

Innovative Growth Strategy in the US, Europe and Japan

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I. Introduction: Innovative Growth Strategy in the US, Germany and Japan

The Korean government is implementing innovative growth policies such as not only a super-connected intelligence project, smart city, smart factories for innovative SMEs, and start-up ecosystem projects, but also policies to innovate regulations and create an innovative infrastructure. The purpose of this study is to suggest the policy implications for the Korean government by analyzing innovative growth policies of major countries such as the United States, Germany, France, and Japan.

The federal government of the United States has already implemented strategies since 2010 to lead the future global market, including high-tech manufacturing industries, AI, IoT, and Big Data sectors. In the case of the manufacturing industry, the federal government has been expanding R & D investment for manufacturing companies and fostering key human resources

through its “Advanced Manufacturing” strategy. In the field of IoT, various policies are developed and implemented to maximize the use of IoT in missions promoted by individual government agencies such as the Department of Homeland Security (DHS) and the Ministry of Justice (DOJ) and related organizations such as the National Science Foundation (NSF). Also, in the field of AI, line ministries affiliated with the National AI R&D Strategic Plan have been investing vast R&D funds to develop AI technology, with the Defense Advanced Research Projects Agency (DARPA)’s AI-related projects particularly noticeable. In the field of Big Data, the Networking and Information Technology Research and Development (NITRD) Committee, which coordinates the projects of individual government agencies and related agencies, serves as the control tower. In terms of pursuing privately-led innovation in connection with the federal government's policy, a number of companies and research institutes in the private sector, such as the Industrial Internet Consortium (IIC), are also actively working to test and commercialize advanced technologies related to the fourth industrial revolution.

In Germany, the federal government-level innovative growth strategy of “Industrie 4.0” originated from a project of the high-tech strategy of the German government, aimed at Digital Transformation in the manufacturing industry. Industrie 4.0 makes good use of the industry-academia linkage system in technology development in areas related to the fourth industrial revolution, such as IoT, Cloud, and AI. As a platform for implementing Industrie 4.0, “Plattform Industrie 4.0” is providing a total of 371 Use Cases related to industry-academia cooperation technology development and commercialization in the areas of smart logistics, data integration, smart production support, process automation, networking, etc. These efforts clearly demonstrate the characteristics of Germany’s industry-academia linkage system by operating a total of 81 test beds all across the country.

Japan's innovative growth strategy is implemented through the growth strategy announced by the Abe cabinet every year since 2016 under the concept of “Society 5.0.” The new industrial policy of Connected Industries has been promoted by the Ministry of Economy, Trade and Industry (METI) since 2017, and aims at maintaining the competitiveness of the manufacturing sector by creating new business models focused on sharing and utilizing industrial data among the local manufacturers, which the Japanese government sees as its strengths in competing with global IT platforms such as GAFA (Google, Amazon.com, Facebook, Apple). In particular, the introduction of the industrial data certification system for the purpose of promoting the distribution and utilization of industrial data, and the demonstration project to link the industrial IoT platforms independently developed by local manufactures can be seen as

Japan's unique industrial data-related policies. The Japanese government has recently been emphasizing the Digital Transformation of private enterprises as a key axis of innovative growth to innovate the IT infrastructures in Japan, a nation sometimes referred to as an “IT undeveloped country.”

Against this backdrop, this study focused on a comparative analysis of fourth industrial revolution areas currently being pursued by the Korean government: smart factories, start-up ecosystem, and the fintech industry.

II. Manufacturing Innovation Policy in Germany and Japan

In Germany, utilization of smart factories is increasingly expanding, especially emphasizing the connectivity aspects of smart factories. Siemens, Bosch, and SAP are typical examples of smart factory innovations developed on open industrial IoT platforms. Siemens' MindSphere open platform is a cloud-based Internet of Things operating system. Figure 1 shows the basic structure of MindSphere’s Industrial IoT Platform. It visualizes the actual production or product through a Digital Twin, and collects and analyzes real data through the cloud-based Industrial Edge. Bosch has developed the IoT Suite, which is a cloud-based comprehensive platform service compatible with various clouds. With the SAP HANA series as the intelligent suite, SAP focuses on building an intelligent enterprise using SAP Leonardo as an intelligent analysis tool, and multi-cloud strategy.

Figure 1. Siemens' Open Industrial IoT Platform: MindSphere



Source: Siemens. 2018/. MindSphere: Enabling the world's industries to drive their digital transformations.

The federal government of Germany actively supports the construction of smart factories by local SMEs through the MittelStand 4.0 Competence Center under the Mittelstand-Digital policy. The Center operates in 26 regions across Germany, with each location operating under a different personality and differences in the type of activities they support.

A characteristic commonly found in the process of building a Japanese local smart factory is that it focuses on innovation in the manufacturing process. However, the factory automation and visibility that utilize the latest technologies such as IoT, AI, image recognition technology, cooperative robots, and Automated Guided Vehicles (AGVs) are an extension of manufacturing process innovation. The focus is on predictability maintenance, productivity improvement, and production traceability (QCD: Quality, Cost, Delivery).

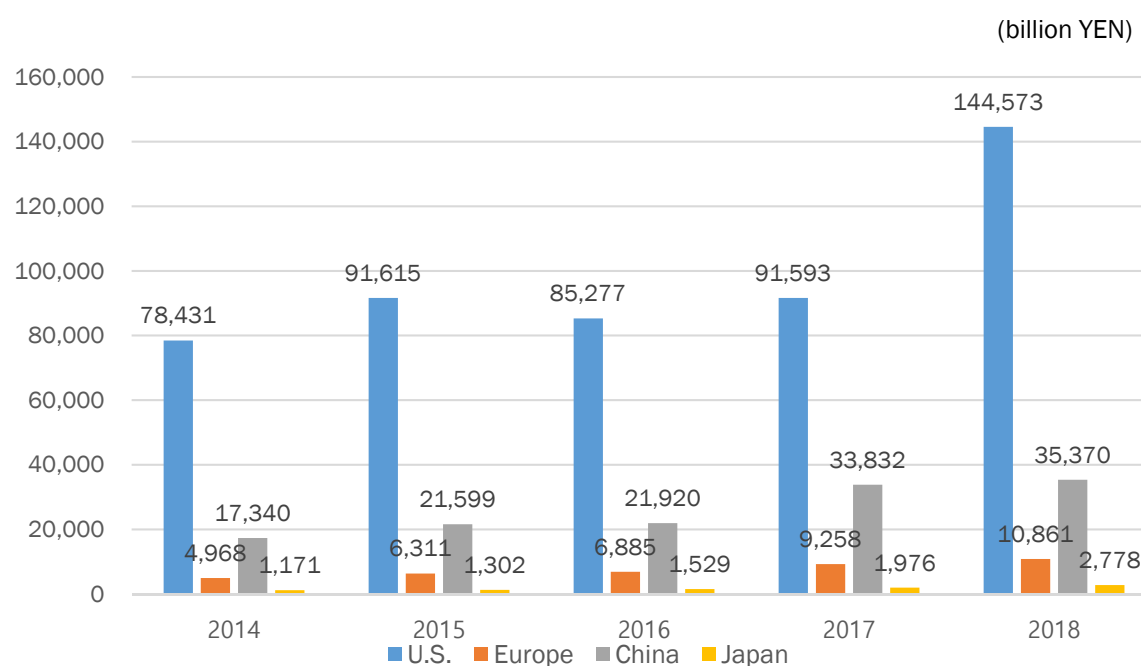
Japanese manufacturing companies have been competing with the German manufacturers in developing open industrial IoT platforms. Mitsubishi Electric's Edgexcross expanded by the e-F@ctory solution, and FAUNAC's FIELD system, Hitachi's LUDA, DMG Mori's ADAMOS are attracting public attention. The Japanese industrial IoT Platform basically focuses on Factory Automation (FA) and IT data connection. In particular, FAUNAC's FIELD system is famous as an industrial IoT platform that integrates data from Computerized Numerical Control (CNC) and industrial robots. Of course, Mitsubishi Electric is running an e-F@ctory business in China and FANUC is also very interested in the Chinese and Southeast Asian markets, but concerns have been raised that these projects will cause another “Galapagosization” in that the companies limit their partners to domestic companies.

III. Startups Supporting Policy in the US, France and Japan

The reason for the success of startups in the United States was that key factors composing the startup ecosystem – such as human capital, technological innovation, and venture capital – interacted effectively with each other to create positive synergy effects. Among these elements, the venture capital's role in providing funds to startups and recovering the return on investment

through M&A or initial public offerings (IPO) after the startups grow is pointed out as the most important factor. Figure 2 compares the trends of venture capital investment in the major countries. The US government indirectly supports startups to lead R&D investments to successful commercialization, while startups and large enterprises cooperate to drive innovations in the private sector. The government's representative policies are the Startup America Initiative and the JOBS Act promoted by the Obama administration in 2011.

Figure 2. Trends of Venture Capital Investment in Major Countries



Source: Venture Enterprise Center Japan. 2019.

The Japanese government has been implementing the J-Startup policy since 2018 with the goal of doubling the number of ventures from universities and research institutions compared with 2016 levels. The Integrated Innovation Strategy 2019 announced by the Japanese cabinet in June 2019 presented the targets in terms of the num-

ber of ventures, the amount of venture investments, and the number of “unicorns,” i.e. private companies valued at \$1 billion or more (see Table 1). The Japanese government also provides high-quality information to promote open innovation among large companies, venture capital and accelerators, universities and research institutes. The Japanese government discloses data

on ventures, such as key technologies and the talents of university ventures established on the basis of research results generated at universities,

and encourages open innovation between industry and academia to commercialize innovative technologies from various outstanding universities and research institutes.

Table 1. Venture Promotion Targets in Japan

		Current situations	Targets in 2020
Ventures	From universities (numbers)	2,533 (2016)	Twice compared to 2016
	From research institutions (numbers)	207 (2016)	Twice compared to 2016
Funding	Compared to GDP (%)	0.036% (2017)	Similar level up to the US (04.36%) or China (0.245%)
Growth	Unicorns (numbers)	7 (2019)	20 (2023)

Source: Japanese Cabinet, Integrated Innovation Strategy 2019.

In France, at the government level, startups policies to support and foster startup ecosystems and businesses have been active since 2016. The government's La French Tech policy helps entrepreneurs seeking to start a business to realize innovative business ideas through financing, recruitment, and incentives for growth companies. "Station F" is a startup campus established in 2017 led by the private sector, as well as startup companies, investors, and large global companies, together with the La French Tech team. It has the strength to quickly deal with various legal and institutional problems that startups can encounter in their business processes.

IV. Fintech Supporting Policies in the US, Japan, and England

The US is leading the world's fintech industry with its technology, home to 18 of the top global 100 fintech companies in 2018. Fintech companies are changing the landscape of the financial market, especially in the lending sector, through

the use of cutting-edge technologies such as blockchain technology and AI. Since 2013, fintech has accounted for a rapidly increasing share of personal loans at banks and financial institutions, despite growing concerns that this could lead to the expansion of personal loans with high risk of default. Large banks in the US are trying to increase business efficiency by directly acquiring fintech companies or forming strategic alliances with fintech companies, and start-up companies are actively entering into new business sectors such as investment and asset management using Robo-Advisors technology. However, there is a concern that the fees cut due to the introduction of innovative digital technologies such as Robo-Advisor will prevent the growth of fintech companies newly entering the sector by lowering the profitability of investment and asset managers.

In Japan, the lack of incentives for new fintech companies to emerge is pointed out due to the existing well-equipped financing infrastructure as well as the consumers' preference for cash.

However, in recent years, several fintech companies have appeared, and existing financial institutions are also increasing the introduction of new fintech technologies. In addition, the Japanese government also expressed its willingness to prepare related policies by selecting fintech as a major Innovative Growth strategy area in 2016. The core of the Japanese government's fintech policy is to review the legal system to reflect the rapid changes in the financial environment due to IT innovation. By revising the Bank Act, Payment Settlement Act, and Financial Instruments and Exchange Act, the government allowed the subsidiaries of financial institutions to enter new financial areas, and imposed obligations on financial institutions to open APIs to provide new fintech services. Also, through the Fintech Support Desk and the Fintech Demonstration Experiment Hub, the Japan Financial Services Agency (FSA) provided a window for companies to consult legal and regulatory issues that may arise when launching their fintech businesses. The Japan FSA, as part of the Blockchain International Joint Research Project, held a round table with experts from overseas financial authorities, and universities to prevent potential side-effects of blockchain technology, such as money laundering and cyber security problems.

In the United Kingdom, in order to maintain the competitiveness of the traditional financial industry, the government views the emerging fintech sector as a target of support rather than regulation. The Financial Conduct Authority has established a new FCA Innovation Team, and in June 2016 introduced the Regulatory Sandbox to test grounds for new business models that are not protected by current regulation or supervised by regulatory institutions. Also the FCA provides the consulting services of Request Direct Support, and financial advising services through

Advice Unit. The FCA also supports LegTech, which consists of a group of companies that use cloud computing technology through software-as-a-service (SaaS) to help businesses comply with regulations efficiently and less expensively. In the private sector, Level39, the world's most connected tech community with over 200 tech startups and scaleups based onsite, was launched in March 2013 by the Canary Wharf Group. It offers workshops for the education of fintech companies, and at the same time provides opportunities to build close networks with investors and accelerators.

V. Policy Suggestions for the Korean Government

It is important to maximize the synergies between 5G and AI technologies by building a 5G infrastructure, and prioritizing AI R&D investment to achieve the national AI National Strategy announced in December 2019 by the Korean government. Also, the rigid organizational system at the government ministries hinders the promotion of agile innovative growth strategy due to departments placing their own interests first. Like the National Science and Technology Committee (NSTC) of the United States and Japan's Integrated Innovation Strategy Promotion Meeting (IISM), it is necessary to establish a national control tower for the promotion of innovative growth policies, and strengthen its status and authority by unifying and empowering disparate functions. Furthermore, as can be seen from examples such as Germany's Plattform Industrie 4.0 or Japan's Robot Revolution Initiative (RRI) and IoT Promotion Consortium (ITAC), it will be important to establish a public-private cooperation or private consortium system.

When it comes to innovative manufacturing policy, with reference to industrial IoT platforms such as Siemens' MindSphere, FANUC's Field Systems, and Mitsubishi Electric's Edge Cross, Korean manufacturers also need to pay attention to building smart factories and industrial IoT platforms from the perspective of creating a business model, and as a new area to generate exports. Also, as shown by the Federal Government of Germany, the SME smart factory policies should support the digital transformation of SMEs in accordance with regional industrial structures and corporate needs. Also, it is necessary to benchmark the Japanese case where the government supports "customized" human resources and services for SMEs in a bottom-up manner.

The government needs to provide databases or cooperation guidelines for start-up companies to reduce trial and error that can occur in the process of cooperation between large companies and start-ups, and provide additional tax benefits to large companies in cooperation with start-ups. When establishing business support policies, it is necessary to find ways to expand the participation of large companies. Like the French government's start-up support agency French Tech National Team, it is necessary to build a one-stop service system that places government-wide manpower in the start-up support team to provide consultation on legal regulations related to start-up business activities, assist with applications for technology patents, and attract external investment.

With reference to fintech policies in the US, the Korean government must pay attention to regulatory reforms, especially in areas such as payment and financial investment convergence (Acorns), cash asset management (Betterment),

easy insurance subscription (Lemonade), and customized loans for SMEs. Also, it should be noted that the Japan Financial Services Agency is launching an international joint research project on the subjects of fintech regulation and supervision, money laundering, block chain. Furthermore, regulatory and legal measures to protect Korea's financial market are deteriorating the competitiveness of domestic fintech. In this regard, it is necessary to refer to how the UK Financial Conduct Authority (FCA) performed both support and advisory roles, not regulation and control, in the process of OakNorth Bank's launch of new financial services. [KIEP](#)