

The development and Current Status of China's Transportation System

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Introduction

Since China's reform and opening policies began in 1978, the Chinese government has implemented a series of effective measures, such as increasing road maintenance fees, imposing a surcharge for motor vehicle purchases, and implementing a policy for toll roads in order to realise the rapid development of the national transportation construction. Each transportation mode has achieved unprecedented development in competitive environments, which has eased pressures

in transportation supply.

Transportation Infrastructure

After years of construction and development, China's transportation infrastructure has improved greatly and a basic arterial framework for different transportation modes has taken shape, focused on trunk line railways, expressways, deep water channels, long-distance pipelines, and airport and port hubs (See Figure 1).

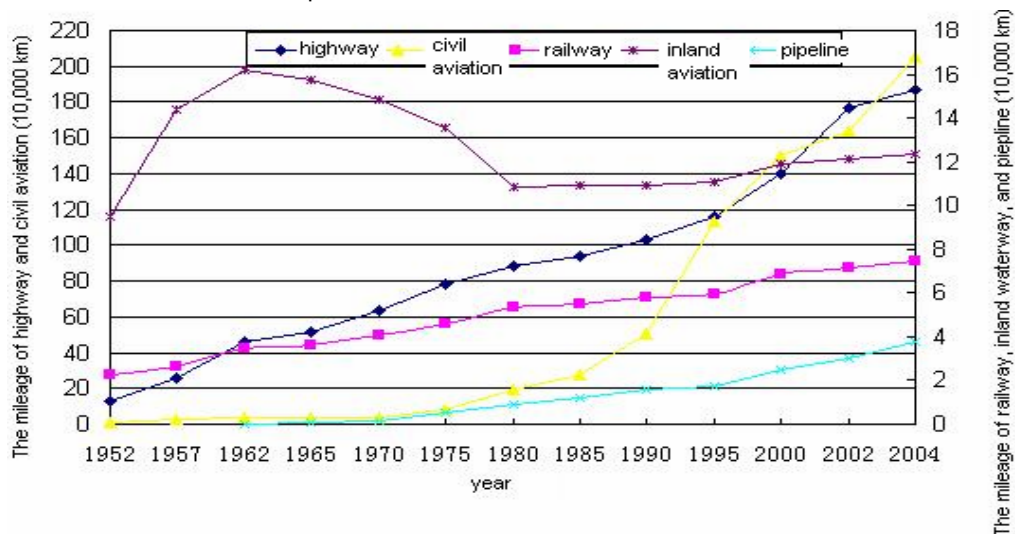


Figure 1: The Evolution of China's Transport Network

Source: *China Transportation Statistics Yearbook*

By the end of 2004, China's total railway mileage reached 74,408 km (third in the world after the U.S. and Russia); total highway road length reached 1,870,700 km (fourth in the world after the U.S., India, and Brazil), including 34,288 km of expressways (second in the world); Navigable inland waterways reached

123,300 km. There were 4,197 commercial berths along China's coast, of which 790 were 10 thousand ton class and above. China had 133 airports and 1,279 regularly scheduled flights and its total airline turnover volume ranked third in the world, as did passenger volume.

Transportation Equipment

China's transportation equipment has experienced remarkable improvements. It ranks first in the world in total rail density. Locomotives are almost all diesel and electric. The number of motor vehicles in China has increased rapidly. By the end of 2004, China had roughly 28 million cars, and significant progress has been made in model design, ergonomic customisation, performance and comfort, as well as environmental technologies, energy efficiency and safety. Ocean-bound shipping technology and equipment are essentially on par with international levels. However, in inland waterway transportation, China still lags behind. Most of the civil airplanes are imported, mainly from Boeing or Airbus.

Transportation Capacity

With a larger number of transportation facilities and technological improvements in transportation equipment, China's overall transportation capacity and quality have improved substantially. Expanded and improved transportation has supported China's socio-economic development and has met rapidly growing demand for passenger and freight transportation at a

basic level. In 2003, total passenger volume on all transport modes was 16.84 billion passenger trips and passenger turnover was 1,379.82 billion persons/km, 4.9 and 6.0 times 1980 levels, respectively. Total freight volume was 15.56 billion tons and freight turnover volume was 5.38226 trillion tons/km, 2.8 and 4.5 times 1980 levels, respectively.

Structure of Transportation

The structure of transportation in China has also changed substantially. Passenger and freight road transportation has increased rapidly. Air passenger transportation and ocean shipping have steadily increased. However, railways are under great pressure, and the small share of other transportation modes has increased. Overall, the market shares of different transportation modes have become relatively stable, a development trend that is roughly similar to that experienced by industrialised countries. (See figure 2 and figure 3)

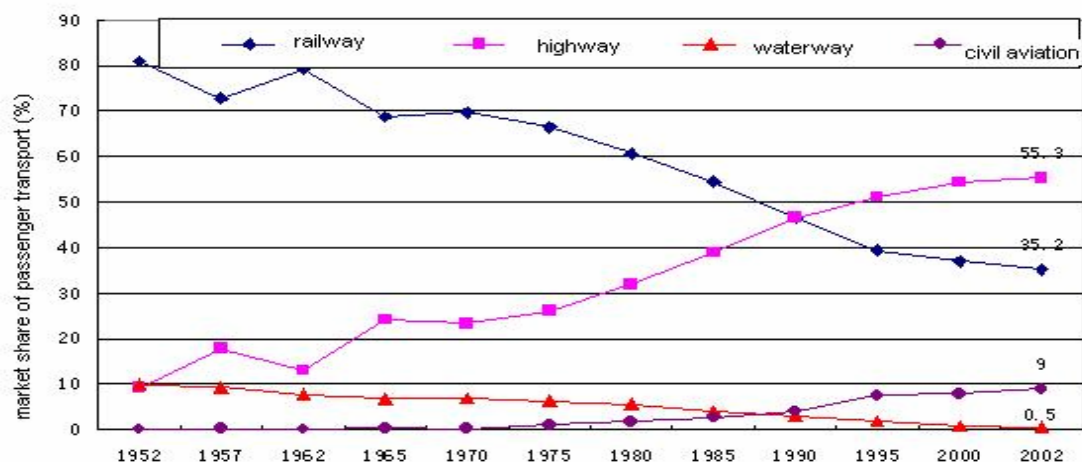


Figure 2: Changing Market Shares for Passenger Transport in China

Source: China Statistics Yearbook

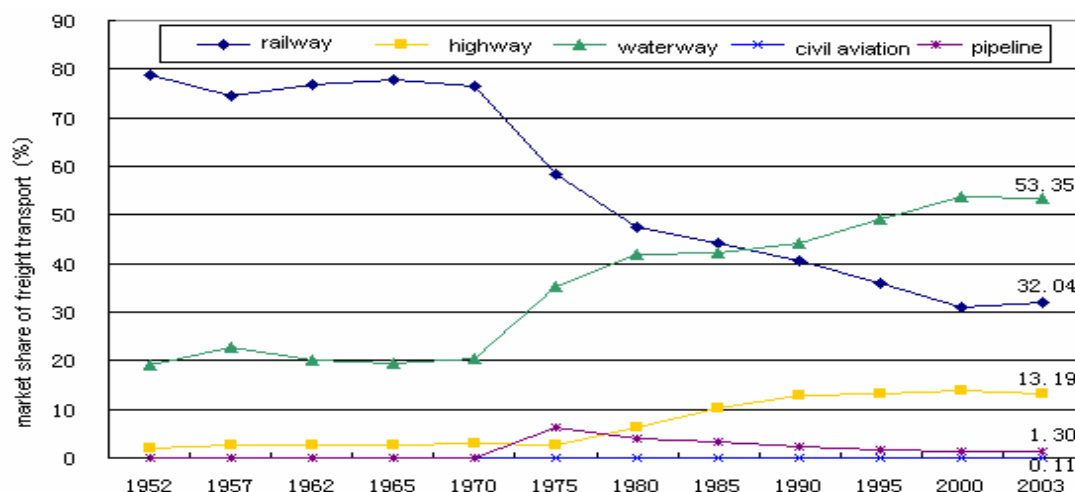


Figure 3: Changing Market Shares for Freight Transport in China

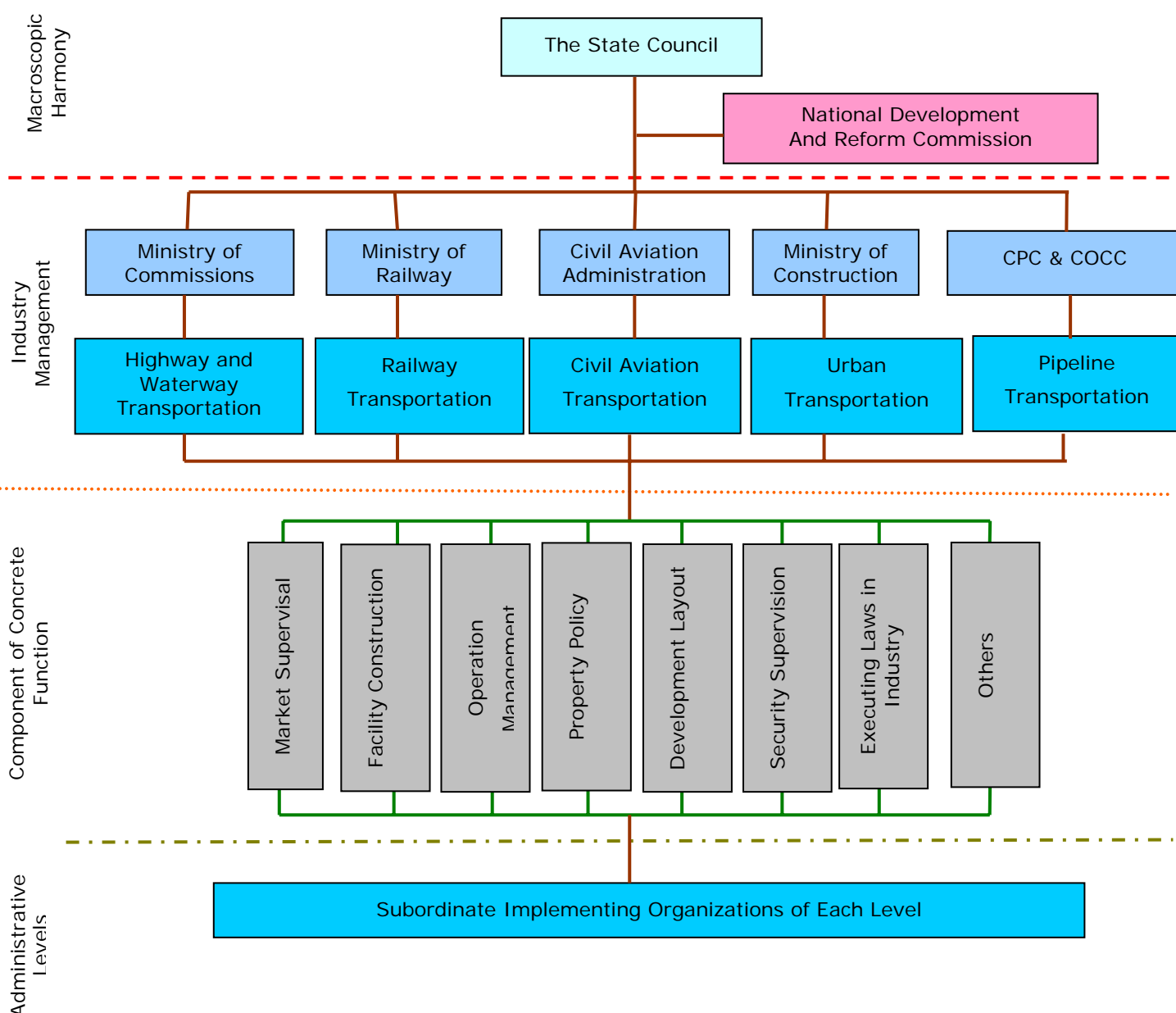
Source: China Statistics Yearbook

Current Transport Management Structure

Transport management in China is organised separately according to different transport modes. Each transport mode works according to its own policies, operational strategies, and allocates projects and builds its own network of relationships across other authorised departments. For instance, road and water transport are administered under the Ministry of Communications; railroads fall under the authority of the Ministry of Railways; civil aviation is administered under the Civil Aviation Administration; oil and gas pipelines are managed mainly under PetroChina and Sinopec; urban transport falls under the authority of the

local Construction Management Commission with the State Development and Reform Commission, Ministry of Construction, and the Ministry of Public Security simultaneously involved in corresponding elements of the administration of transport. Additionally, transport management also involves several other departments such as the Ministry of Finance, the Bureau of Land Resources, the State Forestry Administration and the State Environment Protection Administration, etc. Generally speaking, the transport system in China lacks comprehensiveness, while an integrated transport management administrative system is still inchoate. The organisation of the transport management structure is shown in Figure 4.

Figure 4: Institutional Structure of Transport Administration



Problems

Although China's transportation has made great achievements and the long existing transportation pressures have been alleviated, there still exist many issues and challenges.

Infrastructure for an Integrated Transport System Lags Behind

Many problems in the transport system arise from the lack of a comprehensive

master plan: the infrastructure for an integrated transport system lags behind, the layout of transport network and routes are not rationalised, and the foundation for coordination in urban transport development is still weak. Integrated transfer stations are still rare, and connections are hard to make and coordinate for passengers. The objectives of having zero-distance transfers for passengers and seamless transfers for

modern logistics are not even close to being met; waste in transport resources is common and financing for infrastructure is not as effective as it could be. Railways are over capacity, the inland navigable waterways are not used to their full potential, and oil and gas pipelines are still lagging behind. These individual problems combine and can not live up to the requirement that various transport modes should be utilised according to local conditions.

Insufficient Investment in infrastructure construction and Maintenance

The railroads are still financed by one single investor (the government). Return on capital investment is slow and there is great difficulty in investing in the capital market for rail. Acting as the representative for the central government in railroad investment, the Ministry of Railways is still responsible for all the investment in railways infrastructure loan repayment for rail projects. Railway construction funds and bank loans are the major sources of infrastructure investment, with construction funds amounting to 209.4 billion RMB in the period between 1991 and 2000, and with 48.22% of the total investment by the Ministry of Railways. Loans from domestic banks total 96.1 billion RMB, accounting for 22.13% of the total investment in rail. Investments from the outside market account for less than 10% of the total rail project investment.

There has been increased diversification of investors and investments in road construction. However, major problems such as a heavy debt burdens and a large demand for maintenance capital still

plague the system. In December 1984, the State Council implemented a series of policies resulting in rapid expansion of road infrastructure, including new standards for road toll collection applied to road maintenance, a vehicle purchase tax, implementing toll road policies, and key policies regarding the diversification in investors and investments. Despite this, the current debt burden for government departments relating to road transport reached 600 billion RMB. With the large-scale expansion of the road network, there has also been a steady demand for maintenance investment, with more needed daily; only 30% of rural roads can be maintained with currently allocated capital.

There are still no special investments to encourage construction of inland navigable waterways or urban public transport. Up until and including the time of the Ninth Five-Year Plan, the total investment for inland navigable waterway infrastructure was only 30 billion RMB, and the three years before the Tenth Five-Year Plan saw only approximately 14 billion RMB invested in this mode. This minimal amount of investment cannot meet the demand for inland waterway transport.

High Costs of Transport

Research from the China Logistics Information Centre shows that total logistics costs in 2003 was 2497.4 billion RMB, 21.4% of GDP. This percentage is more than twice the spending on logistics by developed countries such as the United States (9.5%) and Japan (8.7%). Within this total, transport costs account for 1402.8 billion RMB, storage costs for 737.6 billion RMB, and management costs for 357 billion RMB. Transport costs which contribute to half of the total logistics costs

(as represented by Figure 5) directly impact the competitiveness of China

against other countries.

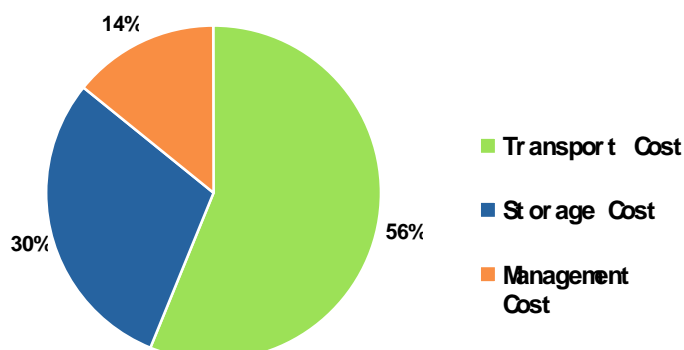


Figure 5: Components Contributing to Logistics Costs in China
 Source: *China Statistics Yearbook*

Low Capacity for Independent Innovation and a Minimal Amount of Science and Technology

Currently, there is a low capacity for independent innovation in China, and the technological advances needed to support the transport industry come too slowly. Although there is an increasingly great market demand, a low capacity for independent innovation and the lack of system integration form large obstacles to the creation of a high value-added scientific industry, technology market and technology outputs, badly hindering the creation of a sustainable transportation system..

References

Sustainable development taskforce of China Academy of Sciences (2001). Report on Sustainable development Strategy in China, Science press, Beijing.
 China Transportation Association, China Transportation Statistic Yearbook, Beijing
 China 21st Century Compiling Taskforce (1994), China 21st Century Protocol, China Environment Science Press.

Yang Hao, Zhao Peng (2000), Sustainable Development of Transportation, China railway Press
 Wang Qingyun (2004), Transportation Development Conception, China Science and Technology Press
 Word Bank (2003), Sustainable Development of Transportation, China Architecture Industry Press.
 State Development and Reform Committee (2003), China Action Program of Sustainable Development in the Early Stage of 21st Century. China Xinhua news net.
 Task Force on Sustainable Transportation, China Council for International Cooperation on Environment and Development, China Academy of Transportation Sciences & Ministry of Communication, P.R. China (2005) Sustainable Transportation Development in China: policy Recommendation Draft.
 Task Force on Sustainable Transportation, China Council for International Cooperation on Environment and Development, China Academy of Transportation Sciences & Ministry of Communication, P.R. China

(2005) TOWARD A SUSTAINABLE FUTURE:
Strategy for Comprehensive Transportation
Development in China.

Task Force on Sustainable Transportation,
China Council for International Cooperation
on Environment and Development, China
Academy of Transportation Sciences
& Ministry of Communication, P.R. China

(2005) TOWARD A SUSTAINABLE FUTURE:
Urban Transportation Development in
China.

Task Force on Sustainable Transportation,
China Council for International Cooperation
on Environment and Development, China
Academy of Transportation Sciences
& Ministry of Communication, P.R. China

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Institutional Structure Reform for
Transportation Management in China.

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