AI.

- ☐ Microsoft - ChatGPT (investment in OpenAI)
- ☐ Google (Alphabet) – Bard (interactive AI)
- ☐ Facebook (Meta) - LLaMA (developing large-scale language models)
- ☐ Apple - Working with Qualcomm to develop proprietary semiconductors (Chip)
- ☐ Amazon - Partnering with Hugging Face

These ICT-related knowledge issues were also addressed at the G7 Hiroshima Summit of Digital Technology Ministers, where international policy discussions are underway to maximize the potential for cross-border transfer of data under DFFT (Data Free Flow with Trust). It is also an issue of information integrity, which is a challenge to maintain and promote a secure, free, and open Internet and to strengthen trust in the digital economy with broader social implications, and the promotion of responsible AI and AI governance has been raised.

### **3. The Structural Powers and Innovation Systems: Political Economy of ICT –**

## **States, Markets, and Civil Society**

The international regime established after World War II was based on the independence of each country's economic system and provided a system for trading the results of domestic innovation systems and facilitating the settlement of payments. Furthermore, international competition has encouraged outsourcing to emerging countries through the international horizontal division of labor in search of price advantage, which has led to regionalization as seen in the EU and the North American Free Trade Agreement, as well as the development of a global supply system and the rise of the Asian NIEs and China. These developments were accompanied by the remarkable development of information and communication technology, which necessitated new frameworks for international trade, such as direct investment, trade in services, and intellectual property rights.

In the global economic and industrial ecosystem, each country and region is also focusing on innovation policies to seek international industrial competitiveness. In the global economic and industrial ecosystem, countries and regions are also focusing on innovation policies in their search for international industrial competitive advantage. The rise of China's economic presence in the international arena has shaken the structural power regimes mentioned earlier, leading to economic friction between the U.S. and China (split-decoupling), and has also become an issue of geopolitical technological hegemony, as symbolized by the participating countries and issues discussed at the G7 Hiroshima Summit.

In particular, the struggle for hegemony between states and markets over information and communication technology has taken on the appearance of a hegemony that extends from the knowledge structure to other structural powers.

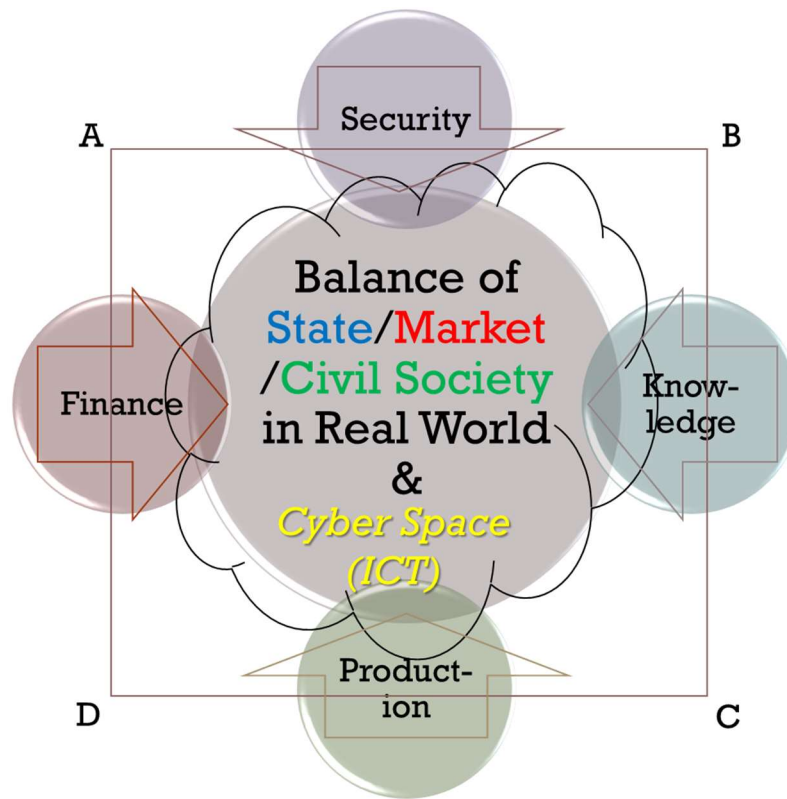


Figure.2 Four Structures around the State-Market See-Saw + Civil Society

#### 4. Concluding Remarks: Techno-Globalism, Regionalism, and Nationalism

King, B. and Petty, R. (2021) define technosocialism as the reconstruction of capitalism in the 21st century, in contrast to Neo-Fudalism, Luddistan and Failedistan, as follows.

*Technosocialism: Society becomes highly automated, replacing most human labour.*

*Technology advancements make housing, healthcare, education and basic services ubiquitous and low costs. Capitalism is re-engineered toward long-term sustainability, equality, and the advancement of humanity as a whole. Climate mitigation efforts generate centuries-long global economic cooperation. (p.39)*

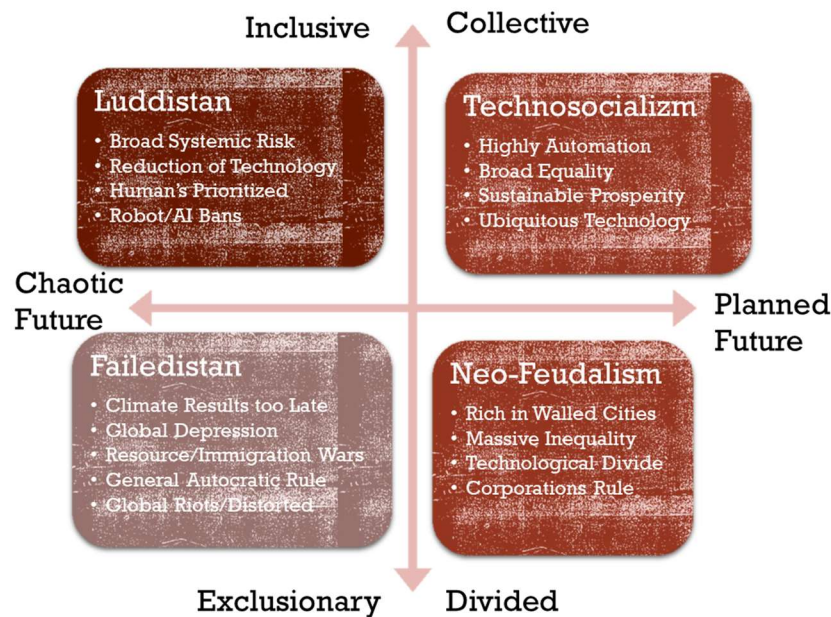


Figure 3. Futures Humanity Faces  
(King, B, and Petty, R., 2021)

On the other hand, Aghion, P., A., et. (2021), taking up the capitalism model of Acemoglu, D. (et. al.) (2017), compares "cutthroat capitalism" of the American model with "cuddly capitalism" of the Scandinavian-German model and argues that the American model, which promotes innovation, is desirable and that social reforms aiming at inclusion of social security and inequality are necessary. While the American model, which promotes innovation, is desirable, and it explains the need for social reforms that aim at the inclusion of social security and inequality, the Nordic-German model calls for reforms that promote innovation and creative destruction without reducing social security and public services. However, it is uncertain whether such reforms are feasible in the Nordic-German model, which calls for implementation of reforms that encourage innovation and creative destruction without reducing social security and public services. Ultimately, a complementary and cooperative relationship between the American and Nordic/German models may form an innovation ecosystem. In other words, the American model, which brings innovation, and the Scandinavian/German model, which seeks social acceptance of technological innovation, should cooperate with each other to find a way of social acceptance of technological innovation. In the field of information and telecommunications technology, Europe's rule-making strategy should promote the development of a social rule base that encourages social acceptance of Nokia and Ericsson's telecommunications infrastructure and the innovative technologies (including

cutting-edge semiconductor design technologies) of U.S. platformers in social media technology. The European rule-making strategy could be used to promote the development of a social rule infrastructure that encourages social acceptance of the innovative technologies (including advanced semiconductor design technologies) of the U.S. platform of Nokia and Ericsson and social media technology.

On the other hand, if one asks what the innovation infrastructure is like in the emerging East Asia, it reveals the limitations of a country that is too centralized and bureaucratic to foster civil society and a bottom-up approach, as seen in the response to the COVID-19 infection outbreak. This could lead to what could be called national "authoritarian surveillance capitalism," the pursuit of an innovation system with centripetal force backed by authority in order to generate innovation, a system of surveillance and control by authority. This is in contradiction to the exclusivism in the system of surveillance and control by authority. However, if technological capabilities backed by authority are put into its technological orbit, it will also be able to demonstrate its efficient productive capacity.

If these three distinctive and complementary elements of capitalism could be combined and share the foundation of an autonomous "civil society" with mutual social acceptability, it would be possible to build a regional-to-global innovation system that transcends the national. It is also the incorporation of The Triangle of State, Market, and Civil society presented by Bowles, S. and Carlin, W. (2020) into a showcase of the four structural powers of the state and the market, including the power of "civil society" to generate AI technology. The power of "civil society" must be enhanced by information and communication technologies, including AI technologies.

- U.S. "**cutthroat capitalism**": universities, institutional investors, venture capitalists, philanthropists, and DARPA form ecosystem to drive innovation + reforms for security and inclusion.
  - *Leading the GLOBAL INNOVATION SYSTEMS*
- European "**cuddly capitalism**": the autonomy and cooperative system of diverse states prevents them from creating future innovations on their own. However, in Germany and Scandinavia, implementation of reforms that encourage innovation and creative destruction without reducing basic social security and public services.
  - *Leading the SOCIAL INNOVATION SYSTEMS*
- East Asia (Japan/Korea/China) "**authoritarian surveillance capitalism(?)**": pursuit of innovation system with centripetal force backed by authority (contradiction with chauvinism in authoritarian surveillance/control system) ... Limitations of countries



with too much centralization and bureaucracy that do not foster civil society and bottom-up approaches ... Tributary Trade System + Indirect Territorial Expansion (Chinatowns around the world) ... China as a geopolitical "Amphibia" (Spykman, 2017)

➤ *Sticking to the NATIONAL INNOVATION SYSTEMS*

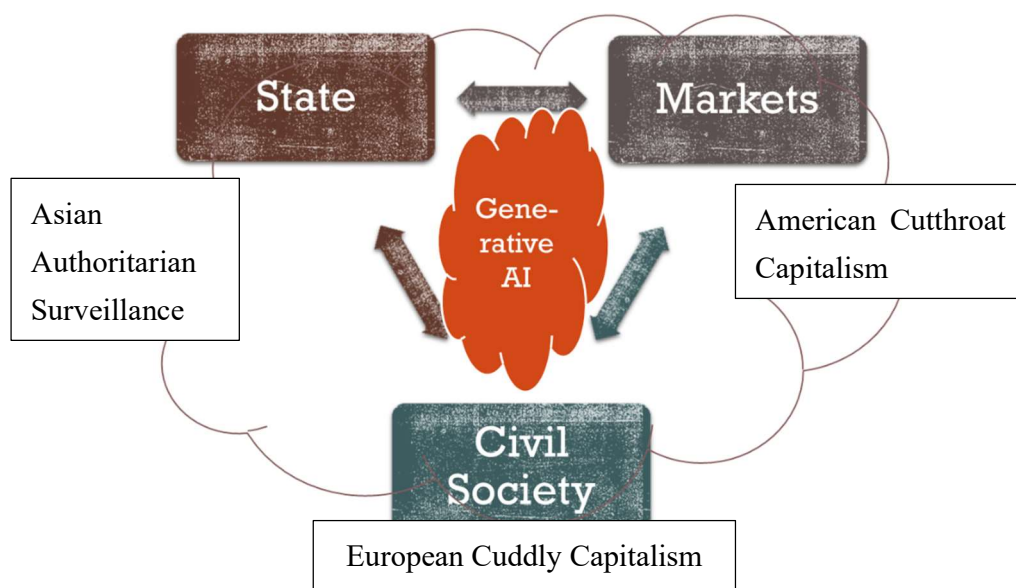


Figure 4. Generative AI(GAI) and The Triangle of State, Market, and Civil society  
(Revised to Bowles, S. and Carlin, W., 2020)

Innovation is a combination of technological and social (organizational and institutional) innovation that brings about change, and it is essential that information and communication technology, which is GPT, function as a collection of various objectives, such as how society and individuals perceive and recognize information and data, what knowledge they need to analyze and interpret it, and how they can acquire the information power (intelligence) to adapt and respond to circumstances. It is essential that GPT functions as an aggregate of various objectives, such as how society and individuals perceive and recognize information and data, and how they can acquire the information power (intelligence) to adapt and respond to circumstances by analyzing and interpreting it with knowledge. It is necessary to apply superior technology to society with "social shaping" to sharpen it socially, and to consider whether the technology should be used as a means of management and control, or simply as a means of inducing desire and promoting wealth (profit), or as a means of sharing information for coexistence and co-prosperity with others, or even as a means of collaboration and co-prosperity. Or is it

simply a means of sharing information for the sake of co-existence and co-prosperity with others, or is it a means of promoting cooperation and collaboration? We are at the crossroads of a new age of humanity, where we will either lose our autonomy through automation and become subordinate to a dictatorship (autocracy), or we will establish autonomy, discipline, and rules to govern ourselves through technology. This is an era of tolerance and respect rather than confrontation. Therein lies the significance of technosocialism in information and communication, the sharing of a "value system promoted by the people for the people," or "Civil Society.

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