

THE TECHNOLOGICAL MODELS OF THE UNITED STATES AND CHINA

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Abstract. *The article provides a comparative analysis of the technological models of the United States and China. It examines the historical background of China's technological rise, which was stimulated by American policy in the 1980s and 1990s, and the present-day rivalry between Washington and Beijing for the status of technological superpower. The strengths and weaknesses of each model are identified: for the United States, the completeness of the technological cycle and the location of control centres on its own territory, set against growing dependence on developing states, bureaucratised financing and the excessive politicisation of technology policy; for China, the priority of volume combined with a rising emphasis on quality and cheap labour, set against dependence on imported energy resources and non-ferrous metals. The study concludes that both models share a high degree of dependence on raw materials and a common drive towards the sovereignisation of national technology markets.*

Keywords: *technological model, United States, China, technological sovereignty, semiconductors, sanctions, IT sector, rare earth elements, technological competition.*

INTRODUCTION

The technological development of a state is an important determining indicator in the modern world, since under conditions of the intensifying integration of information and communication and other modern technologies into all spheres of life it ensures the political and economic stability of a state, raises its security, enables its full development and secures its competitiveness in the international arena.

States seeking dominance at the regional level and, still more, at the global level, strive to become technological centres. In the second half of the twentieth century and up to the present day the United States has positioned itself as the innovation centre of the planet and as the principal supplier of modern technologies and IT services. The present century, however, is rapidly changing this configuration through Beijing's activation of a technology policy intended to transform China from a developing state into a developed one in economic terms, since one of the characteristic features of a

post-industrial state is the broad application of modern technologies and solutions in its socio-economic sphere (Danilin, 2020:160–176).

At the same time, it was precisely the policy of the United States in the second half of the twentieth century, and particularly in the 1980s and 1990s, that became the impulse for China's technological development. Initially China placed its emphasis not so much on the quality as on the quantity of the goods it produced across a wide and extensively represented range, and the same holds for technologies. One of the reasons was the need to diversify production through the use of cheap labour, to draw China into the sphere of American interests during the Cold War and to cover one of the potentially largest markets with high development forecasts.

MAIN PART

At present, Washington openly competes with Beijing over retaining for itself the status of technological superpower, while simultaneously creating artificial barriers for Beijing in order to slow China's technological development. Such measures include restrictions on investment in China's IT sphere, support for the Taiwanese microchip market, which is the largest in the world, support for India and the opening in India of production facilities of the principal American IT giants, as well as further cooperation with the Philippines, Singapore and other states in order to reduce the role of China in the technological sphere (Luzyanin, 2023:97–107).

If the technological models of China and the United States are considered, the following features may be distinguished. Among the positive aspects of the American model, the first is that the technological model of the United States is at present based on a policy of the technological cycle, which implies that the technological base and infrastructure are located exclusively on the territory of the United States, and this ensures full technological sovereignty for the United States in relation to any other state. The second is that the centres managing the technological infrastructure are located on United States territory, and consequently external physical interference is practically excluded for the United States itself.

The third positive feature is that the technological model of the United States is characterised by an emphasis on quality, which raises the volume of state financing of projects. At the same time, for the production of technological components the United States depends to a considerable degree on supplies of raw materials from developing states. Thus, for example, despite the sanctions imposed on Russia after 2022, deliveries

of uranium to the United States did not cease, given that uranium is important for the production of energy.

The fourth positive feature is that the technological model of the United States is also characterised by the fact that the United States actively assists its allies and partners beyond the European continent, among which, as of 2024, India, Argentina, Vietnam, Israel, the Philippines and other states stand out. In some of these states the production facilities, branches and subsidiaries of American IT companies have been opened; these companies seek to expand production and the quantity of goods produced through cheap labour and a large market located directly in those same states, with an emphasis on the logistical component, which facilitates accelerated deliveries of resources as well as deliveries of the final product to various markets.

The negative components of the American technological model are the following. First, there is the growing dependence on developing states to which the United States initially provides assistance in technological development, since the latter may in certain parameters overtake the United States – China being an example – which is undoubtedly a negative factor and a risk for the United States (Danilin, 2020:160–176).

Second, the emphasis on quality to the detriment of quantity, the bureaucratisation of financing, the increased technological regulations, administrative barriers and the existence of an oligopoly in the IT market weaken the technological potential of the United States, given that the United States, unlike developing states, regards foreign investment in this sector as a secondary factor, predetermining the leading place of American investors. Ultimately such a situation complicates the adoption of rapid decisions and the monitoring of the general situation at the world level in terms of technological indicators, where such states as China, Japan and Germany are beginning to overtake it in one indicator or another at the expense of effective legal, economic, investment and other kinds of policy.

Third, there is the excessive politicisation of the American technological model, which lowers confidence in it and reduces its competitiveness in comparison with other technological centres, since the United States frequently imposes economic restrictions, or sanctions, on developing states that seek to be less dependent on American technological infrastructure and technologies. This is the case, for example, with the SWIFT fast-payment system (the Russian SPFS and the Chinese CIPS being its analogues), with geopositioning systems such as GPS (the Russian GLONASS and the Chinese BeiDou), with digital currencies, machine building, IT services and many

other directions. At the same time the analogues of developing states gradually begin to enjoy greater demand because of their low cost, convenience and uncomplicated requirements for purchase, use and delivery.

As regards the technological model of China, Beijing seeks to create at the national level a practically complete spectrum of enterprises producing equipment for the microelectronics industry (Ostrovskiy, 2020:6–23). Among its positive aspects, the first is that within the Chinese technological model the priority of quantity over quality is retained, while at the same time an effort is made to increase the quality of the technologies produced. Within the framework of improving quality a number of normative legal acts have been adopted at the all-China and regional levels, and active interaction is taking place with foreign investors from developing states and beyond. Unlike the United States, many states of the European Union, such as Germany, France and Italy, maintain interaction with Beijing in the technological sphere and in the sphere of digitalisation (He, 2020:44–51).

The second positive aspect is the continued use of cheap labour in comparison with other states, which has a positive effect on the quantity of goods produced, although for individual types of goods it continues to have a negative effect for the same reason.

Among the negative aspects, China depends on supplies of energy resources and other resources, and of the non-ferrous metals necessary for the production of technologies. The restrictions introduced by the allies and partners of the United States in matters of supply, as well as the increase in prices for these resources, have an effect on the technological market of China.

Thus it may be noted that among the similarities of the technological models of the United States and China one may distinguish a high degree of dependence on non-ferrous metals and mineral resources, the strengthening of a policy of sovereignisation of national technology markets and models, and the expansion of production (Lebedeva, 2018). Among the principal differences one may distinguish China's continuing technological lag behind the United States and a certain dependence on semiconductors, which are produced in the United States or among the allies and partners of the United States. On the other hand, China still retains an emphasis on cheap labour, though not to the same degree as India.

CONCLUSION

The technological models of both states have positive as well as negative aspects and risks, which have been examined in the content of this work. The American

model provides a high degree of technological sovereignty through the location of the technological cycle and its control centres on national territory, but it is weakened by dependence on external supplies of raw materials, by bureaucratised financing and by the excessive politicisation of technology policy. The Chinese model, in turn, provides scale, speed of production and broad international interaction, but it remains dependent on imported energy resources, non-ferrous metals and semiconductors. The further development of both models will therefore be determined not only by internal innovation policy but also by the degree of success in reducing external dependence.

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