

Review Article

# New Infrastructure Construction in China: Both Urgent and Long-Term Support

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**Abstract** - Under the impact of the new coronary pneumonia epidemic and the downturn in the international market, China's economy is facing extraordinary pressure in 2020. It is necessary to take extraordinary measures, including new infrastructure, to offset the economic downturn, and strive to combine short-term measures with the strategic modernization goals in the mid-and long-term. This paper defines China's upcoming new infrastructure as an infrastructure construction that is closely integrated with the development and application of digital information technology, which is at the frontier of new technologies and new economic development. Then the paper discusses its important significance and role in supporting the fighting of the epidemic, creating a "new economy", and promoting the high-quality development of the national economy. There is great room for its development in China. The paper emphasizes that it must be integrated with reform and innovation of "institutional infrastructure", and specifically analyzes the use of private enterprises and PPP mechanisms in new infrastructure. In order to implement new infrastructure, local governments must take extraordinary measures to strive to form a high-level, customized plan for supply-side reform in their jurisdictions.

**Keywords** - China's new infrastructure, new economy, new technology, PPP, supply-side reform.

## I. INTRODUCTION

Under the dual impact of the domestic epidemic, and international financial turmoil, and market downturn, the pressure on the Chinese economy in 2020 is in an extraordinary time. In this special year, extraordinary measures are needed, and the significance of the "new infrastructure construction" that is the focus of all parties should be understood objectively and comprehensively as a matter of urgency. Meanwhile, the new infrastructure construction provides a strong backup for China to lead the new economic normal and achieve high-quality development and also forms a long and medium-term strategic option.

The import significance of the new infrastructure construction has been constantly highlighted in the process of making progress in China, fighting for the new coronary pneumonia epidemic, and striving to achieve a high-quality upgrade. In December 2018, the Central Economic Work Conference made important guidance for the promotion of "new infrastructure construction" (referred to as "new infrastructure"), those related to 5G commercialization, artificial intelligence, industrial Internet, Internet of Things, etc. were designated as the specific contents of the new infrastructure. In July 2019, the Conference of the Political Bureau of the CPC Central Committee clearly called for the stabilization of manufacturing investment. While implementing the construction of supplementary shortcomings such as the transformation of old urban communities, urban parking lots, and urban-rural cold chain logistics facilities, it accelerated the promotion of new infrastructure such as information networks. In early 2020, under the severe impact of the new coronary pneumonia epidemic, in order to overcome difficulties and create a new situation, the conference of the Political Bureau of the CPC Central Committee in February and the conference of the Standing Committee of the Political Bureau of the CPC Central Committee in March, while further emphasizing the acceleration of new infrastructure, clearly added the construction content of "data-center", and in particular pointed out to "pay attention to mobilize the enthusiasm of private investment".

New infrastructure is not a repetition of investment measures such as "4 trillion". This time, the new infrastructure emphasizes the construction of infrastructure that is closely related to the development and application of digital information technology, the frontier of the new economy, and new technology development. It will also draw on the investment experience during the last two rounds of resisting the Asian financial crisis and the world financial crisis. In terms of funding sources, government debt funds, industrial guidance funds, etc., will be combined with PPPs and other institutional innovations, focusing on new investment and financing models.



## **II. NEW INFRASTRUCTURE SUPPORTS FIGHTING THE EPIDEMIC, CREATES A NEW ECONOMY, AND PROMOTES THE HIGH-QUALITY OVERALL DEVELOPMENT OF THE NATIONAL ECONOMY**

What is the main difference between the characteristics of the new infrastructure and those of the traditional infrastructure? In a word, it is closely related to the development and application of digital information technology in the frontier of the new technology revolution - technological, ecological upgrade, which is to support the development of the digital economy and the overall national economy with high technology. The functional role of this new infrastructure interpreted from the perspective of economic theory, which is to cut in from the conditions of economic development, forms an effective supply capacity synthesized by related hardware and software under the rapid development of information technology in the era of new technological revolution, supports the combination of innovative mechanisms and the application of scientific and technological achievements, opens up vast space for new manufacturing, new services, and new consumption, thus better meeting the needs of the people for a better life.

The new infrastructure that is working on the technology side, under the specific background of the current impact of the new coronary pneumonia epidemic, has practical significance for steady growth, stable employment, excellent structure, and tapping potential. The impact of the epidemic on the economy is still under observation. At present, there is a serious epidemic in the world. This is the worst scenario originally expected. It will definitely affect all major economies, and it will inevitably impact China's 2020 economic growth target under the interaction of the global industrial chain. The "two sessions" (the National People's Congress and the Chinese Political Consultative Conference (NPC & CPPCC)) held in the second quarter gives guidance on the annual economic growth target. The current discussion on how to set the economic growth target for this year must closely track and fully consider the economic situation.

According to the opinion of the author, in order to propose an appropriate growth target that is considered in overall, a global response plan should be prepared after a sharp change in the economic situation, drawing on the extraordinary measures that Premier Zhu Rongji decided to launch in 1998, issuing long-term construction treasury bonds and special treasury bonds, and launching large-scale investment projects led by the government to effectively expand the effective investment and financing. In addition to the new infrastructure and supporting government investment proposed now, the key is to have a good investment mechanism. In fact, the PPP model (Public-Private Partnership, which is the cooperation between the government and social capital, and an innovative model of project construction and operation in public infrastructure) promoted in previous years is a good basis for experimentation and innovative development.

Although there are some problems in this process, it does not mean that this model has problems and should be halted. The government's funds are limited, and the finances are already in a tight time, but the mobilized social funds are still considerable. It is imperative to expand effective investment and expand domestic demand with PPP innovation, thus getting twice the result with half the effort.

If investment performance can be more fully stimulated, this year's GDP growth target can still maintain a growth rate of more than 5%. This year we will build a well-off society in an all-around way, and a growth rate of more than 5% can also be matched to basically achieve this goal.

If we stand on the ground and speed up the new infrastructure construction, it will help stabilize investment, expand domestic demand and solve the urgent need to alleviate the impact of the epidemic. Thus, it will not only achieve the goal of building a well-off society in an all-around way, but also form backup to help across the mid-income trap after 2020. On the one hand, the new infrastructure will help expand effective investment and financing, and while forming network construction investments, it will attract all industries in the national economy to increase capital investment in ICT projects. Taking 5G as an example, it is expected that from 2020 to 2025, it will directly boost the telecommunication operator's network investment by 1.1 trillion Yuan and the vertical industry network and equipment investment by 0.47 trillion Yuan. On the other hand, it helps to expand and upgrade information consumption. Taking 5G again as an example, it is expected that from 2020 to 2025, 5G commercial use will drive 1.8 trillion Yuan of mobile data traffic consumption, 2 trillion Yuan of information service consumption, and 4.3 trillion Yuan of terminal consumption.

China's per capita national income reached 10,000 US dollars in 2019. According to the comparable caliber of the World Bank, this is already in the upper half of middle-income economies. For example, if our country can maintain a medium-to-high speed of economic growth in the next 5 to 8 years, national income per capita is expected to cross the threshold of US \$ 13,000-14,000 and secure a high-income economy. However, from the point of view of global statistical phenomena, this breakthrough shows that in the first 70 years or so, the success rate was only one-tenth, which was a hurdle that most economies failed to cross successfully. For rising China pursuing modernization, it will also become a historic test. China has become a "world factory". In case that China falls into the "sandwich" dilemma of failing in low-end competition with developing economies for their low labor costs or in high-end competition with developed economies for their high-tech, high value-added comparative advantages, China must carry out supply-side structural reform and achieve the high-quality development of replacing old power with new power and transforming growth modes.

In the long term, accelerating the construction of the new infrastructure will build the key infrastructure in the era of the digital economy, support the digital transformation of the economy and society, and achieve high-quality upgraded development. One is to lay a new foundation for the Internet of everything. The high-speed mobile internet of information networks is developing and penetrating into the traditional infrastructure, forming a new type of infrastructure with the interconnection of all things and data intelligence, realizing the flow of technology, capital, talents, and materials driven by the flow of information, and optimizing the efficiency of resource allocation on a larger scale. Second, integration leads to develop new spaces. New infrastructure supports the vigorous development of the digital economy, promotes the deep integration of the digital economy and the real economy, and contains huge potential for development. The calculation shows that the proportion of the digital economy in some developed countries has exceeded 50%, and the nominal growth of China's digital economy in 2018 was 20.9%, far exceeding the growth rate of GDP in the same period, and its contribution rate to GDP growth reached 67.9%. The third is new kinetic energy created and driven by innovation. Taking new infrastructure construction as a carrier, a new generation of information technology will accelerate the cross integration with advanced manufacturing, new energy, new materials, and other technologies, triggering group and disruptive technological breakthroughs, and continue to inject strong momentum into economic growth. Fourth, transformation and upgrading achieve new changes. Looking back on history, railways, highways, power grids, and other infrastructures have supported three industrial revolutions characterized by mechanization, electrification, and automation, respectively. New infrastructure will help the development of digitalization, networking, and intelligence, promote the advancement of industrial structure and modernization of the industrial system, and become a key support for the development of strategic emerging industries and a new round of industrial revolution.

Therefore, the new infrastructure is a very important strategic measure to promote and lead the overall development of a high-quality national economy and form the backup of development to overcome the mid-income trap and achieve the "new two-step" modernization goal.

### III. THE NEW INFRASTRUCTURE HAS ROOM FOR GREAT ACHIEVEMENTS IN CHINA

Overall, after the period of reform and opening-up, China has grown from a large backward country with total economic output listing more than ten in the world and the per capita national income listing more than one hundred in the world rapidly into the second-largest emerging market economy country with total economic output listing the second in the world and per capita national income reaching the upper half of mid-income economies (increased to over the US \$ 10,000 in 2019). However, it is objectively evaluated that China, which has become a

"world factory" in the course of decades of vigorous development, has not yet possessed the high-end capabilities and cutting-edge level to lead the world trend of technological innovation. To move from "Made in China" to "Created in China", we must bid farewell to the traditional extensive economic development mode and strive to open up the space where "technology – the first productive forces" exerts the multiplier effect, so that the development and application of digital technology at the forefront of the information revolution gradually rise to the leading role in the world. This is also the only way for China to further "peacefully rise".

To support this kind of development with new infrastructure, there is room for great achievements in China.

- If makes a general evaluation of China's industrialization, it has only reached the stage of transition from the mid-term to the stage between the mid-late period and the later period. The industrialization process will inevitably advance and accompany urbanization. Considering the "urbanization rate of household registration population" without debts only about 44%, then the real urbanization level is at most about 50%, and there is still room for rapid urbanization of about 20 percent in the future. If it rises by one percent a year, according to the international experience, it will take 20 years to reach the turning point of the rapid development stage of urbanization, which is above 70%.

- Marketization and internationalization, which must be closely integrated with industrialization and urbanization, will forcefully continue to liberate productive forces and promote the continuous release of the potential for industrialization and urbanization. This is manifested in the continuous economic growth of catching up in the next few decades.

- In the current era of industrialization, urbanization, marketization, and internationalization, we must also plus the wings of high technology (that is, the so-called "information"). So in the ultra-conventional development that is catching up, China can no longer miss the historical opportunity of the new technology revolution. And in the process of building a modernized country following a "new two-step" strategy, we have no choice but to make high-tech and economic and social development complement each other, integrate into one, and improve the quality of the entire national economy and improve the efficiency.

- China's high-tech industry, which was launched before the turn of the millennium and was strongly developed in the first two decades of the 21st century, is represented by a digital enterprise platform. It has formed a strong industrial cluster that attracts global attention, such as BAT + JD, Suning, Meituan, SF, Pinduoduo, etc., which rely on digital platforms. There are also large-scale S&T development benchmarking enterprise that has rushed to the forefront of the same industry in the world

and has gone global, such as Huawei. Taking Tencent as an example, which is one of the fastest-growing cloud computing vendors in the global market (the cloud computing service model - IaaS), its total number of servers on the entire network has exceeded 1.1 million. It is the first company in China with a number of servers exceeding one million and also one of the five companies with more than one million servers in the world. It currently has several large self-built or co-built data centers in Tianjin, Shanghai, Shenzhen, Guiyang, and other places. In the past year, Tencent AI Lab explored two important problems in the field of artificial intelligence through [AI + Game] and [Digital Man], and through artificial intelligence and multimodal research, made significant achievements in medical, agricultural, industrial, content, social, and so on. But we also need to recognize that, compared with the developed level and original ability of the “new economy” of developed economies in the world, the vast majority of Chinese enterprises are still in the stage of “following the trend” with learning and imitation as the main focus. Compared with “Silicon Valley,” which is “leading the trend”, we urgently need to catch up. In the process of catching up, the large amount of infrastructure that should be matched by the new economy urgently needs to be formed with new infrastructure investment. The relatively complete industrial chain that China has formed in the past few decades, the quite strong supply capacity of raw materials, the supply of various types of equipment, and the extensive cooperative relations with various economies in the world will provide all kinds of necessary elements for the new infrastructure to make great achievements.

#### **IV. THE NEW INFRASTRUCTURE MUST BE CLOSELY INTEGRATED WITH REFORM AND INNOVATION, MECHANISM INNOVATION, AND “INSTITUTIONAL INFRASTRUCTURE”**

Some commentators have emphasized that system construction is the “new infrastructure” that China needs most. It should closely follow the optimization of the law, the rule by law, and the governance mechanism, focusing on the original intention of the reform of “draining water and raising fish” and the spirit of the contract with Chinese characteristics of “one hundred years of unwavering”. Through the credible commitment of the rule by law, the private investment will be more confident, and entrepreneurs will become the leaders of the “new infrastructure” (Professor Zhao Jian of Size Academy). It makes sense.

Looking at the new infrastructure and the “institutional infrastructure” in a comprehensive manner is by no means an exclusive relationship of “choosing one from the other”, but the two are obvious problems of different nature at different levels. The new infrastructure is an investment item that is directly related to productivity force in the field of material production, which creates scientific and technological leadership and support in economic and social development. “Institutional infrastructure” is directly related to production relations in

the field of institutional rules, which are difficult reform tasks to deepen institutional arrangements by “self-revolution” in the deep-water zone. According to the cognition reached by the new supply economics, the latter relies on effective system supply to form institutional innovation to open up the potential space for technological innovation and management innovation, thus liberating the productivity. Therefore, compared with investment and construction activities, the latter is more profound and more decisive, which is the “key trick” and “maximum dividend” in promoting the modernization of China. However, reform is not an end in itself. Promoting the extraordinary development of China’s modernization to meet people’s needs for a better life is the purpose. Therefore, from the basic logical relationship of “grasping reform and promoting development”, in the process of liberating productive forces, high-quality development of the national economy supported by the new infrastructure and the building of a happy life for the people is the destination of hard work. In order to recognize this relationship and vigorously promote new infrastructure at this stage, of course, we must fully pay close attention to the combination of reform and mechanism innovation, overcome the resistance, in reality, to build a high-standard legal business environment, protect property rights, and cultivate a culture of contract integrity, reduce market access, encourage fair competition, substantially deepen the government’s “self-revolution”, guide and promote the win-win development of mixed ownership of enterprises and the full promotion of entrepreneurship, and vigorously promote the institutional innovation such as PPP (government and social capital cooperation). This is the “integration” advancement that the new infrastructure and “institutional infrastructure” should have.

#### **V. IN THE NEW INFRASTRUCTURE, PRIVATE ENTERPRISES AND PPP SHOULD ALL PLAY THEIR ROLE**

It should be pointed out that in the development of the “new economy” in China, private enterprises are the leader with the most outstanding performance. We need to admit that it is not accidental that BAT + JD, Suning, SF, etc., are positioned as digital platform companies to stand out on the Chinese land and affect the world in the “Internet +” type of information technology application innovation. In the tough process of such a high-tech digital technology company with the mission of “disruptive innovation” to overcome its development “bottleneck period” with large amounts of money, the success rate is extremely low, but once it breaks through, it may “fly soaring”. The mechanical characteristics of private enterprises make them generally superior to state-owned enterprises in terms of tolerance, decision-making characteristics, and sustainability under market tests. Therefore, in this field, several enterprises have been turkeys in the hurricane and finally grown into giants. Almost all of them are private enterprises. In this respect, it has prompted us to further deepen our understanding of the status, role, characteristics, comparative advantages, and development potential of private enterprises. On the other hand, it also allows us to

learn clearly the nature of the “new infrastructure” and its natural connection with the further development of private enterprises, especially digital platform private enterprises. Informatization of the new economy in China has objectively formed a situation where private enterprises are the main market giants and thriving. The new infrastructure will greatly contribute to the upgrade and development of the informatization new economy, so the potential and vitality opened by this will be released, which will naturally expand more significantly for the BAT three giants and private enterprises such as JD, Suning, SF, Meituan, etc., and benefit a large number of upstream and downstream enterprises (both state-owned and private) that they connect with. In particular, a large number of small and micro enterprises (which are basically private enterprise components) have been more fully developed. The prospect of this kind of benefit for private enterprises is not one-sided. State-owned enterprises that have inextricably linked with private enterprises (including both the property rights bond formed during the mixed reform and business cooperation) will also benefit from the “new infrastructure”.

It should also be noted that the implementation of the new infrastructure has enabled private enterprises and state-owned enterprises as investors to enter the field of project construction, which is a place that should be highly valued. A large number of large-scale new infrastructure projects, from 5G, data center, artificial intelligence development center, the Internet of Things, etc., must be linked with “industrial Internet”, “smart city”, “cold food chain,” and other large-scale, long-term projects, as well as the public engineering construction supporting them. The investment and financing requirements are huge. Under the constraints of responding to the impact of the global epidemic and the tight financial situation at all levels of the country (there must be “a tight day”), as the government’s financial resources are very limited, the new infrastructure will definitely require the government to use a small number of financial resources to rely on innovation mechanisms such as PPP to form the “multiplier effect” of pulling and magnifying the external funds of the government, attracting domestic and foreign social capital and the financial power of the majority of enterprises, and forming partnerships to build together, which contains valuable opportunities for investment and development of enterprises. It no denies that under the conditions of China’s national conditions, when new infrastructure in local jurisdictions is carried out by PPP, the government generally prefers state-owned enterprises, but the size of China, the number of projects, and the length of the cycle determine that state-owned enterprises cannot carry out these projects. Many strong private enterprises will surely get the opportunity to be the main body of PPP development, as 40% of PPP projects in previous years will fall in private enterprises. This opportunity is actually right in front of us. Moreover, whether it is a state-owned enterprise or a private enterprise, after winning the SPV (specific purpose vehicle) dominance of a PPP project, many sub-projects, cooperative development projects, and

business docking projects in the development of the project will provide both private enterprises and state-owned enterprises with the cooperation opportunities.

In short, not only the achievements of the new infrastructure will benefit many private enterprises, but also from the beginning of the project construction, the new infrastructure has provided shared opportunities for state-owned enterprises, private enterprises, and foreign enterprises, which deserves the attention of local governments and the business community.

#### **VI. LOCAL GOVERNMENTS MUST STRIVE TO CARRY OUT THE SUPPLY-SIDE REFORM IN THE JURISDICTION TO FORM A HIGH-LEVEL CUSTOMIZED PLAN IN AN UNUSUAL WAY**

The local governments in different cities and in different jurisdictions, when conducting the “new infrastructure”, should not only grasp the consistency of implementing the spirit of the central government, but also fully consider the local conditions. In dealing with the commonality and characteristics, makes a difference in an unusual way. In fact, it is the true meaning of “supply-side structural reform” that the central government emphasizes to realize modern governance and build a modern economic system. At the stage of the “counter-cyclical” demand management, which originally emphasized the total amount, the decision-making in various regions followed more loose or tight macro-control of liquidity (money, financial resources). Although the handling of local structural issues cannot be avoided, it has not clearly grasped the guideline of the regulation and control concept. The supply-side reform as the mainline today is more positively launched to form high-level, customized solutions. It is the supply-side structural problems, including both overcoming the difficulties in the reform of deepening local institutional structure, and also industrial structure issues such as the layout of local productivity and the cultivation of industrial clusters, etc. as well as a series of issues in income distribution structure concerning the people’s livelihood and social management. Objectively, it is required to form a high-level, customized overall solution like “one policy for one city” and “one policy for one region”. This set of systematic engineering “top-level planning” should provide an overview of the customized solutions (development strategy planning) concerning all the reform, development, and stability issues in the jurisdiction. Whether it can stand the test of the history or not is an inevitable major issue that cannot be avoided in China’s local government competition, the basic essentials of which, according to the author, are to combine “effective market” and “promising limited government” to realize high-quality modernization development strategy from “catching up to catch-up”.

The situation varies greatly from place to place, and it is impossible to find a “universal model” to apply. When formulating local high-level, customized solutions, we should actively attract the intellectual contributions of specialized talents and “introduce brain support”, that is,

“purchase intellectual services” in the form of subject research, domestic and international expert demonstrations, etc., for our use.

At the same time, it should also be mentioned that the relationship between the new and old infrastructure needs to be handled well in the “customized solutions” that focus on the new infrastructure in various places. In many scenarios, the two types of conceptually distinguishable infrastructure must inevitably overlap and coordinate. Imagine that the local special bonds that have been accelerating the issuance progress and the funds available for the special national bonds that will be issued this year correspond to public projects and infrastructure, etc. These public projects and infrastructure are not necessarily all old infrastructure. Some new districts and growth pole regions may have already included new infrastructure in the original special projects. Then, after raising funds with special government bonds, more emphasis will be placed on the main new infrastructure project that supports high-quality development and upgraded development, but it cannot be said that it does not involve any old infrastructure next to it. This new infrastructure may be physically integrated with the traditional infrastructure next to them. For example, imagine that the construction of a set of hardware facilities that support 5G, which is emphasized by the central government, is concentrated in a new development zone. There are also data centers and other artificial intelligence development centers in the development zone. This is called the new infrastructure. However, once this development zone develops well, the

surrounding real estate will also develop. These general supporting real estates, as well as bridges, road repairs, etc., are considered to be old infrastructures, but it cannot be denied that they have important and indispensable supporting roles. So it is impossible to cut apart the funds and make clear the development issues. Special local bonds will only be used for old infrastructure, while special national bonds will only be used for new infrastructure. It is impossible to do so. New infrastructure investment may lead to the follow-up of some projects in the surrounding area. The follow-up does not rule out the use of adjustments and combined use. Sometimes it is a platter project and sometimes a packaging project. These things generally form a certain point that there must be certain coordination and cooperation in each specific scenario, or even mutual penetration and integration. This will be the specific situation in reality.

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