

Outline of the 2020 White Paper on Information and Communications in Japan

[Unofficial Translation]

～Digital transformation and new lifestyles prompted by 5G～

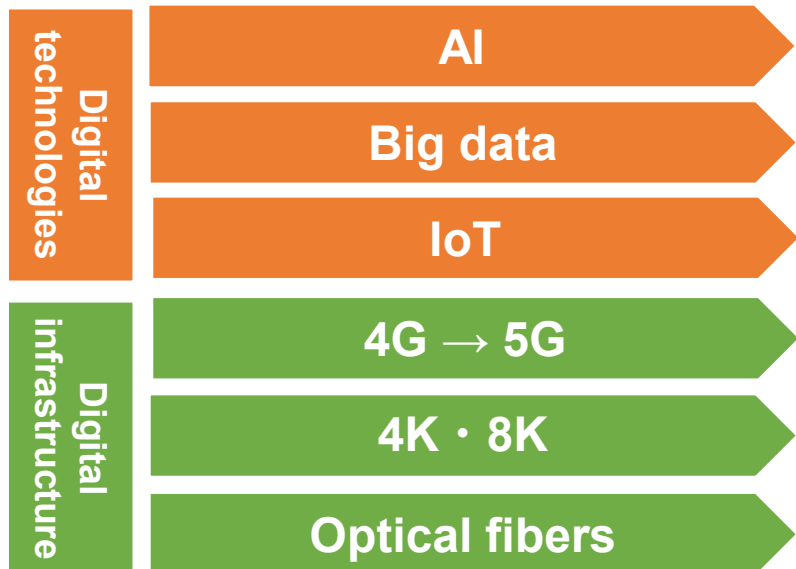
August 2020

Ministry of Internal Affairs and Communications, Japan

- Spurred by the novel coronavirus pandemic, ICT technologies have become indispensable for maintaining people's lives and economic activities, with digitalization waves coming to domains where digitalization had failed to make progress.
- On the premise of the protection of human lives, our society and economy will irreversibly evolve into a new phase due to the pandemic. Digitalization and remote service expansion will be fully exploited to produce innovations at personal, industrial and social levels, leading to the creation of new values.
- While integration between cyber and real spaces has made progress through digital infrastructure development and digital technology utilization, it is pointed out that the pandemic will lead cyber and real spaces to be synchronized in society. In the run-up to an end to the pandemic, digital infrastructure including the fifth generation (5G) mobile communications system: as well as IoT, big data, AI and other digital technologies, will become even more important.

Life before COVID-19

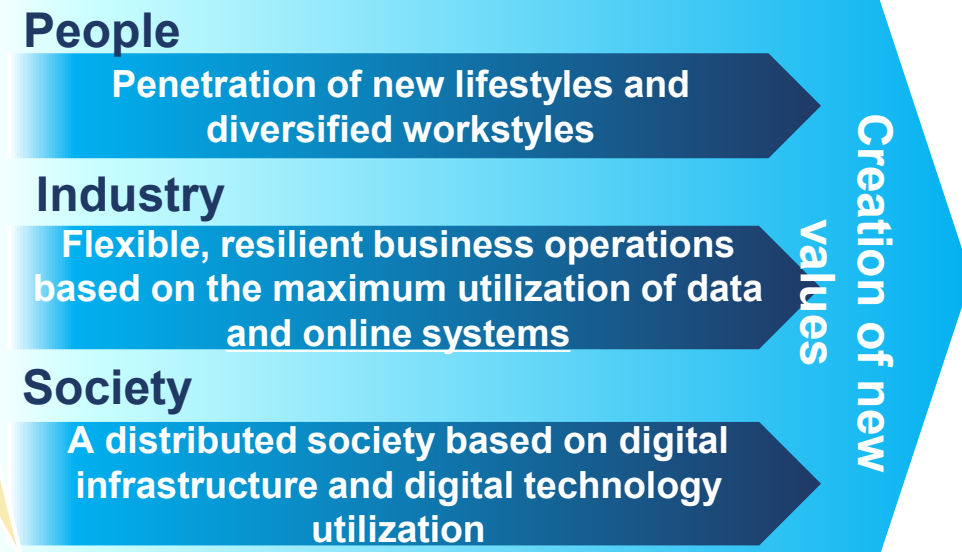
Our society promoted digital transformation through digital infrastructure development and digital technology utilization with the aim of increasing industrial efficiency and enhancing added value.



Novel coronavirus pandemic

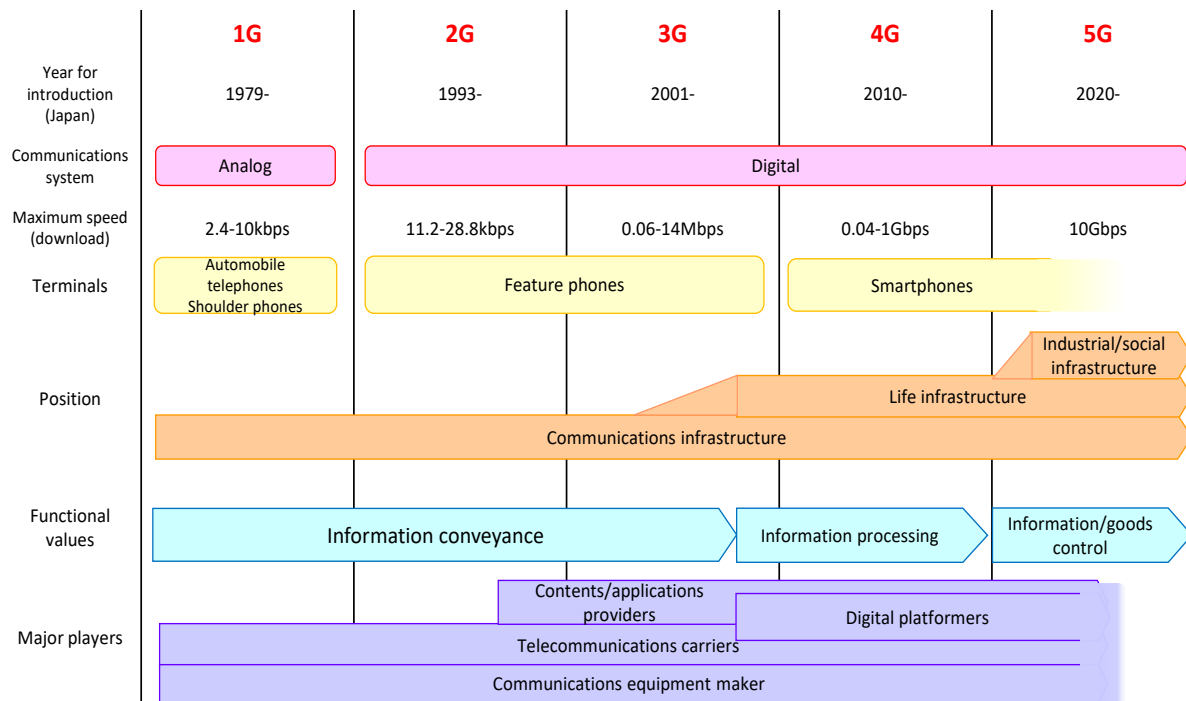
Life with COVID-19

On the premise of the protection of human lives, our society will irreversibly evolve into a new phase to completely synchronize cyber and real spaces and create new values.



- Japan's mobile communications systems have greatly improved their functions through generation changes every 10 years since their introduction in 1979, and with the number of users increasing dramatically. Mobile communications infrastructure has evolved into life infrastructure.
- 5G systems put into commercial operations this year in Japan are expected to bring about an even greater social impact, as infrastructure for the IoT age, through their use in various sectors and industries.
- After the United States and South Korea initiated commercial 5G operations in April 2019, other countries have followed suit one after another.

Mobile communications system evolution



5G Field Trials



Individual identification for cattle farming



Monitoring climbers

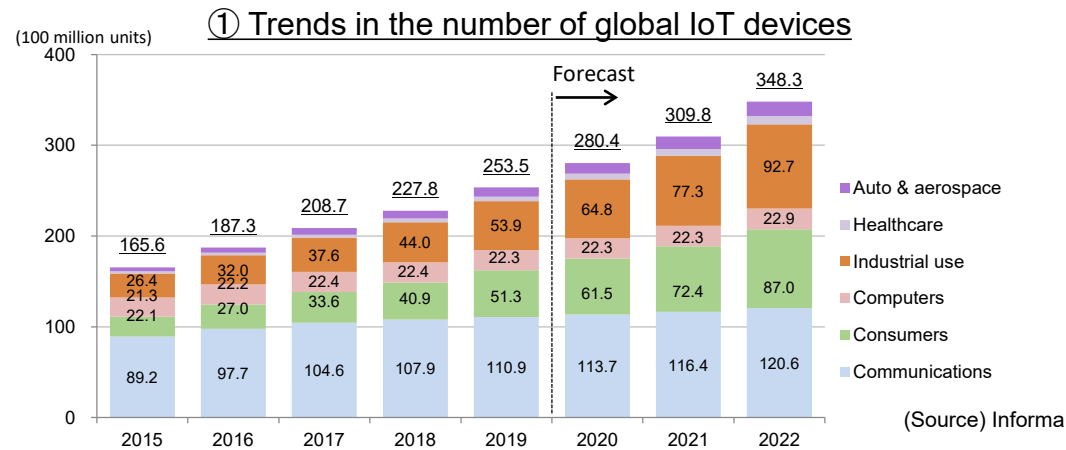


Securing crane safety

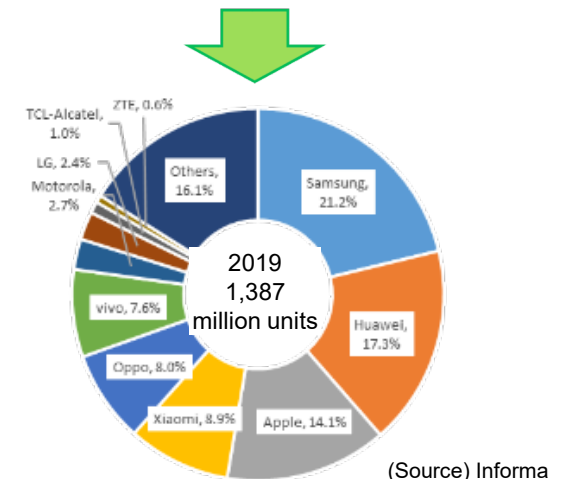
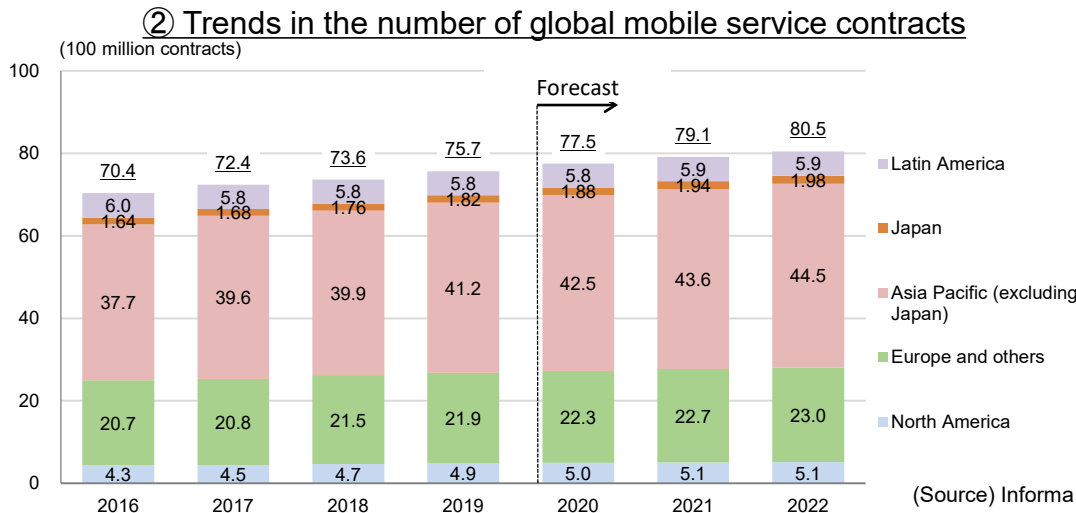
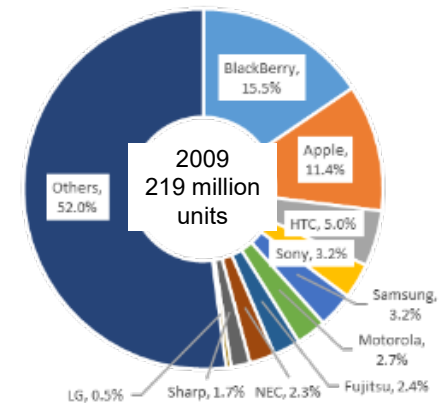


Truck platooning

- The number of IoT devices for industries and consumers is forecast to sharply increase in line with the diffusion of IoT/AI, and the launch of commercial 5G operations (①). On the other hand, the number of mobile service contracts is coming close to saturation and is forecast to only moderately increase (②).
- Global mobile terminal market players have dramatically changed in the past decade. While Chinese enterprises have expanded their share of the smartphone market, the presence of Japanese enterprises in the market has declined (③).

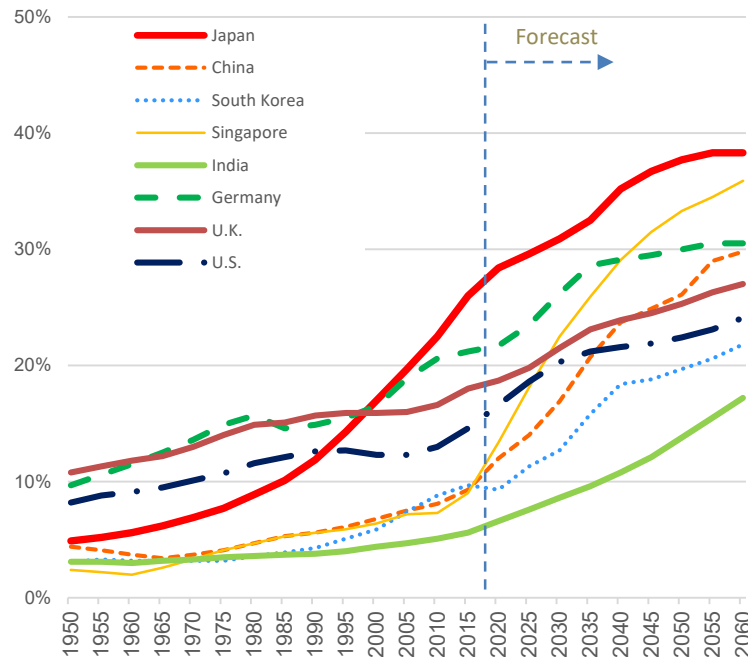


③ Global smartphone market share

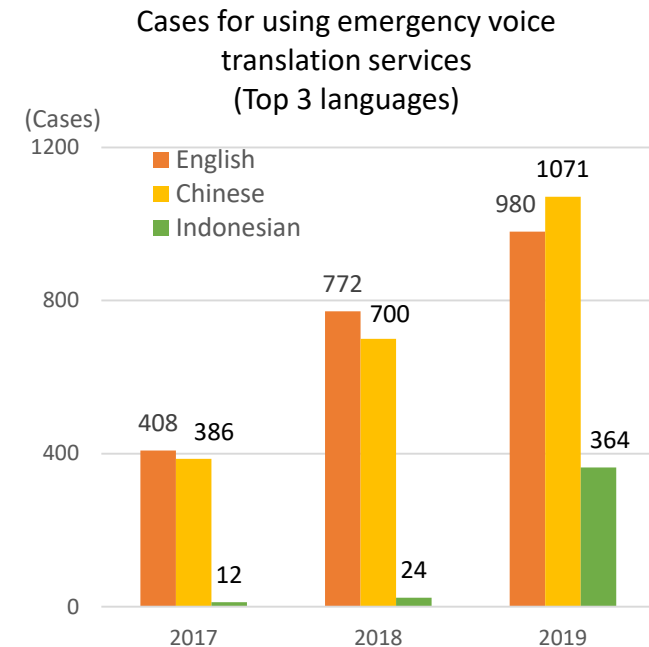


- Japan is known as a developed country plagued with new problems, such as a declining population and birthrate, which is also rapidly aging. (①) Therefore, Japan needs to introduce and use ICT to proactively improve the quality of employment and life, and raise labor productivity.
- Japan's 5G mobile technology for the 2020s, which will feature cashless payment services, multilingual voice translation (②), facial recognition, workstyle reform through telework, disaster prevention, and other initiatives, will provide an opportunity to showcase Japan's ICT to the world, and innovate the whole of Japanese society.

① Japan as a developed country plagued with new problems as indicated by elderly population rates



② Use of multilingual voice translation services



(Sources)

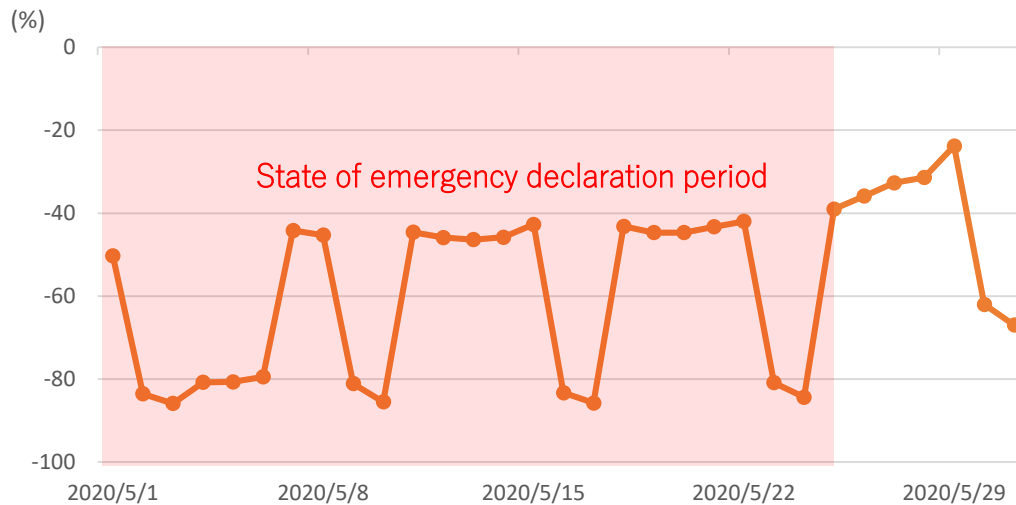
① Prepared from the "World Population Prospects 2019" by the United Nations

② Fire and Disaster Management Agency, Ministry of Internal Affairs and Communications

Use by local fire departments as of January 1, 2020

- The novel coronavirus (COVID-19) pandemic requires people to transition to new lifestyles.
- Contactless lifestyle initiatives using ICT technologies have rapidly expanded, including telework, the administration sector's cooperation with civic tech and private enterprises in visualizing personal contacts (①), remote teaching (②) and the relaxation of requirements for remote medical care.
- On the other hand, initiatives must be promoted to resolve new challenges, including an increase in telecommunications traffic through frequent ICT use, lack of security risk responses, a transition to electronic contracts and other business practice reforms, and balancing between public health and personal data utilization.

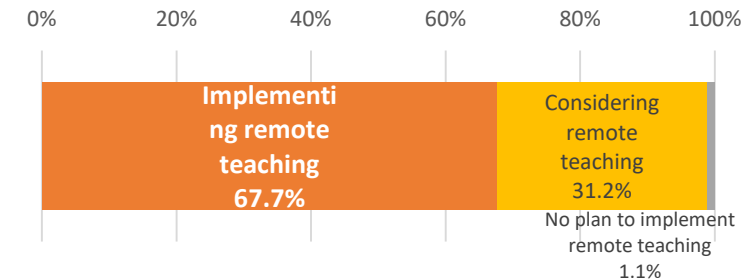
① Population changes from before* state of emergency declaration in the Tokyo Station area



(* 15:00, April 7, 2020)

(Source) NTT Docomo

② Future remote teaching plans at universities and technical colleges



(Source) Ministry of Education, Culture, Sports, Science and Technology (as of May 12, 2020)

- 5G implementation in a wide range of industries and sectors is expected to improve business efficiency and create new values (①-④).
- Apart from nationwide mobile services undertaken by mobile operators, local 5G networks have been created for various entities as flexible mobile systems to meet regional and industrial needs, and there are plans to promote demonstrations from this year to develop problem-solving models using local 5G networks.

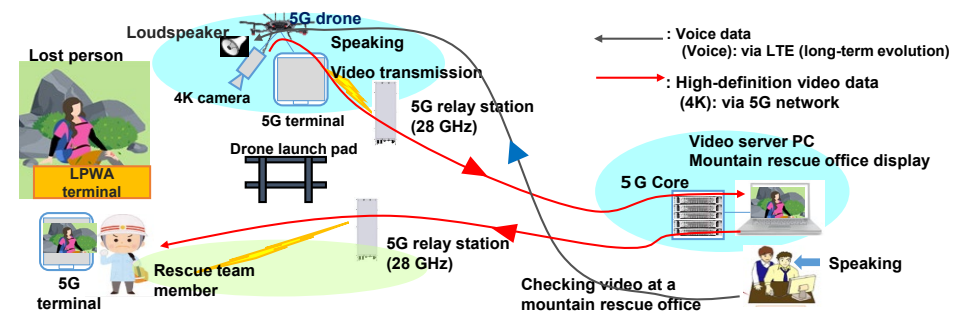
Major assumed 5G use cases

① Farming (e.g., remote monitoring of cows)



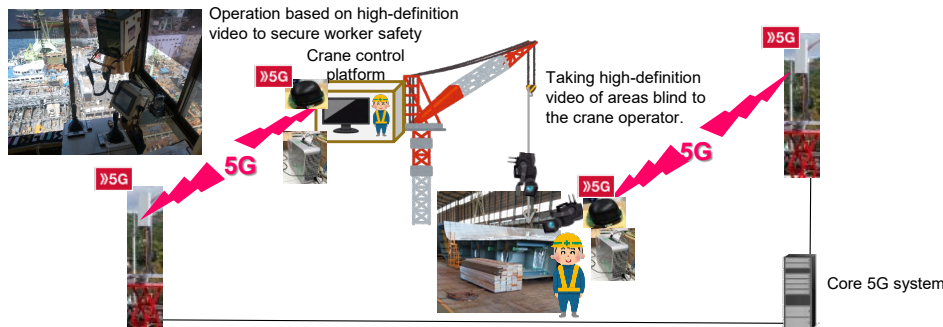
Plural 4K cameras take video of ear tags on cattle at barns and transmit video data through the 5G network to reduce human labor for locating cows and monitoring their milk output.

③ Security & safety (e.g., monitoring of mountain climbers)



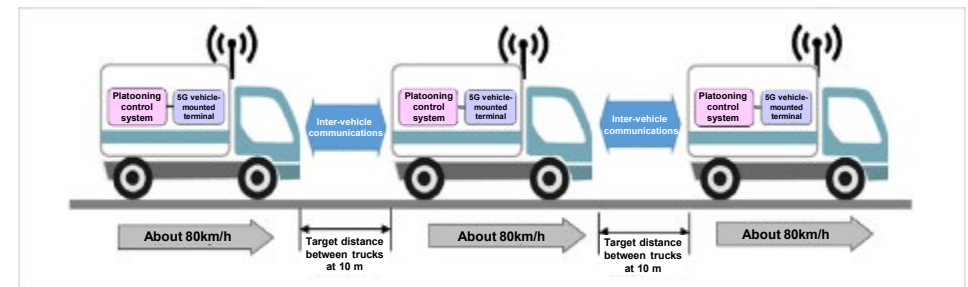
4K video data from a drone is transmitted via a 5G network on a real-time basis at a mountain rescue office, allowing them to promptly check conditions of the location and climber.

② Infrastructure construction (e.g., securing crane operation safety)



The system transmits 4K high-definition video data of areas blind to the crane operator, allowing the operator to safely operate the crane while checking video.

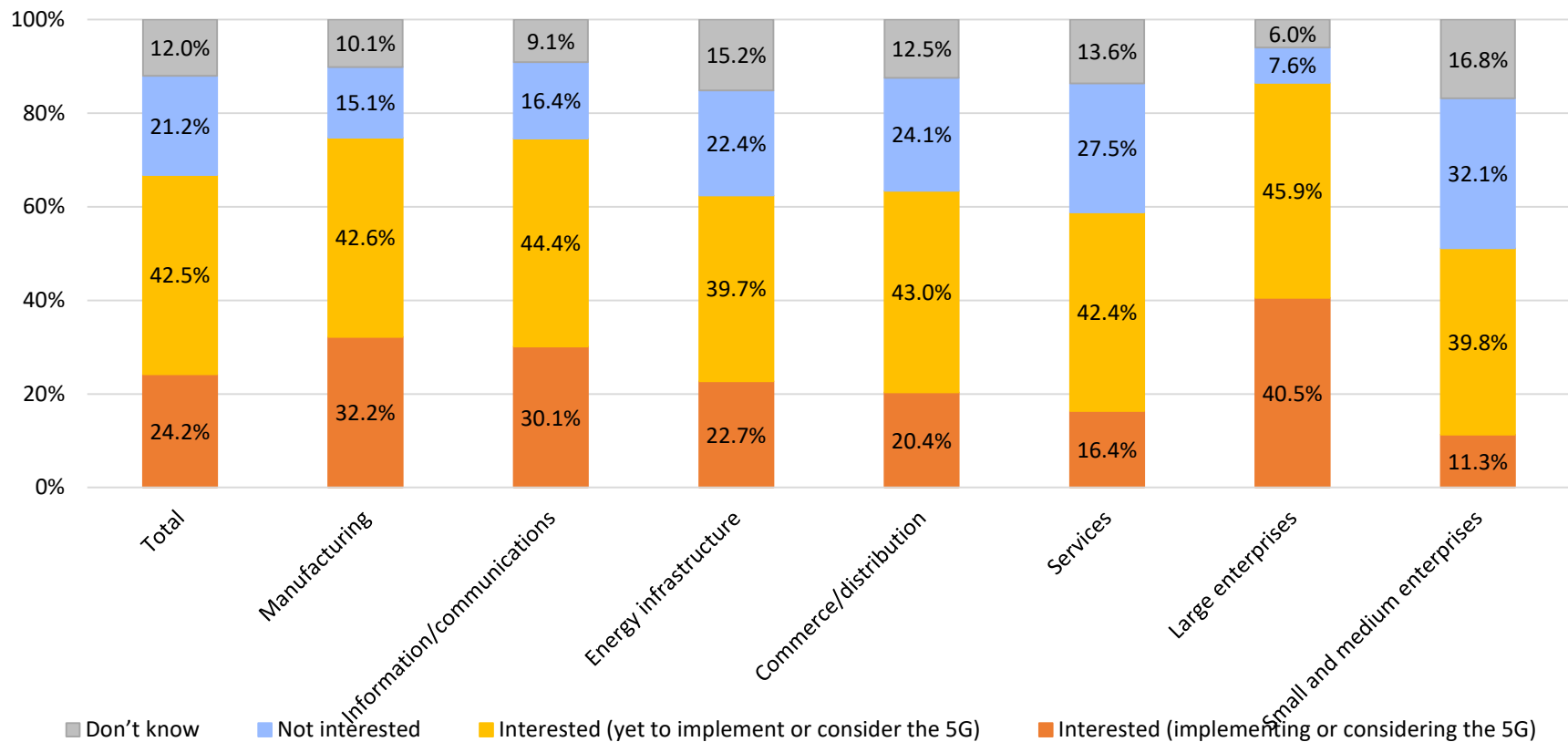
④ Mobility (e.g., advanced vehicle control)



In the demonstration test for truck platooning on an expressway, the ultra-low latency of the 5G network makes it possible to control the distance between trucks at 10 meters.

- A survey of enterprises' interests in 5G networks found that most companies in all industries are interested in 5G networks. Particularly, manufacturers were highly interested. Large enterprises indicated greater interest than others (①).
- Like Japan, some other countries have created local 5G systems for industrial use, and launched relevant licensing procedures.

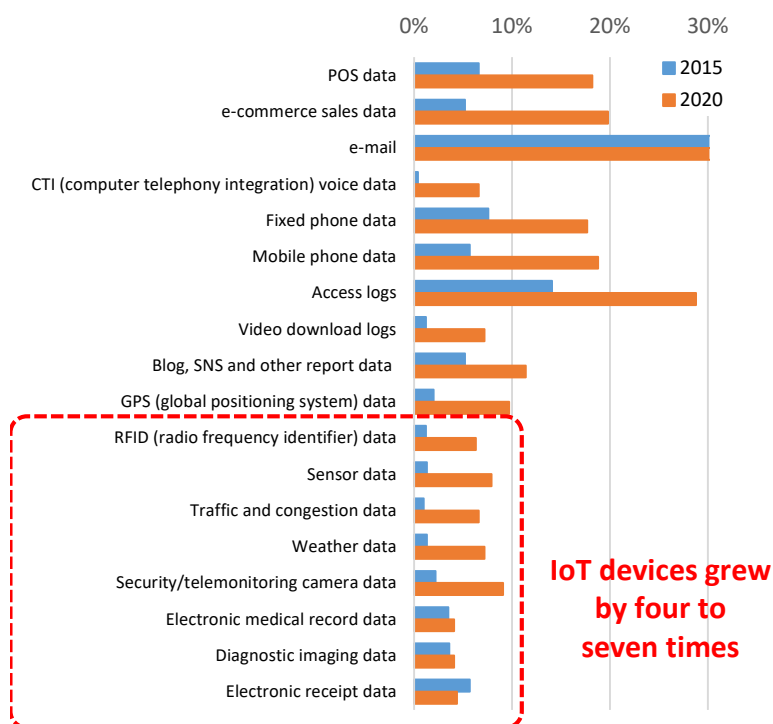
① Enterprises' interests in 5G



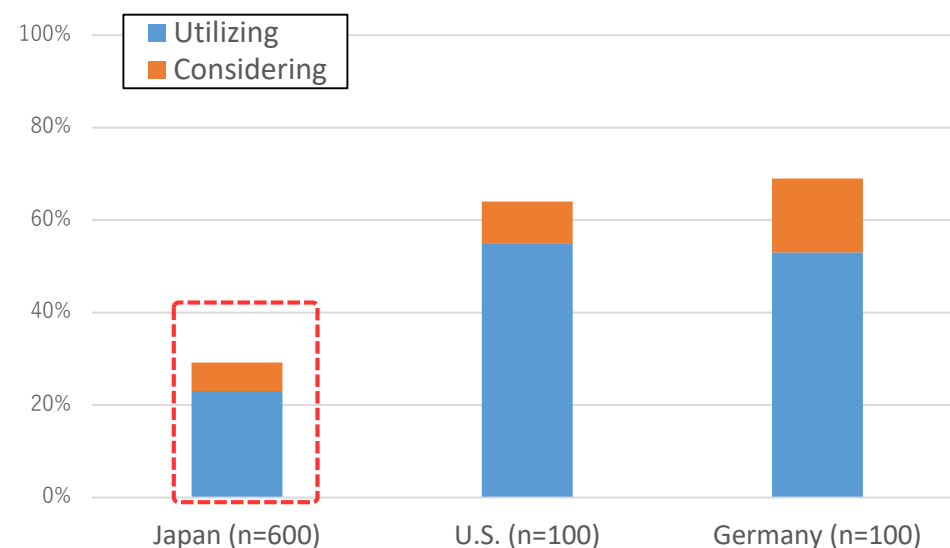
(Source) Ministry of Internal Affairs and Communications (2020) "Survey on Current Status of Measurement and Utilization of Economic Values of Digital Data"

- An increase in data flow through the expansion of content capacity and the diffusion of IoT devices is expected to further accelerate in line with the diffusion of 5G.
- While the percentage of IoT devices has increased by four to seven times in the past five years in Japan (①), the most ideal situation would be for Japanese enterprises to utilize digital data as frequently as their U.S. and German counterparts (②).
- The utilization of open data is promoted mainly for civic technologies in response to the COVID-19 pandemic, and is expected to help to resolve many social challenges in the future.

① Data used by enterprises for analysis



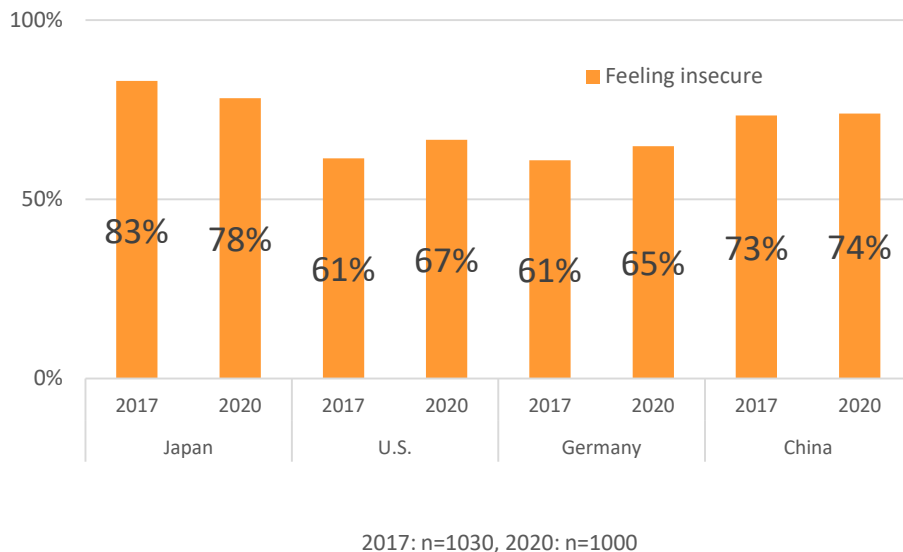
② Enterprises' utilization of digital data



*Survey conducted in March 2020.

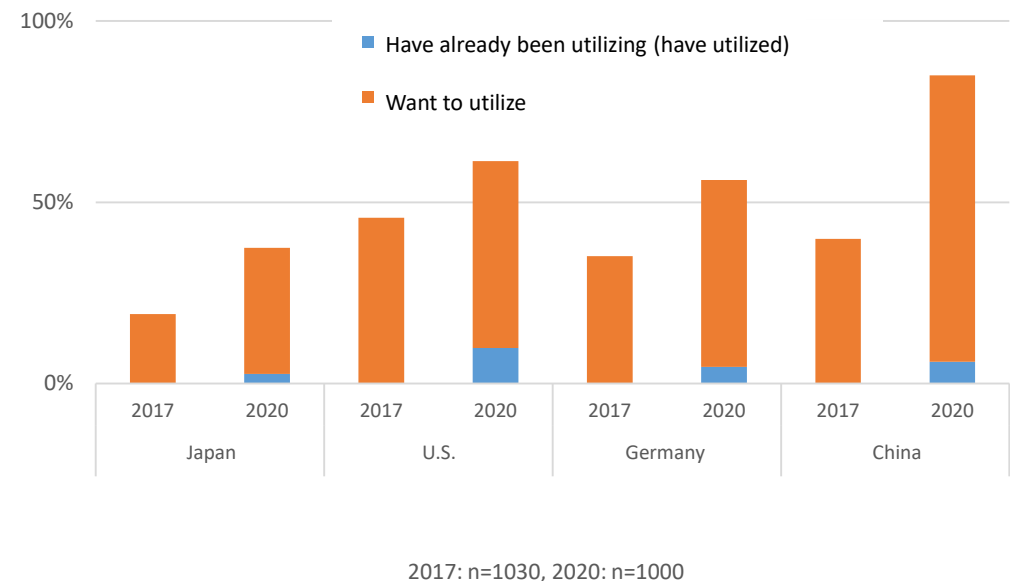
- As Japan has launched personal data trust bank certification and other initiatives, the number of consumers feeling insecure about the provision of personal data has declined from three years earlier, reversing an upward trend (①).
- In the future, personal data trust banks, personal data stores (PDS) (②) and anonymously processed data are expected to be utilized further.
- It is also important to respond to new cybersecurity risks, including those accompanying 5G networks and supply chains.

① Insecurity about providing personal data when using services or applications



(Source) Ministry of Internal Affairs and Communications (2020) "Survey on Consumers' Consciousness of Data Utilization Environment"

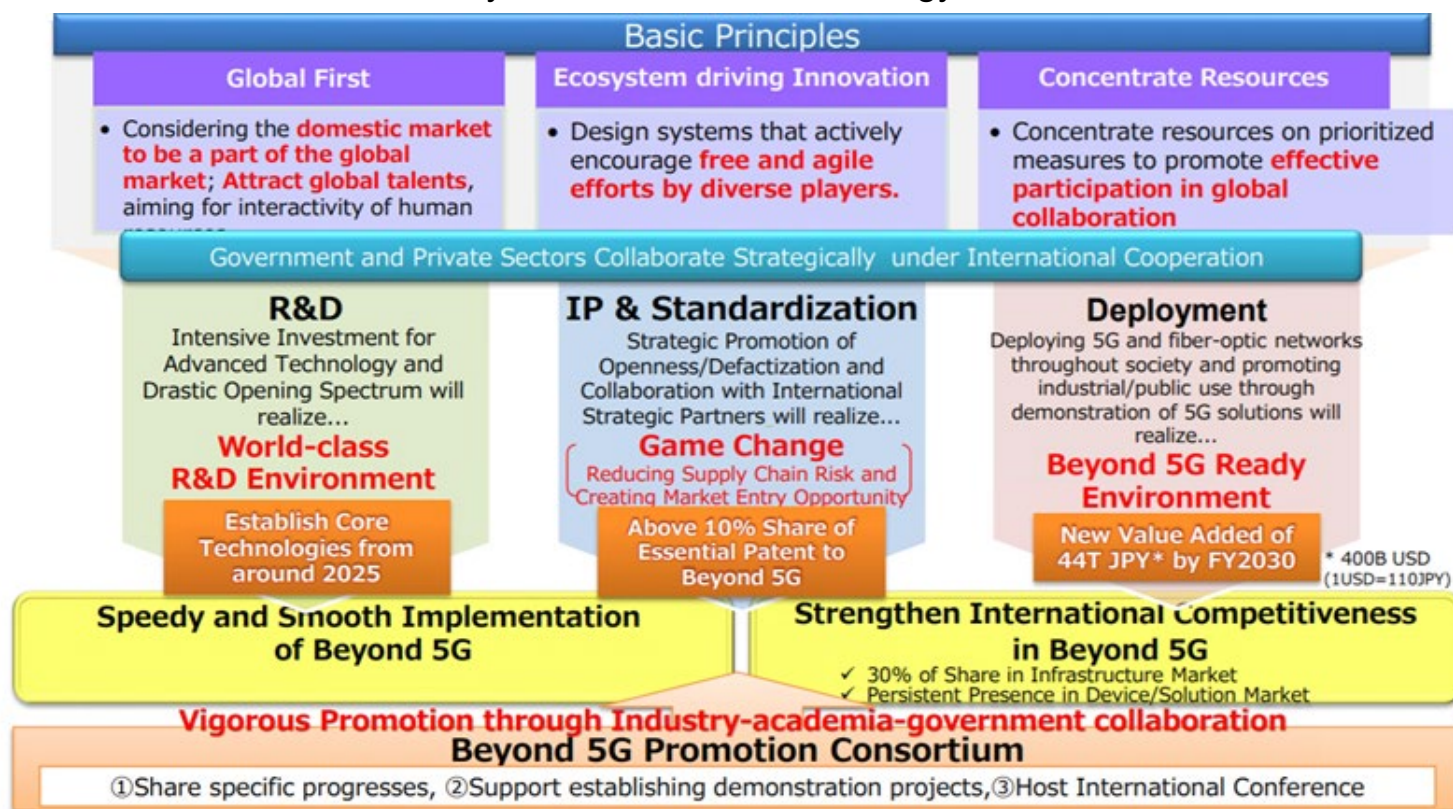
② Consumers' intentions to utilize personal data trust banks or personal data stores



(Source) Ministry of Internal Affairs and Communications (2020) "Survey on Consumers' Consciousness of Data Utilization Environment"

- Developed countries have already launched “Beyond 5G” initiatives towards the 2030s.
- As government and private sectors should be united to strategically tackle Beyond 5G initiatives under international cooperation, the government formulated a Beyond 5G Promotion Strategy during the summer of 2020(①).
- Japan should enhance research and development capabilities primarily for technologies related to its strengths or proactive initiatives (including terahertz waves, all-Photonics networks, quantum cryptography, sensing technology, and low-power consumption semiconductors) to secure its international competitiveness.

① Beyond 5G Promotion Strategy – Overview --



* Cross-department taskforce in MIC will manage the progress of the Strategy. Progress report will be published annually, and the Strategy will be reviewed when necessary.