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Reflections on pandemic governance in China and its implications to future 5G strategy

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1. Introduction—governance mechanism of China

As the first country to be struck by COVID-19, the government mechanism of China may as well be attributed to the country's ability to be one of the few countries to emerge from the pandemic, and to start a post-COVID recovery strategy. The reflection on the governance systems of the Chinese government could be a case reference to be emulated by other countries that face similar challenges caused by COVID-19. However, an introduction of the governance mechanism is necessary for those who are unfamiliar with the unique regime in China.

The first characteristic of the governance system in China is centralism with single-party system. Although this is well known by many non-Chinese, the center of the authority is unknown to many Chinese natives. Constitutionally, the National People's Congress of the People's Republic of China (NPC) is the highest organ of the state power. However, as the NPC is held every 5 years, the head of power is in fact the Central Political Bureau of the Communist Party of China. This is the leadership of the Communist Party in all domains of China, which is constituted by high-level officials (around 10) of the Communist Party (president, prime minister, etc.). Most of the national policies are discussed and decided during the normal conference of the Central Political Bureau, then policies are transferred to the State Council. This is the first level of the governance system and the first procedure of the policy in China (usually referred the central government level). As the highest level of the state, all decisions made by the Central Political Bureau cannot be rejected by any other organization in this country, and it is the reflection of the centralism approach to governance in the country. However, the most important point in this procedure is that policies usually

outlined by the Central Political Bureau are just ideas or conceptualls that are not with detailed descriptions. Therefore, ministries that are related to such policies (the departments of the State council) will in turn pursue research and other consultations to clarify and draft some aspects of the policy. The policy will then be published by the State Council as an official document to the provincial level, which is the second level of the governance system. Although policies approved by the Central Political Bureau are clarified by the State Council, in general, the official document transferred to the provincial level remains a direction or guideline, and not the detailed instruction. Therefore, the second characteristic of the governance mechanism of China comes into sight. This form of vertical power makes it distinct from liberal governance as exhibited in many western countries.

The second characteristic of the governance system in China is the discretionary power of the provincial governments. The appointment of the head official of the province (Governor, Secretary of Provincial Committee of CPC, and the deputies) is controlled by the higher authority. All the actions of the provincial government will be supervised by the central government. The provincial governments send their reports to the central government regularly, and sometimes, inspection teams from the central government are sent to the provincial government to supervise in special cases. As for the discretionary power at the provincial level, it is not fully discretionary since the provincial should wholly observe the official document published by the State Council and have no authority to change the terms in the document. Nevertheless, the provincial government could be able to explain or interpret policies. It means that they can decide their own detailed policies under the guideline or framework of the policy published by the State Council based on their conditions. This process is called the explanation of the spirit (spirit of the document). The detailed policies explained by the provincial government will be transferred to the municipal government, in the third tier of the governance system. At this level, the policies will be further explained as instructions in detail and transferred to the county level, the executor class of the policies. Departments that are related to the policies will follow the instructions from the policies as decided or instructed by the municipal level, and their work will be supervised by the municipal government. In summary, when it comes to policy drafting in China, the central government is the decision-maker, the provincial and municipal governments are the supervisor and explainers of the policy, and the county governments are the executor of the policy. For better comprehension, the process of a new policy will be explained as an example.

In 2018, the establishment of the Ministry of Emergency Management was approved by the National People's Congress to enhance disaster risk reduction in China. In 2019, the National Safety Development Demonstration Cities Evaluation and Management Program was decided and approved by the Central Political Bureau. The State Council then organized related ministries to develop the idea, plan, framework, or guideline for it. The guideline of this program defined six sectors and the main tasks of the evaluation, and the processes are tested on a pilot city. The guideline was published by the State Council as an official document to the provincial government, then the provincial governments developed their own supervision standard according to the guideline. These standards and further descriptions by the provincial government were sent to the municipal level. The municipal government then transformed the guideline to instructions and instructed the county governments to do specific works within the six sectors to fulfill the standard decided by the provincial government. When the time of evaluation came, the provincial government sent a team to the pilot city to undertake

supervisory and other evaluations. The pilot city is selected by the provincial government and is evaluated by the delegation of central government (members of the State Council). The results are discussed and finalized by the central government and are announced by the State Council. This is how the governance system in China acts to realize a certain purpose in normal conditions. In emergent conditions, the delegation from the central government will be directly sent to the municipal level or county level for better supervision of special cases, such as the lockdown of Wuhan during the COVID-19. Therefore, the connection and interaction between the central government and the provincial government is the key to the execution of the governance system. The characteristics as outlined above buttress the point by [Zhao and Guy Peters \(2009\)](#) that autonomies at different levels of the government structures pose challenges to collective management. Using the United States as an example, [Zhao and Guy Peters \(2009\)](#) describe its government system as being fragmented and such increases the number of players and many veto powers that cause a problem for crisis management.

2. Reasons for rapid COVID-19 recovery in China

China's fast emergency response to the threat of the COVID-19 pandemic resulted in outstanding results in their health-care and economic sectors. Truly, COVID-19 pandemic continues to affect many people across the world as the virus continuously mutates and changes its structure. Fortunately, joint ventures of governments and the public have strengthened research and development of vaccines which are currently being inoculated across the world. Concerning China's epidemic timeline, the peak of the effects of COVID-19 was short term as the country managed the human-to-human transmission of the infection. Human interactions were minimized with the Chinese government's rigorous lockdowns. Furthermore, all infected individuals were detected through rigorous approaches by the government and agencies, and these resulted in quarantines, isolation, and ultimate cure. The implementation of these draconian lockdowns allowed the government to mobilize its personnel to conduct contact tracing on those infected individuals and leverage the country's health-care system by constructing hospitals and COVID-19 facilities. Thanks to the country's highly innovative technology sector, it was able to use artificial intelligence (AI), 5G technology, big data, and robotics to aid in the health surveillance of every Chinese citizen ([Shaw et al., 2020](#)). Timeliness, comprehensiveness, and accuracy are the goals of data collection and access, since these pieces of information are important in formulating policies and other measures to combat the disease ([Hua & Shaw, 2020](#)). Hence, the application of the above technology and innovations was vital to the government.

Lastly, the Chinese economy has seen growth amid the pandemic through its technology and innovations as adopted by the government. The pandemic pushed many businesses to go virtual but the internet economy which characterizes most Chinese enterprises allowed the business to continue with their operations as employees telecommuted through work-from-home arrangements. Although the fear of economic meltdown was acknowledged in China, its stringent measure supported works and production to resume. Hence, China has remained the foreign trade king, leading the rest of Asia, because of its aggressive stimulus policies. This has increased export demands worldwide, reflective in its positive GDP increase in 2020.

2.1 China's pandemic timeline

As Fig. 13.1 shows, the COVID-19 pandemic started in China at the start of December 2019, when an older adult experienced flulike symptoms that included high fever, cough, and difficulty in breathing. According to [Boghani \(2021\)](#), in the middle of December 2019, patients experiencing similar symptoms were rushed into hospitals in Wuhan because of the strange impression on their lung X-rays. The concentration of these individuals suggested that the infection started in Wuhan, China. Based on contact tracing results, patients seemed to have been to a seafood market in Hubei, wherein live animals were sold. More so, the results further implied that the disease came from the animals and was passed on to humans because of their interaction in the area of concern.

On December 24, 2019, lung samples were taken from patients and brought to a genome sequencing company that determined the partial genetic sequence of the virus. The [AP News \(2021\)](#) said that the Chinese laboratory could produce a complete sequence of the virus. Based on the sequence analysis, the virus was similar to the structure of a coronavirus that is a causative agent of SARS which caused an outbreak in 2002. Hospitals within China feared exhausting the country's health-care system because of the exponential increase in patients being admitted because of their "pneumonia-like symptoms" ([Li, Guan, et al., 2020](#), [Li, Qin, et al., 2020](#)). At first, health-care workers were not aware of the measures to take, which made them become infected with the virus. On the last day of December 2019, the Chinese government released a statement to the World Health Organization (WHO) regarding the possibility of the novel virus affecting lungs and causing pneumonia. Immediately, the European Centre for Disease Prevention and Control (ECDC) and WHO started rolling out protocols to contain the virus and stop its dispersion in communities. Their concern was to set policies to prevent transmissibility, severity, and other considerations relevant to the outbreak ([Adhikari et al., 2020](#)).

Ever since the news regarding the new coronavirus was announced, further proliferation on social media platforms and other media outlets occurred, including some patients' medical records in Wuhan, China ([Safi, 2020](#)). The fear and uncertainties regarding the disease created a series of panics among people across the world at the start of 2020, and on January 7, 2020, the Chinese government concluded that the virus was indeed a new type of virus,

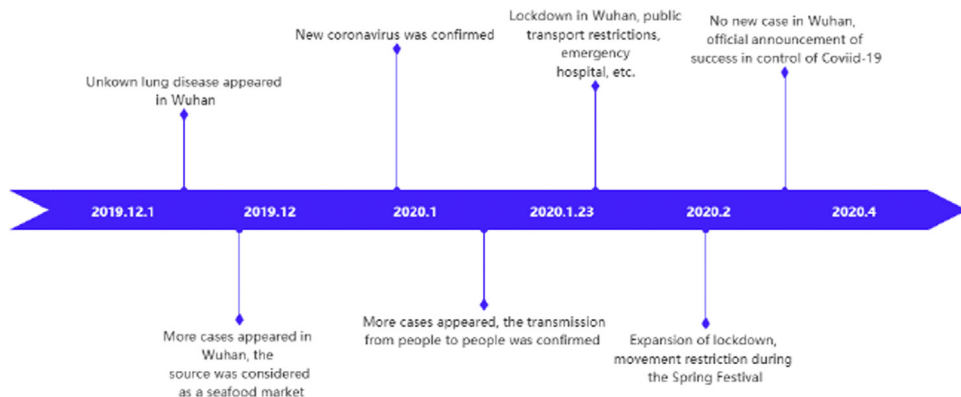


FIGURE 13.1 Timeline of COVID-19 pandemic in China. *Source: Authors.*

which was later called “2019-nCoV” (Allam, 2020). Singhal (2020) reported that the newly identified virus was 95% similar to the structure of the bat coronavirus and 70% similar to the SARS coronavirus. By January 7, proximately 44 individuals were reported to have been infected with the disease. Outside China, several countries started imposing intensive screening of people coming into their areas. Anyone who experienced flulike symptoms was immediately isolated and quarantined.

2.2 Government policies on disease prevention and control

On January 14, 2020, the Chinese government had already initiated tightened response against the outbreak by installing temperature checkers at different locations such as train stations and airports. This kind of measure was a part of the country’s intensive surveillance and epidemiological investigations. According to Xu et al. (2020), each and every person was obliged to wear facemasks in public places. Since the Chinese government had already announced that human-to-human transmission of the virus had already started, the main goal of the emergency response revolved around self-protection and information dissemination. Therefore, on the night of January 22, 2020, a lockdown in Wuhan City was imposed, followed by other nearby cities in Hubei Province. The Chinese government mandated the military to supervise at the checkpoints to ensure that people were strictly following the government policies. Hence, as of January 27, 2020, all other cities, except Shennongjia, were placed under a strict lockdown.

People were obliged to stay at home all day as part of community management protocols. Nonetheless, only one person could be sent out for essential matters, given that he/she presents a certification issued by the authorities. For communities with strict lockdowns, the Chinese government personnel were responsible for going house-to-house and providing people with their necessities. Every community had an assigned organization responsible for temperature checks, daily monitoring, follow-ups, and home isolation supervision.

Apart from strict lockdowns in every city, the Chinese government mandated that all forms of gathering and meetings were to be canceled. These activities included working on-site, face-to-face classes, and the attendance of any occasion or celebration. These measures covered an estimated 60 million people in the country (Gunia, 2020). In fact, the Chinese New Year was held with a small number of attendees despite its extension from January 30 to February 2, 2020. All activities involving traveling and people attending were subjected to assessment by the COVID-19 prevention and control team. For flights, the Civil Aviation Administration of China announced on January 23, 2020, that several flights in and out of Hubei Province were canceled and the postponement of other flights was not lifted until March 28, 2020.

A study by Gunia (2020) reveals that China’s lockdowns expanded as days passed, with a coverage of at least 760 million Chinese. This stringent lockdown implementation gave the government enough time and opportunity to plan, mobilize, and put the spread and combat strategies in action. According to Chatterjee et al. (2020), risk assessment is a necessary tool to reduce the risk of a disaster by understanding it and recommending solutions for prevention and mitigation. The main parts of risk assessments are hazard, exposure, and vulnerability. In the case of the COVID-19, health, safety, and environment are the areas in which risk assessment can be conducted. Governments must conduct a thorough risk assessment that considers considerations such as health risk, governance, visibility, and citizen behavior (Shaw et al., 2020). To manage this public health emergency, a systematic methodology to disaster risk governance

is vital to improve the community-level response. This course is also reiterated by the Sendai Framework. To this effect, the Chinese government applied new technologies (i.e., AI, big data, 5G technology, and robotics) to its risk governance (Shaw et al., 2020).

AI has become a great help for the Chinese government because it can carry out data analytics and predictive models, such as knowing the structure of the new coronavirus and determining ways to target its protein structures to stop its functions from infecting people. The activities involving AI in China included early COVID-19 detection, vaccine research and development, and individual risk evaluation. The use of AI in computerized tomography (CT) scans aids in the identification of patients who are likely to be infected with COVID-19. China created a highly accurate model that measures radiological changes and compares them to a normal standard using an AI algorithm. According to studies, the efficiency of the AI-coupled machine was 92.3%, which could be considered extremely sensitive. This high sensitivity can be correlated to the accuracy of the results in COVID-19 detection through testing (Arora et al., 2020). Through the incorporation of deep learning models, COVID-19 could be distinguished from community-acquired pneumonia (Li, Guan, et al., 2020, Li, Qin, et al., 2020).

Further use of efficient technology could be seen from the use of big data applications to the virus management. Regarding the use of big data, this tool is vital to conduct modeling of virus transmission, which is the foundation of infection control and emergency response processes. Before the outbreak, prevention and control measures were created using (1) medical health data, (2) participatory syndromic data, (3) internet data, and (4) other data not related to health (Bansal et al., 2016). China's risk governance using big data is commendable as hospitals have information systems (HIS) where medical health data can be obtained. In fact, their electronic medical record system includes a comprehensive database of patients' information and other medical records. The Chinese government utilized the big data conceptual framework to aid COVID-19 prevention and control (Wu et al., 2020). This framework consists of four levels, namely: (1) application, (2) analysis, (3) data, and (4) collection.

Data collection became difficult during the pandemic due to the inability to solicit in-person information. The risk of exposure with probable or suspected COVID-19 infected individuals prevented such course. Therefore, the Chinese government, through the help of other community organizations, used different information reporting systems to overcome this challenge (Hua & Shaw, 2020).

2.3 Economic governance

The series of lockdowns that the Chinese government implemented had severe repercussions on the country's economy. Nonetheless, through the use of technology and innovation, the economy slowly went back to being afloat. The pandemic-internet economy allowed the businesses to continue with their operations as employees telecommuted through work-from-home arrangements. The government's swift action in containing the disease, through sacrificing the economy for a while, led to effective economic meltdown prevention. The government focused primarily on strengthening the health-care system so that it would not be overwhelmed once the economy got back to its normal pacing. Internally, the economic meltdown prevention measures included the support to resume work and production, which included economic finance.

The People's Bank of China used traditional policy tools such as free-market operations, the reserve requirement ratio, lending facilities, repayments, and rediscount initiatives to preserve market balance and fulfill the demands for capital investment and other funding (Huang et al., 2020). Reduced borrowing costs, increased debt rollovers and renewal loans, and clear credit lines for the commencement of development were among the economic assistance initiatives introduced by the Chinese financial institutions, particularly for small and medium enterprises (SMEs). These initiatives were necessary such that, as reported by Zhu et al. (2020), a survey suggested that almost 85% of the SMEs in the country could not survive beyond 3 months if the pandemic persisted. The effects of the pandemic on firms' performance are shown in the bar graph in Fig. 13.2.

This anticipated SMEs' crisis would not be caused by their operational flaws but by unforeseen circumstances. As a result, the government, financial institutions, private money, and other stakeholders must join hand-in-hand to assist them in overcoming their challenges.

Despite the COVID-19 pandemic, China has remained as the foreign trade king, leading the rest of Asia because its aggressive stimulus policies worldwide increase export demands in the country. The Chinese government has unveiled a package of policies aimed at stabilizing international commerce and international investment and continuing to expand the economy further. Excluding the energy-intensive, polluting, or resource-intensive goods, all export tax incentives must be paid in full and on time. For those minor trading companies badly impacted by the outbreak, financial firms have been urged to raise international trade credits, delay loan payments, and prolong debt rollovers. Industrial insurance providers have promoted short-term exchange credit insurance and reduced fees for trading businesses.

Most global supplies came from China in 2020, which increased its global trade value by 1.7 points compared to the previous year. In 2020, the country benefited from in-demand goods by customers trapped at home, such as a 20% rise in computer exports and a 24% rise in household appliances. The export of masks and other related textile products had increased by 30%. Chinese exports also increased more than anticipated in December 2020 due to the increase in the disruptions caused by the pandemic around the world, hence boosted demand for Chinese products (Vaswani, 2021). Fig. 13.3 shows how the country was able to grow its GDP in 2020. From the graph, the rise in GDP indicated that the economy immediately normalized. Hence, strict virus containment measures and risk governance for businesses helped the economy recover.

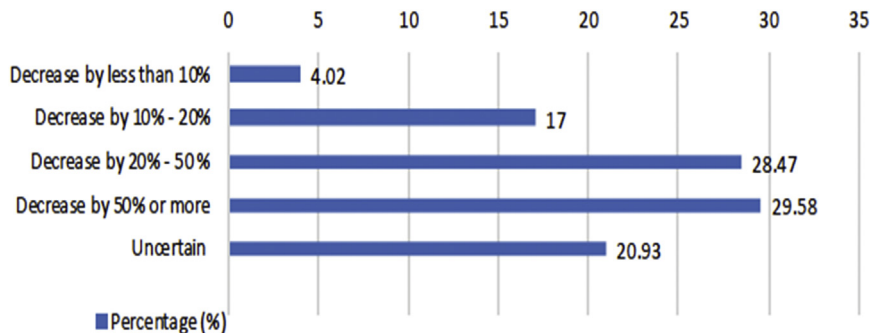


FIGURE 13.2 Effects of the COVID-19 pandemic on business performance. *Source: PBC.*

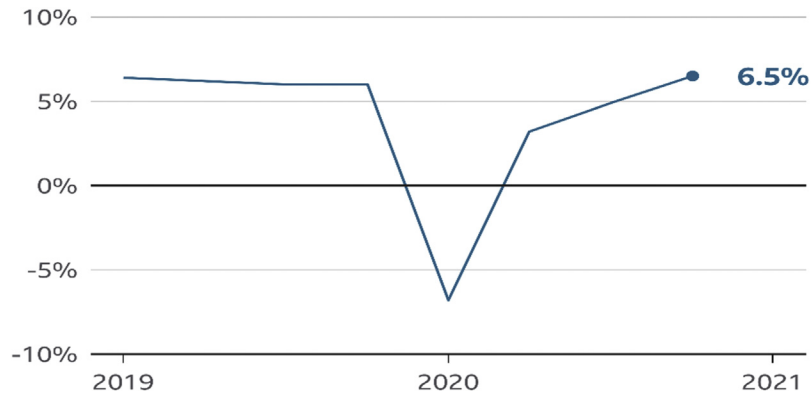


FIGURE 13.3 Year-on-year GDP of China as of December 2020. Source: *The State Council of China*.

3. Attempt to turn COVID-19 to opportunity: 5G

As mentioned in [Section 2](#), to face the economic crisis caused by COVID-19, the Internet economy has been the choice of the Chinese government to expand the internal demand. The demand for noncontact activities emerged due to the transmission of COVID-19, as a result, remote or telework changed the lifestyle of many people. The private enterprises in China offered more online services as a response to the noncontact demand. Such services include take-out service platforms and online work services ([Hua & Shaw, 2020](#)). However, the existed 4G-based network could not offer a reasonable solution to some kinds of demands due to the network latency and speed, which also include a use by remote medical service providers. Besides, the economy of China is craving new growth points facing the changes brought by COVID-19. Therefore, 5G, the foundation of the new infrastructure, was chosen as a new attempt to turn the crisis of COVID-19 to opportunities in China ([Hua, 2020](#)).

3.1 Rapid development of 5G during the COVID-19

5G is not a new concept posed during the COVID-19 in China; it came out with the Made in China 2025 plan as one of the aims in 2015. 5G was posed as the main challenge in the new IT technology ([State Council, 2015](#)). However, 5G in China before COVID-19 was just in the early phase. The prosperity of the Internet economy has shown the potential of 5G toward the new challenge based on its characteristics, thus, low network latency and high speed. Therefore, the development of 5G was enormous both in the private consumption domain and in the public domain.

In the public domain, the applications of 5G led by state-owned enterprises (SOEs) increased a lot during the COVID-19 to look for the application model of 5G. As the first domain to be affected by the COVID-19, the overload of the medical system was an important problem for China. To relieve the medical burden of Wuhan, the remote diagnosis system based on 5G was applied in Huoshenshan and Leishenshan hospitals, the emergency medical service center in Wuhan. Mobile operators (SOEs) built 5G base in 3 days to cover two

hospitals and connected them to the Internet. With the help of 5G, high-resolution video of patients in Wuhan could be sent to medical specialist team in Beijing in real time with low latency and the specialists could give their feedback in real time. Besides this, conditions of the hospitals were sent to commander centers against COVID-19 in Wuhan by the 5G network to reduce the contact between people. As a result, the accuracy of remote diagnosis was confirmed to have increased and the workloads of concerned people were reduced (Deloitte China, 2020).

The 5G was not only active in the medical field but also in public prevention. During the COVID-19, the 5G patrolling robot was adopted by several cities. These patrolling robots could be remotely controlled through 5G, and had the ability to measure the temperature of passersby, then send the high-resolution video to a control center (Hua et al., 2021). In Shanghai, the 5G patrolling robot was applied on shopping streets to protect the patrolling policemen from infection during the COVID-19 (Xinhua Net, 2020a, 2020b).

Due to the propagation of 5G in the public domain, more and more private users began to change their awareness of 5G. From January to May in 2020, 5G users increased exponentially according to the mobile operator China Mobile (see Fig. 13.4).

China Mobile is just one of the four 5G mobile operators approved by the Chinese government. By April 2021, China Mobile's 5G users already surpassed a threshold of 200 million; all 5G users had exceeded 400 million in China (see Fig. 13.5). To support the expansion of users, the construction of a 5G base station is also tremendous. By the end of 2020, China Mobile had established 380,000 base stations, while China Unicom and China Telecom had established 330,000 base stations. The construction plan is 600,000 to cover all main cities in 2021 (Xinhua Net, 2020a, 2020b).

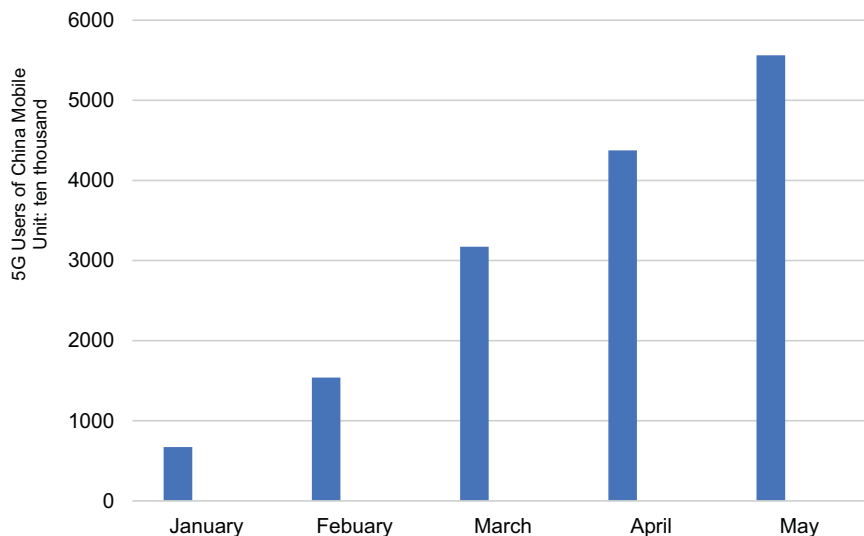


FIGURE 13.4 5G users of China Mobile in 2020. Source: China Mobile.

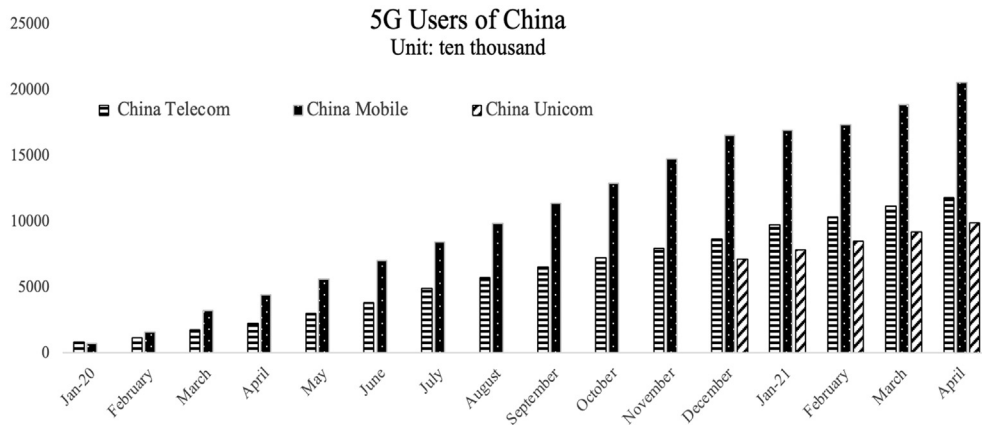


FIGURE 13.5 5G users of China in April. Source: China Mobile, China Unicom and China Telecom.

3.2 Foundation of rapid development: policies supporting 5G

Just as the development of other industries in China, the development of 5G is based on the policy support of the government. As the beginning and the big framework, the Made in China 2025 was the first policy to support the development of 5G. In the following 5 years until 2020, the central government published more detailed policies to complete the policies system to instruct the development of 5G.

To clarify the direction of the development of 5G, the State Council published the 13th Five-Year Plan for the Informatization in December 2016 that clarified the aim of the development of 5G in China: industrialization and commercialization. To promote the realization of this aim, the State Council published the Information and Communication Industry Development Plan 2016–2020 to accelerate the formation of the 5G standard and relative technical parameters. With the support of the two important policies, the experiment of 5G was successful. Finally, the operating license of 5G was issued by the Ministry of Industry and Information Technology to mobile operators, and the construction of 5G began formally in June 2019.

To respond to the strategy of the country, provincial governments began to publish their own complementary policies based on the guideline of the central government. Especially from 2019, the policies concerned with the construction of 5G began to emerge at the provincial level. The policies for the implementation of the construction were the mainstream: thus, the investment plan policy, the planning policies, the allowance policy for construction of 5G base, the support policies for the land use relative to 5G construction, etc. Besides these, according to the characteristics of development in different provinces, the provincial governments began to look for their own direction by publishing the promotion policies of 5G application with obvious local characteristics: for example, the 5G+Smart Ocean service policy in Shandong (port service is one of the economic pillars in Shandong), the 5G+Smart mining policy in Shanxi (the most important coal mine area in China), and the 5G+Smart finance policy in Shanghai (the economic center of China). These local policies realized the interaction with the central government in 5G development and formed the basement of quick development before COVID-19 (CAICT, 2020).

Due to the active application of 5G during the COVID-19, the potential of 5G has been recognized by the central government. In February, the 5G was a centric topic in the normal conference in the central government level. In March 2020, 5G was highlighted as the base part of the concept of New Infrastructure by the central government as the most important part of the post-COVID strategy. It was considered as the milestone and beginning of 5G in post-COVID period.

3.3 Reasons for the investment in 5G

The New Infrastructure Policy was not a new concept that emerged in COVID-19. The original policy about 5G was published in 2018 and was independent of the New Infrastructure Policy until February 2020 (Hua, 2020). As the New Infrastructure Policy was placed as the main umbrella strategy for the future development of China, it is important to discuss how 5G can be considered as the critical base of the futuristic vision of China's growth. The answer to this stems from two set of reasons for the transformation:

- a. The economic potential of 5G: According to the forecast, 5G will create an economic output of 13.2 trillion dollars and 22.3 million relative employment opportunities (Xinhua Net). The potential market in China is also tremendous. According to forecast as given by the chairman of China Mobile, the information market relative to 5G will reach 20.4 trillion RMB (People.cn, 2021a, 2021b), the scale will be larger than the traditional industry, and China will be the largest market of 5G.
- b. Challenges in the international economy in post-COVID-19: COVID-19 not only was a direct threat to the Chinese economy, but also changed the international circumstance. As the first country to show signs of recovery from the COVID-19, China is also the first country to face the challenges in its post-COVID-19 restructuring. The most challenge to China caused by COVID-19 was the shift of the global supply chains. Due to the lockdowns in China, many multinational manufacturing companies had to face the interruption of production in their factories in China. As a result, the financial report of the first quarter in 2020 showed the economic losses which the multinational corporations had incurred. Hence, they began to reconsider the constitution of their global supply chain and to discuss the diversification of the supply chain instead of continuing the dependency on China. Before the COVID-19, some Japanese manufacturing multinational corporations had already transferred their factories to Thailand and Vietnam, considering the increasing labor cost in China (such as Sony). Due to the impact of COVID-19, economic specialists in Japan began to initiate the conception of Mother Factory in Japan and the diversification of supply chain to enforce the resilience of manufacturing multinational corporations (Fujimoto, 2020). To enhance this initiative, the Japanese government began to offer allowances for those who were willing to transfer their factories from China to other areas. The COVID-19 crisis accelerated the international industry shift, and it is an irreversible economic rule. As a result, China had to find new economic growth points to realize the economic recovery in post-COVID-19. The response chosen by the Chinese government was to upgrade industries, and rebuild the economic constitution with the New Infrastructure Policy. As the past economic development model in China showed, the road/railway was considered as trigger economic

development of an area. The central government was willing to follow the successful model in the past. Hence, it considered 5G as the foundation of the New Infrastructure: the role of digital highway/high-speed railway (based on the characteristic of 5G), to promote the development of relative IT industries, and finally the IT relative industries will replace the low-end manufacturing industries and support the economic recovery in China.

- c. The international political factors: Before COVID-19, the trade conflict between China and the United States was the most impressive political incident in the past 10 years. The conflict is evaluated from economic conflict to ideological conflict. During the COVID-19, international circumstances for China had gotten worse because of a series of incidents, such as the propagation during the COVID-19, and the political conflict with the United Kingdom about Hong Kong. To break the dilemma, the Chinese government has been looking for opportunities to expand its international influence. As an emerging industry, China has realized the technology superiority even compared with some developed countries. The investment in 5G will be necessary to keep the superiority of 5G technology not only in China but across the world. As an essential industry for all the world, the development of 5G will be a bargaining chip in future negotiations.

As conclusion, the investment in 5G is an appropriate choice of the Chinese governance system to the challenges in post-COVID-19.

4. Analysis on 5G governance in post-COVID-19

As mentioned in [Section 3](#), policies published by the provincial government in China were mainly for the construction of 5G and primary application before the central government relocated 5G as the foundation of the New Infrastructure. As the traditional economic development model in China, the construction of the road/high-speed railway is just the beginning of the development. How to support the development of industries relative to the infrastructure is the most important task when the road/railway is built. The development of 5G is also the same with it. According to the plan announced by the State Council, the 5G network will cover all the cities in China ([CCTV, 2020](#)). When the network of 5G is almost ready for service, the measures to promote the development of relative industries will be the key point for the central government to realize their attempts in post-COVID-19.

4.1 Direction of 5G development

As the first phase, the plan of the Chinese government is to promote the development of industries that have a close link with 5G. The two main domains by the government are the individual consumption and an industrial Internet.

For the individual consumption, the first step will be the promotion of the 5G mobile terminal equipment. The most important 5G mobile terminal in the individual consumption domain is no doubt the 5G smartphone. From February 2020, the promotion by mobile operators (China Mobile, China Unicom, and China Telecom) increased based on the guideline

of the central government. In June 2020, the mobile operators adjusted the price of 5G service to appeal to individual consumers to purchase 5G phones. The reason for this adjustment was that that date for one of the most important online shopping events 6.18 held by Jingdong was near. The promotion was quite effective according to the market report (see Fig. 13.6).

After the popularization of 5G terminals, the service based on 5G will be the next economic growth point. In recent years, live streaming has been an emerging domain in China. The combination of live streaming and online shopping has significantly been welcomed by many individual consumers in China. To promote 5G development, high-resolution live streaming (4K/8K) was the direction chosen by the Chinese government as the attempt in the individual consumption domain. The government of Beijing has been working for the possibility of 4K live streaming of the Winter Olympics of 2022 to spectators. The combination of tourism and high-resolution live streaming was also considered as a service option for the famous 5A scenic spot.

The attempt in the industrial was also divided into two parts. The first principle promoted by the central government was the 5G+industrial Internet. This application is based on the three characteristics of 5G, namely, low latency, high-speed, and multiple connection. With the upgrade of the manufacturing industry, 5G has shown better coordination with the new needs of the manufacturing industry since big data analysis has been applied in production to improve productivity. As a result, the transmission of data collected in the factories will need the solution of 5G. Another application arises from the need for accurate and multiple connections, especially the remote operation and supervision of supply chains. 5G has the capacity to handle far more connections and requests at the same time. Therefore, large-scale manufacturing enterprises are able to get feedback from all assembly lines all over China and improve the efficiency of production supervision. An accurate remote operation based on 5G transmission is a reasonable solution for high-risk operations, such as the underground operation of large machines in mines. The Ministry of Industry and Information

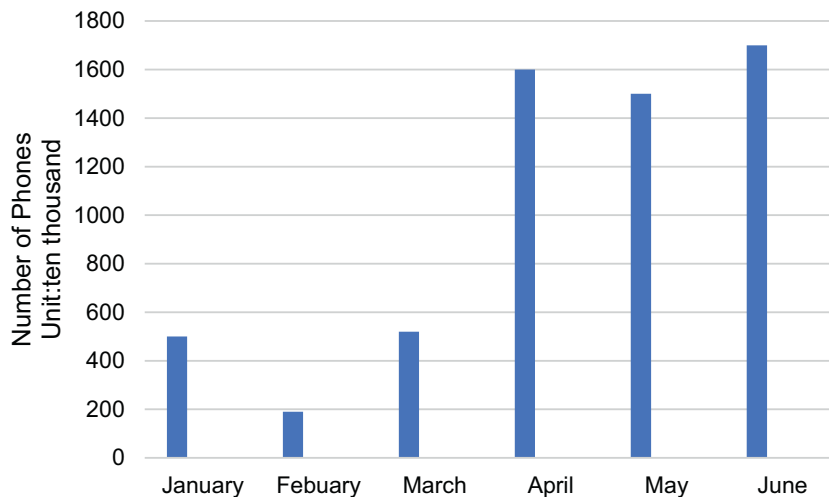


FIGURE 13.6 Shipments of 5G phones in 2020. Source: CAICT.

Technology has announced that the central government plans to establish five service platforms of 5G+industrial Internet, covered by 10 industries to promote the upgradation of the manufacturing industry in China (People.cn, 2021a, 2021b) as a part of the Made in China 2025 plan.

Another attempt of the Chinese government was the support for essential technologies relative to 5G, especially in hardware and software domains. The most important industry for 5G is not only the essential point for 5G, but also for Made in China 2025 policy. As the necessary hardware in computer science, the semiconductor is the key technology for IT industries. From mobile terminals to a large data center, semiconductors are indispensable. However, the technology of semiconductors in China is quite less developed compared with the development of the Internet economy. As a result, the State Council announced that the central government will publish all kinds of policies to realize the aim in the semiconductor domain: realization of 70% self-sufficiency of semiconductors as a part of the Made in China 2025 plan (FUJITSU JOURNAL, 2020). In the software domain, as the 5G is quite different from traditional networks, if software could not adjust according to the characteristics of 5G, the efficiency of 5G could not be reflected in the application. It is not only for industrial purposes, but also for individual service. The State Council has mentioned this domain, but until now, there is no specific policy for it.

4.2 Challenges relative to 5G governance

Although the Chinese government has published a lot of policies supporting the development of 5G, the development of this industry is just in the early phase. However, four main challenges seem prominent.

- i. The market governance: The monopoly of large-scale companies on the Internet in China has become a major problem. This is evidenced especially after Tencent was punished by the Chinese government for activities seen as ways to stifle other small-scale companies in May 2021. To keep the market relative to 5G, the governance system be regulated effectively to promote healthy development since 5G is also relative to the Internet.
- ii. The technology relative to 5G: As an emerging industry, the development of 5G requires investment in many related technologies such as computer science and information technology. However, as a developing country, China seems weak in these domains. The impact of COVID-19 on the economy is not neglectable; thus, how to balance the investment in relative technologies will be an important task for the Chinese government should be one aspect to consider.
- iii. Standardization of 5G: As an attempt to get more international influence, participation in the negotiation of international 5G standard is indispensable for the 5G development in China. However, the political conflict with the United States and United Kingdom could have a rippling impact on this issue. The influence in negotiations of the establishment of international 5G standard through this geopolitical spectrum may pose challenges for the Chinese government.
- iv. Supervision to the new risk: Sharing mechanisms are key elements to the development of the Internet economy. During the construction of 5G foundation, China Unicom and

China Telecom cooperated with each other and shared the basic foundations. In other words, the users of 5G, be it individual users or enterprise customers, could be faced with the risk of information leakage during the sharing of data. There is no special law or regulation related to the information security for 5G. In fact, many enterprises have raised concerns about this problem. Hence the enactment of relevant laws and regulations will be indispensable to promote the development of 5G.

As the pioneer of the 5G development, the solutions to these problems might be referenced to other countries facing similar problems.

5. Conclusions

From the timeline of COVID-19 in China, the role of the unique governance system has been important throughout all the stages. This was specifically vital as means of infection control, management, and as a means of safeguarding approaches for economic recovery. Therefore, decisions were characterized by a top-down authority control. As a result, the transmission of the virus was limited, and medical resources through this approach were able to target the most needed areas, thus been accompanied by swift lockdown policies. These acts were important because all infected patients could be quarantined in emergency hospitals in a short time.

In the wake of all these was the efficient utilization of improved and new technologies such as 5G. As a new technology capable of being applied in many fields and sectors, its importance was realized in earlier times for the control of the spread of the virus. However, the application of 5G was made possible due to the earlier thoughts and policies of the Chinese government through the national strategy based on internal economic and international factors. Therefore, the development of 5G and its contribution to the economic recovery has been tremendous after the New Infrastructure policy was decided by the central government. The roles of the various local governments could be said to be vital to the application of the technology in the fight against infections and management in the local communities. All these have yielded an enormous growth in 5G development in just a few years in both private consumption and public infrastructure domain.

Therefore, to face future challenges in post-COVID-19, a balance between centralism and discretionary powers of other decentralized governance structures will be a key point for any country hoping to achieve a successful application of 5G technology in crisis management including China.

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