An Analysis on the Impact of the Epidemic of Novel Coronavirus Pneumonia (NCP) on the Development of New Infrastructure in China

Zhang Yuwen and Chen Wenqu

On February 21, the Political Bureau of the CPC Central Committee emphasized "strengthening support for R&D of reagents, drugs, and vaccines and accelerating the development of biomedicine, medical equipment, 5G networks, and industrial Internet," at a working meeting on the prevention and control of the epidemic of novel coronavirus pneumonia (NCP). The important role played by new infrastructure such as 5G, AI, the industrial Internet, and the Internet of Things (IoT) in epidemic prevention and control and resumption of production and work have been highly valued by the Political Bureau. Under the epidemic, the new infrastructure has a more significant role in economic development, but the development of new infrastructure needs to be considered from a holistic perspective. We need to accelerate the research on core technologies and boost the development of new infrastructure.

I. Impact of the NCP epidemic on the development of new infrastructure

Economic development has a new task under the epidemic situation: to promote the rapid development of new infrastructure. The development of new infrastructure is an important direction for a new round of investment, which can help optimize the economic structure and mitigate the downside risks of economic growth. The epidemic has a major impact on the macro economy in the short term. On February 29, the National Bureau of Statistics released the operational data of China's PMI. The manufacturing PMI was 35.7% in February, a decrease of 14.3 percentage points from 50% in January, and the non-manufacturing PMI was 29.6% in February, a decrease of 24.5 percentage points from 54.1% in January. The impact of NCP on macro economy in 2019 will be greater than that of SARS in 2003. An IDC study shows that the impact of SARS on China's economy in 2003 was V-shaped, while the impact of NCP on China's economy was U-shaped. The outbreaks of the two epidemics mainly affected the tertiary industry. The total tertiary industry increased from $0.58 trillion in 2003 to $7.5 trillion in 2019.The development was driven by large-scale infrastructure investment such as real estate. Investing in new infrastructure has become a new option to mitigate the downward pressure on economic development.

Online applications such as telemedicine, online education, and remote work, have increased the demand for large bandwidth. The restrictions on offline activities during the epidemic caused a shift in lifestyles such as medical care, study, and work, moving from offline to online, which has spawned a variety of online application scenarios and increased demand for large bandwidth. In the area of telemedicine, remote consultations have been held for severe NCP patients. The transmission of high-definition video and CTs during consultations requires greater bandwidth. For example, on February 25, China Unicom supported Wuhan Leishenshan Hospital to complete the video consultation of remote lung CT screening with experts from five hospitals in three places and completed the transmission of multiple CTs over 500MB in a very short time. The online education applications developed explosively, enabling teachers and students to continue teaching and learning at home. Live streaming has huge demands for large bandwidth. For example, China Telecom Tianyi Cloud Class provides online services for elementary and middle schools nationwide, with an average of 10 million users served on a daily basis. Tianyi HD provides free live streaming and video-on-demand services for 130 million home users, and the demand for large bandwidth is strong.

New infrastructure supply chains face severe challenges of stockouts. The changes in the international trade environment and the impact of domestic epidemic prevention and control have increased the risk of stockouts in the supply chains. The US government intends to adopt a series of policy measures in an attempt to cut off the supply of key components in the field of 5G AI to China. For example, the Wall Street Journal reported on February 17 that the US government is considering adjusting the Foreign-Produced Direct Product Rule to prevent companies such as TSMC, the world's largest contract chip maker, from supplying chips to Huawei Technologies. A large number of small and medium-sized enterprises (SMEs) are involved in the new infrastructure supply chain. In the epidemic, the SMEs are short of funds, which increases the risk of stockouts in the supply chain. According to the results of a recent survey jointly launched by Tsinghua University and Peking University among nearly 1,000 SMEs, 85.01% of them can only survive up to three months with the balance of funds on their accounts, and 34% can only survive one month.

II. Analysis of the impact of NCP on the development of new infrastructure

The development of new infrastructure needs to be accelerated. New infrastructure played a vital role in the context of NCP epidemic. In terms of epidemic prevention and control, we launched telemedicine and intelligent medical robots to avoid cross-infection through people-to-people contact. In terms of resumption of work and production, online office collaborative work platforms were launched to ensure the normal operation of enterprises. In terms of life, online service platforms and smart delivery robots were launched to ensure the normal life of the people during the epidemic prevention and control. The epidemic situation continues to affect the existing industrial forms, and drives the rapid implementation of new infrastructure. It can be predicted that after the epidemic, there will be more new applications of new infrastructure. New infrastructure needs to be built and deployed urgently.

The scheduling of network resources on new infrastructure needs to be more flexible. The epidemic has resulted in an explosive growth of collaborative office applications such as remote conferencing and distance education, and it has also brought challenges such as video buffering. Traditional network infrastructure mainly serves voice calls, and the epidemic has driven the transformation of traditional network services from voice to video, resulting in a surge in bandwidth demand. The current network rollout approach is that the network resources are aggregated from edge to backbone and assigned in a centralize manner. When the exponential growth of online video applications has increased the pressure on the backbone network, such an architecture limits the flexibility of network resource scheduling to a certain extent. In the future, it is necessary to design a reasonable network deployment architecture and switching strategy according to business needs and regional conditions and from a holistic perspective to achieve flexible scheduling of network resources. At the same time, network traffic needs to be further processed locally to reduce the pressure on the backbone network.

Arrangements and preparations should be made in the field of core technologies for new infrastructure. In order to curb the development of China's new infrastructure, the United States has exercised long-arm jurisdiction to crack down Chinese tech companies, causing the shortage of key and core 5G software for Huawei. In the short term, China urgently needs to find the bottlenecks in the development of new infrastructure industry chain, give full play to the synergies of the industry chain of industrial Internet platform, and provide emergency materials management and matching services for core software of new infrastructure; China needs to improve the speed of emergency response, ensure that enterprises can quickly find

alternative products in the event of a broken supply chain and reduce the impact on the development of new infrastructure. In the long run, China needs to step up strategic deployment, research and develop cutting-edge technologies, do a good job in patent layout, and exercise corresponding technical sanctions on other countries as necessary means for negotiation.

III. Suggestions for the development of new infrastructure

The NCP epidemic has a certain impact on economic development in the short term, but on the whole, it cannot change the basic trend of China's long-term economic improvement. In order to mitigate the impact of the epidemic on the economy, the financial, policy, and industrial research should be strengthened in the short term, and the policy layout and regulation should be strengthened. In the medium and long term, strategic positioning should be maintained and the pace of new infrastructure such as 5G, AI, and industrial Internet should be accelerated.

The financial, policy, and industrial research should be strengthened in the short term, and the policy layout and regulation should be strengthened. While preventing and controlling the epidemic, we should promote the orderly resumption of production and work in stages and by types. Through the introduction of policies and measures, such as tax and fee reductions, financial services, rent reductions, and job stabilization subsidies, we should first address the practical difficulties of enterprises, especially small, medium, and micro enterprises. We should establish public service platforms such as 5G, AI, and industrial Internet, guide the integrated application of new infrastructure at a deeper level, better serve the production and operation of enterprises, and accelerate the restoration of normal social and economic order.

In the medium and long term, we should maintain the strategic positioning and accelerate the development of new infrastructure. We should actively mobilize all parties and promote the further development of next-generation information technologies such as 5G, big data, AI, industrial Internet, and blockchain. We should use the consensus on digital transformation gathered during the epidemic and vigorously promote the integrated and innovative applications of advanced technologies. We should follow the prudent and inclusive regulatory concept, guide the healthy development of emerging technologies and industries and promote high-quality socio-economic development.