Fit for Future Demands?

Impact, development and outlook of China’s logistics infrastructure

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Shipping goods and raw materials in supply chains within the requisite quality from suppliers to customers is a basic necessity for successful sourcing and procurement. China has become a "Global Workshop" of huge scope and need to provide well-developed infrastructure and logistics centres which enable the success management of supply chain undertakings. This article provides an overview of the common infrastructure and illustrates how they continue to be developed, as well as detailing what further investments are being made. Based on demands for logistics, we show how China has sought to satisfy these requirements by increasing available infrastructure over the last 15 years. Finally, we give a brief insight into the satisfaction of infrastructure based on a survey with European production companies in China.

Backbone for Business

Logistics services and activities are the backbone of China's business. Logistics in general is defined as the process of planning, implementing, and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customer requirements. During the last decade the Chinese economy has grown steadily with an annual growth rate and the logistics activities have grown even a bit faster [see Fig. 1]. Since 1995 the worth of logistics activities in China has tripled (+ 162%). Since 1991 the total value of logistics services and activities...
in mainland China has multiplied six times - to 3.8 trillion RMB in 2006 (about 540 billion CHF).

![Graph of Wachstum des BIP und Logistikwesens](image)

**Fig. 1 Growth rate of logistics services and activities compared with China’s GDP**

A comprehensive development of infrastructure is required to facilitate a smooth supply chain necessitated by the increasing demand for logistics services and related activities. In particular, the volume of transported goods in China (including roads, railways, ships, airports and pipelines) has more than doubled from 9.9 billion tons in 1991 to 21 billion tons in 2006. This fact highlights the necessity of increasing the development of infrastructure which connects industrial areas with congested urban areas and major seaports for export.

**A Look Back in the Last Decade**

![Map of China's main roads infrastructure](image)

**Fig. 2a China’s main roads infrastructure**

Roads remain the most important means of transporting goods and China has more than 3.5 million kilometres of road. In 2006 highways concentrated in central and eastern China accounted for more than 45,000 kilometres [see Fig. 2a]. Railways extend for 77,000 kilometres, but only 25,000 kilometres of
double-tracked and only 23,000 km of electrified rail exists thus far [see Fig. 2b]. Without double tracks, transportation by train takes longer than transportation by road.

The development of road and railway infrastructure has been quite different. Road length has grown by more than 50 per cent since 1998 despite the fact that the demand for goods being transported by road has only increased by 40 per cent. While the construction and maintenance of highways is a key factor for improving infrastructure and trucks are a very flexible way of transporting goods from one place to another, they do have a significant impact on highway abrasion. Railways, however, have only grown by 14 per cent during the last eight years although the demand for transport of goods by rail has increased by more than 70 per cent since 1998. In comparison to rail tracks, roads are easier to construct and private investment in roads is probably one of the reasons for this different development of infrastructure.

Although China has 5,800 rivers navigable for in total 123,300 kilometres (including 15 rivers over 1,000 km long) China’s major inland waterway system comprises only four rivers and one canal by the end of 2005. They are the Beijing-Hangzhou Grand Canal, the Qinhuai River (both North – South), the Yangtze River, the Xijiang River as well as the Souchua River (all West – East), which carry 80% of total waterway traffic - about 2.5 billion ton kilometres each year. Regarding the fact that only the Yangtze River, which is the largest inland waterway with 4,000 kilometres navigable, is suitable for large ships, inland waterway transportation is not as important as in other countries (for example in Europe). Since the construction of the Three Gorges Dam, however, it is possible to transport goods by ship as far as Chongqing. As a result, ten more logistics centres are being planned along the river, in addition to the seven already working. Chongqing will become a very important logistics’ hub with major facilities thereby optimising logistics in central China.

International seaports are significant indicators of globalisation’s impact on the development of China’s infrastructure. Mainland China has ten main international seaports along its 18,000 kilometres coastal line and more than ten smaller seaports. Excluding the SAR (Hong Kong), the total turnover of containers was more than 100 million TEU in 2007 and more than 6.5 billion tons of cargo. Shanghai’s Yangshan seaport has opened in 2005 and in 2007 Shanghai already became the second biggest port in the world (26 Million TEU) behind Singapore (28 Million TEU). Besides Hong Kong (24 Million TEU in 2007), Shanghai is China’s most important seaport and is responsible for the turnover of the majority of international imports and exports. Container turnover during the last 15 years indicates that China’s importance as a centre of production for the world is undeniable. Compared to 1991, where the total turnover at China’s seaports stood at about two million TEU. Goods handled at China's seaports, measured in tons, increased four times during the last 15 years.

While air freight becomes more and more important, the aviation facilities will also expand rapidly. Especially the increase in air passenger traffic has been dramatic: from 7m passengers in 1985 to over 185m in 2007. Therefore, the government has planned to add another 97 airports by 2020 to the 142 China had at the end of 2006. This should also entail a rise in air freight.

Driven by Private Spending

Since 1991 the investment in infrastructure is raising [see Fig. 3]. Especially investments in roads have been raised extremely since 1997: this is mainly based on investments of industrial companies and foreign funds. For example, in 2006 about 50% of the invested money has been spent by industrial credit and 5% by foreign funds investment. The rest has been invested by central government and local authorities.

Tolls are required to refinance the investments on highways. Therefore, the private investments become profitable. Total investments in roads have been about 627 billion RMB (about 89 billion CHF) in 2006, which is 12% more than in 2005.

On the other hand, the investments in state-owned rail tracks have been 207 billion RMB (about 29.4 billion CHF) in 2006; it has been raised by more than 50%. Up to 2010 the government will invest even more than 1.4 trillion RMB (about 200 billion CHF) in new rail tracks and trains. This emphasizes the efforts of the Chinese government to boost the railway transportation, especially since environmental protection and Carbon dioxide reduction becomes more and more important.

Investments in seaports have also been extended during the last years up to 105 billion RMB (about 15 billion CHF) in 2006. The investors in seaports are solely the central as well as local governments.

Investments in airports have been 50 billion RMB (about 7.1 billion CHF) in 2006. Most of it took place for airports in Central China. Therefore, more than 100 cities have got a
modern airport. Besides these infrastructure projects in less developed parts of the country, in Shanghai and Beijing the airport investment is also still rising. New terminals for handling the passenger traffic in Beijing and Shanghai (Pudong) opened in March 2008 and the air freight infrastructure have been extended by private investments. For example, DHL will open a big Hub at Shanghai Pudong-airport up to 2010, where all the Express parcels for the North-East Asia area will be handled.

A European Perspective

Thanks to the major investments in infrastructure, the quality of infrastructure is already fulfilling the requirements of European enterprise in the eastern part of the country. In its latest survey, the German Chamber of Commerce in Shanghai asked more than 300 companies about the satisfaction of infrastructure in China. More than 67% are very satisfied or satisfied with infrastructure and only 6% think that logistics and its infrastructure is still a major problem in China. For the future the survey participants expect a rising quality of infrastructure, while only 4% are expecting a worsening.

![Very Unsatisfied to Very Satisfied](image)

**Fig. 4** Satisfaction with China’s logistics infrastructure and logistics services

The high degree of satisfaction is also reflected in the satisfaction with costs for logistics and transportation services (68% are satisfied or very satisfied) and only 25% are not satisfied. In this case the further expectation is not as positive. Therefore, one third of the survey participants anticipate raising costs for logistics and transportation services during the next three years. 39% are expecting costs on the same level, while 19% even expect a decrease.

The high degree of satisfaction may depend on the location of European enterprises in China. None of the companies that have answered the questionnaire have their headquarters in western China and only few have production activities there. This is confirmed by the structure of GIC members; the companies are concentrated in Eastern China (around the Shanghai area), Northern China (including Beijing and Tianjin) and Southern China. Therefore, we can just assume – not definitely confirm – that there are differences in satisfaction to the western parts of the country. Merely for Northern China the results are not as good as Eastern and Southern China. In Central China the dissatisfaction is a little bit higher.

**Investments in Different Regions of China**

At last there seem to be big differences between investments in Eastern and Western China. While the coastal area's (Eastern and Southern China) traffic carriers are already well developed, the rural part of Western China still lacks modern logistics infrastructure, e.g. highways, rail tracks and airports.

As mentioned before, there is a close relation between infrastructure and economy development – economic growth is only possible if the infrastructure is able to fulfill the economy's requirements. To boost the industry settlement in the Western parts of China, the central government has decided to raise the investment in infrastructure. Therefore, the part of investments in rural areas (measured by total investments in infrastructure) has been raised by 5% up to 27.4% during the last six years with the aim to achieve better conditions for companies. For example, more than 150 billion RMB (about 21.3 billion CHF) has been invested in expansion of the roads network.

With better infrastructure and lower labor costs in the Western China area production companies could significantly minimize costs and delivery times. Furthermore, there are some concepts to directly connect the western parts of China with Europe. For example at the end of 2007 the first cargo train has left Beijing for an 18-days trip to Berlin (Germany), to test the cooperation between 5 national rail operators. Another trial is organized by a Chinese businessman, who is going to set up an airlift service from Urumqi (city in western China) to Parchim in Mecklenburg-Vorpommern (Northern Germany). Connecting these airports will reduce the flight distance from China to Germany by 50%.

![Share of Investments in different Regions](image)

**Fig. 5 – Logistics infrastructure investments in different regions of China**

Nevertheless, the most infrastructure investments are still taking place in Eastern China (45.7%, minus 3% compared with 2001) and Central China (26.9%, minus 2% compared with 2001). The development of the infrastructure in rural areas
seems to have a positive influence on local industry, but up to now only few international companies dare to move to western China outside the developed areas.

Conclusion and Outlook

To conclude, facts confirm that China has seen an impressive development of infrastructure in the last 15 years. Further development is still necessary to satisfy increasing logistics requirements, especially those connecting major logistics centres in the eastern part of the country. While road and seaport capacity is already well established, parallel development in railways is still lacking. Due to this fact, roads undoubtedly remain the most important carrier in China. The launch of more logistics centres in central and western China will further optimise handling goods by combining different carriers. In addition, once this infrastructure has been developed, it will become increasingly attractive for companies to move their manufacturing there. Companies will not only avoid high wages associated with the eastern provinces, but also have reliable transport for their customers.

We finally conclude: China’s logistics infrastructure is on a long but good way to become “fit for future demands”!

1. Pipelines are used solely for the transport of goods like oil or raw materials in the chemistry industry which is not being considered here.
2. Since 2006 the small roads are also included in annual statistics report, that is why the number is not comparable to previous years.
3. TEU - Twenty-foot Equivalent Unit: containers of a standardized size (6.1 metres long by 2.6 metres high by 2.44 metres wide).

References


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