The Railways of the People’s Republic of China: An Agenda for Action

Asian Development Bank
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Acknowledgment

This report was prepared by Manmohan Parkash, Senior Transport Specialist, Asian Development Bank (ADB). Mr. Parkash has been closely associated with the railway development in the People’s Republic of China (PRC) and has led task teams to identify, prepare and appraise large and prestigious railway projects in the PRC. He has led numerous studies on policy reforms in the railway sector and is deeply involved with the reforms, restructuring and institutional development of the railways in the PRC.

This paper draws upon the findings of the technical assistance supports provided to Ministry of Railways (MOR) and numerous discussions on related policy and reform issues with stakeholders including MOR officials, logistics operators, research institutes and other development partners.

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Foreword

People’s Republic of China (PRC) railways has played a very important role in developing the national economy and in the country’s industrial revolution. However, with increasing market access and growing competition from other modes, PRC railways faces competitive challenges in marketing and customer relations, pricing and tariffs, servicing public service obligations, increasing transportation capacity, furthering reforms and restructuring and mobilizing financing.

This paper is an analysis of strengths, weaknesses, opportunities, and threats of the PRC railways over the next 10–15 year perspective. The paper makes ten key recommendations that can be considered by PRC railways for implementation.

We hope that this paper will generate interest among numerous stakeholders and provide a better understanding of the key issues. We also hope that transport planners, transport operators, policy makers, development partners, the private sector, and decision makers will find it useful and relevant.

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Acronyms and Abbreviations

MLRNP – Mid- and Long-Term Railway Network Plan
MOR – Ministry of Railways
NDRC – National Development and Reform Commission
PRC – People’s Republic of China
US – United States
WTO – World Trade Organization
Executive Summary

This paper is a detailed analysis of the strengths, weaknesses, opportunities, and threats of the People’s Republic of China (PRC) railways. Railroads are facing growing competition for long-distance passenger and freight traffic; the current sellers’ market will become a buyers’ market in the near future. PRC railways must become business- and customer-oriented and adopt a strong market orientation that vigorously seeks to attract multimodal traffic. It must also obtain sustainable financing for the sector to grow while it is transforming to compete in the transport market.

Additional capacity has to be created rapidly on the main trunk routes to overcome limitations and to facilitate economic development. In 2003, the Ministry of Railways (MOR), which controls PRC railways, prepared the Mid- and Long-term Railway Network Plan (MLRNP) to identify investment needs through 2020. The sheer scale of the MLRNP and the rail sector’s ability to service loans and investments require diversifying sources of external financing. To do so, MOR will have to separate its regulatory functions from its administrative functions, allow greater tariff flexibility, and create a more investor-friendly environment. High priority is given to physically expanding the system, but to make the process sustainable, structural changes are also required; this is widely known in MOR.

There are several international examples of good practices and approaches to separating railway executive functions from ministry functions; yet no single example may suit the PRC entirely. Establishing new institutions while sustaining ongoing operations is a complex process that should be addressed by a working unit whose members are not responsible for the day-to-day functions of the railway.

Additional recommendations for PRC railways are the following:

- Compensate PRC railways for the noncommercial public service obligations the Government requires it to undertake.
- Enhance freight-carrying capacity by eliminating carload operations, concentrate on point-to-point trains, and reduce speed differentials.
- Study optimal maximum axle loads, train speeds, train lengths, stacking containers, and freight car design to formulate standards and configurations that will reduce freight traffic cost effectively over the next 30 years.
- Establish both marketing and managing customer relations as core enterprise functions for freight and passenger services.
- Delegate pricing to appropriate staff in a framework of enterprise norms as a marketing tool to encourage loads in empty directions and to garner additional traffic.
- Establish a quality assurance system for passenger services.
- Vigorously pursue rejuvenating branchlines with private sector participation to enhance mainline traffic and profitability and to establish branch-line operators.
- Finance rolling stock replacement and purchases with private sector participation; encourage shippers to buy rolling stock and leasing companies to operate in the People’s Republic of China.
- Diversify funding sources and provide risk analyses to reduce risks in large investment projects.
Introduction

At the end of 2006, the national transportation system of the People’s Republic of China (PRC) comprised the following:

- A 77,000 kilometer (km) railway network of which 63,400 km of national railways and 13,600 km of joint venture and local railways; the network is 34% double track, 54% continuously welded track, and 32% electrified with 40.4% automatic block signaling; it is state-owned with some joint ventures hauling long-distance passengers and bulk goods (like coal) and is planned to expand to 100,000 km by 2020;
- A 2.29 million km public road network comprising 45,300 km of newly built, mostly toll expressways with various service providers that is planned to expand to 50–55,000 km by 2010;
- Extensive inland waterway transport and coastal shipping generally carrying low-value or nonperishable cargo mostly run by the private sector;
- State-owned ports that are becoming increasingly efficient and successfully competing for traffic; and
- 142 airports and 25 airlines (4 major companies, one of which is a joint venture) with 998 passenger and 46 freight aircraft that will increase to 4,000 by 2020.

A significant feature of the transport sector is that different modes function under different ministries. The National Development and Reform Commission (NDRC) is the main coordinating entity that either regulates prices (for railways) or issues guidelines (for passenger transport by road) that other entities follow. Many functions related to regulating seaports, inland water transport, and roads have been devolved to provincial governments. These authorities also regulate the pricing of joint ventures for local railways.

It has been clear for some years that additional capacity has to be created rapidly on the main trunk routes to overcome limitations and to enhance economic development.

At the macro level, the policy framework for the railway sector is influenced by NDRC’s China’s Key Reforms in Seven Fields in 2004 and Logistics Development Strategy 2001–2010, the commitments under the World Trade Organization (WTO) accession and the western development strategy. It has been clear for some years that additional capacity has to be created rapidly on the main trunk routes to overcome limitations and to enhance economic development. In 2003, MOR prepared the Mid- and Long-Term Railway Network Plan (MLRNP) to identify these investment needs through 2020. As part of the MLRNP, by 2020 the total operational length of PRC railways is expected to increase by one third to 100,000 km with separate high-speed dedicated passenger lines and freight routes on the main corridors and 50% of the network either double-tracked or electrified or both. The plan also includes high-capacity coal transport corridors, developing container transport, and schemes for strengthening the network in the west.
Reforms in MOR have played a primary role in sustaining the railway and making it efficient and profitable, and are as important as adding modern infrastructure and equipment.
In the growing PRC economy, there is ample room for expanding all transport modes. But since 1990, the mode that has gained the most is inland water transport (coastal shipping, rivers, and canals). Rail, however, still carries the most freight traffic in the country (about 50%), and its growth rate has accelerated in the past 5 years. Compared with road transport, the average length of haul of rail freight traffic in 2006 was 762 km while road hauls averaged shorter distances (67 km). In passenger transport, on the other hand, highways have overtaken railways over the past 26 years, growing at an annual rate of 10.7% compared to 6.1% for rail, though railways have retained their market share at about 35% for the past 6 years. This is because of massive investments in road infrastructure and of growth in disposable incomes. Again, rail passenger traffic is clearly oriented to medium- and long-distance travel (527 km) while highways serve short-distance demand (54 km).

Since 1978 when reforms started in the PRC and more so since 1990, the size and quality of railway infrastructure have greatly improved. Modern rolling stock and equipment have been introduced to cater to a market demand that is still growing and to create carrying capacity in a network that was already the busiest and most intensively used in the world. The railway industry has been transformed to face the challenges of a market economy. Such transformation includes a continuous restructuring of the organization and its working methods and the introduction of some of the most modern processes and techniques available adapted to best suit the situation in the PRC. Reforms in MOR have played a primary role in sustaining the railway and making it efficient and profitable, and are as important as adding modern infrastructure and equipment. These reforms have been carried out methodically using pilot projects and deciding what to absorb from experiences elsewhere.

Nevertheless, additional changes and reforms are needed to give the railways a business and customer orientation and to obtain sustainable financing for the sector to grow while it is transforming to compete in the market. The amount of private sector participation in financing so far, even including the large amounts raised in the stock market, is still in single digits and is a fraction of total investment in the sector. The funds required are so large, however, that government participation as the major provider will have to continue. According to the Eleventh Five-Year Plan (2006–2010), 300 billion yuan (CNY) are needed for railway investment every year. The estimated investments for implementing the MLRNP are CNY2 trillion.

There is also the question of MOR’s continued ability to service its debt if the only sources of funds are those that it has used in the past. The sheer scale of the MLRNP and the rail sector’s ability to service loans and investments require diversifying sources of external financing instead of relying on the current pattern of raising funds from provincial governments, state-owned enterprises, banks, insurance and pension funds, and the private sector. To attract more financing, MOR will have to separate its regulatory functions from its administrative functions, allow greater tariff flexibility, and create a more investor-friendly environment. The existing railway structure discourages market-based financing—both with long-term capital and private sector participation. Investing long-term capital in an agency of the Government with enterprise functions would require sovereign guarantees while the private sector could consider the multiple roles of MOR a detriment.

To attract more financing, MOR will have to separate its regulatory functions from its administrative functions, allow greater tariff flexibility, and create a more investor-friendly environment.

A further reason for railway reform is that the Government has committed the country to fully opening rail freight transport to foreign firms under the WTO accession arrangements that took effect in December 2007.

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2 Ibid.
The provision of low-cost, long-distance transport services for the movement of passengers and goods should be the railway’s main contribution to the country’s economic development. If the railways did not exist, costlier services would have to be substituted; this would result in higher costs of goods and services. Furthermore, railways are more energy efficient than all other transport modes, except inland water transport, particularly for carrying freight where they are at least six times more energy efficient than road transport. Rail transport is also the most energy efficient for carrying passengers if occupation rates are high.

The primary strengths of the railway sector in the PRC are the following:

- technical efficiency;
- modern track and other infrastructure;
- good quality rolling stock;
- appropriate maintenance facilities;
- operating efficiency in point-to-point and heavy haul traffic;
- excellent equipment utilization;
- a disciplined and skilled workforce that actively supports management when new techniques, work practices, and efficiency measures are introduced;
- project management skills for developing and building quality infrastructure rapidly, on time, and within budgets; and
- skill in choosing and adapting complex and advanced reforms.

In addition, safety standards at PRC railways are high. They are well structured, reasonably independent, and effective, and can be readily adapted to any industry structure in the country. Infrastructure and rolling stock are well maintained, and the system appears to be particularly good at ensuring that safety consciousness is a standard part of daily work routines.

PRC railways has found a way to mitigate the social impact of change which is one of the main reasons it has been able to move forward on several reforms simultaneously and continuously for more than two decades. Organizing joint ventures, local railways, and diversified companies helped redeploy a substantial number of excess staff.
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Weaknesses

As in other developing countries, state ownership of railways in the PRC results in using them for public service obligations and in undertaking new construction and transportation on routes that are unlikely to generate sufficient traffic to be commercially viable in the foreseeable future. In this way PRC railways acts as an agent of government economic policies that seek equitable development throughout the country. One study estimated PRC railways’ public service losses in 2001 to be CNY10 billion, excluding transport provided for disaster relief and for defense personnel. The main components of this were CNY6 billion on reduced tariffs for agricultural products, 1.3 billion for new lines, 1 billion for student concessions, and 0.9 billion for losses on branchlines. 

The current policy framework does not encourage PRC railways to proactively determine market pricing. Only local railways can establish their own rates under NDRC guidelines and with approval from local governments. This is not the case for road freight services and many passenger services. It is a long-term weakness in the sector, particularly in areas and traffic groups that face competition from other transport modes. The inability of PRC railways to raise or vary tariffs easily as other modes can is a serious constraint to establishing meaningful passenger and freight marketing, to managing customer relations, to making its presence felt in logistics services, and to developing new products in a competitive transport environment. It prevents optimizing internal surpluses for investment and in turn inhibits raising private sector participation to higher levels through enhanced revenue streams. Because of the rigid framework of tariff approval and lack of pricing power, PRC railways give costing a low priority in its activities. Without costing and pricing, operating in a competitive market such as that for container transportation is not possible.

PRC railways have limitations on freight carrying capacity on major corridors because passenger trains that travel at different speeds reduce the number of potential train paths. Furthermore, priority is given to certain freight traffic such as coal for power plants and industries. This limits the ability of PRC railways to respond to demand for transportation from the growing market economy. The sector has thus become insular and production driven instead of being customer and business oriented. PRC railways have, up to this time, operated in a segmented sellers’ market in passenger and freight traffic and have with few exceptions not worked or had to work in cooperation with other transport modes. For these reasons, marketing and managing customer relations are not well developed at PRC railways even though the enterprise has the necessary information technology.

The sector has thus become insular and production driven instead of being customer and business oriented.

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Major effort is required to give prominence to containers as the main mechanism for making railways third- and fourth-party logistics providers and to improve trainload operations for both external and internal trade. Currently, the China Railways Container Transport Company, formed in 2003, has this function. The creation of a network of 18 major and 40 minor inland container depots connected by routes with regular service operated by a subsidiary with a minority MOR equity stake has begun and will almost certainly be established efficiently. However, though the container company is technically independent, it does not directly receive or control its own revenue and cash flow. It will need to be provided considerable leeway by MOR to achieve its primary objective of making the railway presence felt in the logistics sector.

Reducing average freight car turnaround, which was 4.87 days in 2006, is greatly emphasized. Since average wagon movement time is already only 39 hours for 873 km average hauls, emphasis on reducing average freight car turnaround through higher speeds may not be an optimal strategy as it does not significantly reduce total transit time for customers for whom reliability and advance arrival information are more important. Furthermore, freight trains operating at optimal speed for energy consumption ought to be an important cost consideration.

The PRC has reached a stage where saturation on critical sections of major and intensively used routes is hampering the movement of both passengers and freight. Thus, creating new corridors is seen as the primary solution to the problem. In the case of passenger traffic, the majority of passengers are hard-seat and hard-sleeper travelers. These passengers are mostly carried below average cost, which is a business weakness. PRC railways’ infrastructure and equipment standards limit freight carrying capacity. A policy of raising axle loads and train lengths for freight has not yet been formulated though PRC railways plan to lengthen routes capable of carrying double-stack container trains to 16,460 km by 2020 (presently only the 1,460 km of the Shanghai–Beijing route is so configured).

Other weaknesses include the following.

- The enhanced traffic and increased profits that could result from operating branchlines under a framework different from the mainline are not being realized.
- There is reluctance in disseminating statistics, particularly business statistics, and commodity and revenue statistics.
- PRC railways own most of their rolling stock, which involves considerable annual capital outlays by MOR for renewals and new stock; leasing and private ownership of rolling stock should have high priority.

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7 Ibid.
8 Rolling stock renewal has averaged $2 billion a year in the past 3 years based on MOR financial statements.
Weaknesses
Opportunities and Threats

Opportunities

Opportunities are considered in a 10–15 year perspective. Demographically, the PRC is already relatively urbanized as 500 million people live in 690 cities; of these, 40 have populations greater than 1 million. The three metropolitan areas of the Pearl River Delta, the Lower Yangtze River Delta, and Beijing–Tianjin–Tangshan contribute about 40% of national gross domestic product though they have only 1% of the national land area. The populations of the 10 largest cities grew at an annual rate of 7.2% from 2000 to 2005. Their populations will double in the next 10 years if this growth rate continues. Thus, economic growth will be concentrated in urban agglomerations stretching from north to south along the eastern part of the country while the less urban western region will continue to have relatively lower rates of development. This prospect is addressed by the western development strategy with its incentives for locating industries in the west.

There are important growth opportunities for rail in this framework when the PRC’s growing integration with the world economy and the increase in third- and fourth-party logistical activities in the country are considered. Even if the economies of the wealthier parts of the PRC start shifting to services, the country will continue to seek better economic prospects for its less-developed and poorer areas through export-led growth in manufacturing, particularly because this methodology has worked extremely well in the past 25 years.

In the constant search for cheaper products and lower prices, higher wage levels will probably gradually shift some manufacturing bases in the east of the country to interior areas where wages are lower. Transport and logistics costs and capabilities will determine where these manufacturing bases are established, and the efficiency of the rail sector in responding to this demand will decide whether rail will play a major role in the future. Wage levels and the cost of factory space are already causing a shift inland from coastal areas, though currently this is more to the north.

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10 Based on data collected from statistical year books of the relevant provinces.
11 The PRC doubled its share of global manufacturing production to almost 7% in the decade to 2003 while other Asian countries collectively increased their share from less than 7% to more than 9% in that period (The Economist, 11 Jan 2007). This dominant position of the PRC will unlikely deteriorate rapidly.
There are important growth opportunities for rail in this framework when the PRC’s growing integration with the world economy and the increase in third- and fourth-party logistical activities in the country are considered.
A pattern that could emerge for medium- and long-distance passenger traffic is the need for high-speed services linking major cities. With increasing per capita incomes, dedicated passenger lines could provide serious competition in high-yield markets that are currently dominated by airlines at one end of the spectrum and road services at the other.

The growing concern on environmental degradation in the PRC could be an opportunity for rail to exploit its inherently superior energy consumption and environmental characteristics to attract both freight and passenger traffic. Electric and diesel railways are environmentally superior to other modes of transport, and electric lines will eventually allow for the intensive use of renewable energy sources instead of coal.

**Threats**

Additional capacity will not automatically bring new traffic. Customers, not production targets, have to become the centerpiece of business development. This change not only implies competition with other transport modes but also cooperation with them and the development of innovative products. A major danger for railway traffic is that road transport providers are usually much quicker to see opportunities in the market and to establish themselves with customers. Weaning satisfied customers away from an efficient transport supplier is difficult if they have a standing relationship and if transport costs are not the major issue in the customer’s supply chain.

Another related threat is that the expressway system in the eastern part of the PRC will be mostly complete by 2009, providing an opportunity for competition in rail’s traditional long-distance markets. Road freight transport prices could drop quite rapidly even if load limits are enforced because of improved vehicle types and better return loads. A change in passenger transport regulations emphasizing quality could result in higher vehicle use and competition among large bus operators that would result in lower tariffs and greater comfort for passengers.

If the regulation of rail tariffs is not eased, railways will find it difficult or impossible to utilize marketing tools to maintain and enhance traffic levels. Similarly the problem of public service obligations has to be resolved so the railways can work in a sellers’ market efficiently. If this does not happen, the dedicated passenger lines could attract all paying traffic, leaving PRC railways to cater for shorter distance, low-tariff passengers.
1. The Government should compensate PRC railways for the noncommercial public service obligations that they are required to undertake.

Current best practices are found in Europe where a series of European Union initiatives and directives have sought to rationalize and restrict the use of railways by governments to provide subsidized transport without compensation. That the Government should provide essential services for economic development and poverty reduction is not disputed; however, using the railways without compensation is inefficient and greatly hampers the activities of PRC railways as an enterprise and will constrain future development when a competitive market develops. A detailed study should be conducted and a methodology agreed for establishing annual compensation contractually (Box 1).

Box 1: Best Practices in Financing Public Service Obligations

Over the past two decades, governments of the European community have agreed on systems whereby they are required to establish compensation contracts with their railway enterprises. These contracts increase transparency in rail accounts; pay the full cost of rail services for passengers, regional development, and defense; and progressively eliminate cross-subsidies that cause deficits and threaten profitable rail markets. European governments have also separated accounts and rail activities by line of business.

Marketing needs to start changing now even before the paradigm shifts from the current sellers’ market because it requires time to develop the skills necessary to compete and cooperate with other transport modes in the markets of the future.
2. PRC railways should have the flexibility to set tariffs to allow it to operate in a competitive market.

Perceived market domination by railways can lead to regulation which, if accompanied with unviable tariffs, could lead to serious problems. Ensuring uniform approaches to competing transport modes is a problem even in the market-oriented developed world, and it can take a crisis to trigger changes in regulatory practices (Box 2). A major regulatory concern appears to be that higher rail freight rates might translate into increases in the cost of electricity and other products that use raw materials transported by rail; however, dealing with exceptions would be preferable to across-the-board regulation. There is also the question of whether competing transport modes are evenly taxed to recover the costs of inputs from governments or whether their beneficial economic and environmental impacts are considered.

3. Enhance freight carrying capacity by eliminating carload operations, concentrate on point-to-point trains, and reduce speed differentials.

Although the railway sector in the PRC is highly efficient, it is unable to meet traffic demands. There are four broad strategies for realizing substantial additional line capacity on heavy and congested routes: constructing additional corridors, automatic signaling, increasing the trailing load and axle load, and eliminating speed differentials.

At PRC railways, the policy is to create dedicated passenger lines as additional corridors. This would have the impact of reducing speed differentials and releasing paths for use by additional freight trains. Line capacity would be substantially augmented if all trains ran at the same speed, and freight train sets capable of running at 120 km per hour have already been introduced. For the present, PRC railways should examine the twin issues of eliminating speed differentials and migrating to end-to-end unit train operations with consolidation and container services at terminals as strategies for overcoming capacity constraints and moving toward enhanced profitability.

The carload and less-than-carload operations that currently represent 50% of all freight business are the main constraint for improving capacity and profitability for freight traffic. The railway should focus on its core skills of long-distance, point-to-point transportation. Each congested section should be studied to establish a plan for point-to-point routes, and two routes should be selected for a pilot project.

For the present, PRC railways should examine the twin issues of eliminating speed differentials and migrating to end-to-end unit train operations with consolidation and container services at terminals as strategies for overcoming capacity constraints and moving toward enhanced profitability.
PRC railways should encourage shippers to aggregate their shipments. That approach reduces the amount of switching in freight yards, a process that can lead to delays, routing errors, and damage. Carload customers could be retained by outsourcing consolidation of traffic at terminals into trainloads (PRC railways as wholesaler and consolidators as retailers) and encouraging containerization of domestic traffic.

The benefits of running unit trains are well recognized worldwide. In the context of PRC railways, running unit trains will free up line capacity that is currently constrained by handling carload traffic. Since the private sector or diversified companies currently handle carload traffic, only the consolidation methodology has to change, not the principle of outside participation in the process. If PRC railways start now on this path of rationalization and emphasis on its core competencies, it will be able to produce even higher efficiency levels and profits as railways in other countries have (Box 3).

Conceptualizing the creation of new freight products in the present working environment may be difficult, but this will be essential to cater to the paradigm shift to a buyer’s market, particularly as carrying capacity increases.

With effective consolidation and containerization accompanying this change of operations, there is no need to lose out on high-yielding traffic. Some low volumes may still migrate to other transport modes, but the benefits of unit train operations will far outweigh the loss of revenue from a small percentage of traffic. The capacity created will probably allow PRC railways to attract containerized goods even before dedicated passenger lines are established and to increase freight capacity on core heavy-traffic corridors.

Conceptualizing the creation of new freight products in the present working environment may be difficult, but this will be essential to cater to the paradigm shift to a buyer’s market, particularly as carrying capacity increases. Products emphasizing timely delivery and innovative combinations of multimodal transport services will gain market share in the future and will develop brand equity for freight services. North American railroads are leaders in developing a variety of new products to suit market demands. US class I railroads have developed inter-modal deliveries with money-back guarantees if promises are not met. Canadian Pacific has created complete supply chains with inter-modal connections from port to warehouse.

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**Box 3: The Experience of Indian Railways**

In the 1970s, Indian Railways was in the throes of a crisis. Revenue traffic was stagnating and core industries were suffering. It was unable to meet demands for freight movement, and this affected the growth of the national economy. A decision was made to do away with carload freight and to concentrate on end-to-end unit trainloads. The wagon fleet was converted into trainload sets using stock of similar types. (They still had a large two-axle freight fleet at that time.) All boxes, covered wagons, flats, bogie tanks, four-wheeler tanks, and four-wheeled covered stock were segregated and formed into units called rakes.

This change has had a continued positive impact on freight operations and on equipment utilization. Freight increased from 148 billion tons/km in 1980-81 to 440 billion tons/km in 2005-2006. While other factors were involved as well, this increased traffic was carried with a smaller fleet of 207,000 wagons in 2005-2006 compared with 401,000 in 1980-1981. Wagon turnaround time dropped from 15 days to 6 days in the 25-year period. All the marshalling yards were closed, and some were restructured into terminal yards. Excess track in yards and stations was uprooted and sold. Many wagon repair facilities were closed, and end-to-end examination of rolling stock was introduced and extended to intensive examination of up to 6,000-km runs. Some high-yielding, relatively low-volume traffic was lost, but economies of scale of operations were substantially realized.
4. Study optimal maximum axle loads, train speeds, train lengths, stacking containers, and freight car design to formulate standards and configurations that will enhance freight traffic cost effectively over the next 30 years.

The potential for increasing trailing load with longer trains is limited by loop length which is generally standardized on a railway based on main operating and equipment characteristics. Therefore, scope for improvement is either in increasing the axle load combined with improving the payload to tare ratio or in undertaking the latter by itself. Increasing axle loads has implications for investment in track and bridges. Increasing trailing loads by either increasing axle load or by increasing the load to tare ratio or both has implications for locomotive power, drawbars, and braking distances.

In the PRC, enhancing axle loads to the current 32-ton limits used in some other railways and hauling trains with 20,000 ton or 10,000 ton trailing loads with train braking controlled electronically is an option that should be explored both from the technical and financial angles for freight traffic (Box 4). An increase of 25–50% in the current 21-ton axle load could provide benefits if optimal standards for track infrastructure and freight cars are determined.

5. PRC railways should establish both marketing and managing customer relations as core enterprise functions for freight and passenger services.

Passenger traffic on PRC railways is restricted despite the operating priority it gets. Several measures are available to improve the situation:

- increase the number of passengers per train;
- invest in additional platforms, stabling lines, and maintenance facilities;
- invest in new rolling stock with higher capacity and fewer maintenance requirements;
- stagger vacations and market off-peak travel;
- revise timetables and run trains in groups;
- run longer trains and optimize equipment links;
- reduce time for safety checks with better quality assurance; and
- use information technology to optimize running trains, crew planning, and dispatching.

While no price-related strategies exist presently, these would follow from other recommendations for establishing meaningful marketing and customer relations management and liberalizing tariff setting. Marketing in PRC railways implies changes in the way the enterprise thinks, analyzes, and focuses on markets, customers, and their needs; in the way it creates new products to satisfy those needs; and in all its business activities in a buyers’ market. Marketing needs to start changing now even before the paradigm shifts from the current sellers’ market because it requires time to develop the skills necessary to compete and cooperate with other transport modes in the markets of the future. Passenger traffic on PRC railways is restricted despite the operating priority it gets. Several measures are available to improve the situation:

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Box 5: Electronically Enabling Customers

For passenger services, European railways and the Japan East Railway Company are in the forefront of using widely available Internet access and information technology to establish user-friendly systems to enhance marketing. Innovative products have been developed for specific market categories. Some railways in developing countries have also started using technology effectively for making reservations and disseminating departure and arrival information. Examples include the following:

- E-tickets can be purchased through the German railway system from any station to any station on any linked European railway.
- Through the National Train Enquiry System, a customer can track any passenger train on Indian Railways from anywhere in the world. Speech recognition software built into an interactive voice response system enables telephone enquiries to elicit information about the entire range of products and services. The computerized passenger reservation system started in 1985 was enhanced in the past 5 years. It now handles more than 1 million transactions every day through 4,000 terminals at 1,200 different locations. A country-wide computerized reservation and ticketing system enables passengers to print reserved e-tickets on any train from any location. There are safeguards to prevent fraud.
- Norwegian State Railways has contact-free ticketing across the nation’s public railway system. The introduction of radio frequency identification in tickets and ticket machines has improved customer service by giving them more control over how they use transportation services.
- The East Japan Railway Company has Bluetooth-enabled equipment for self-service ticketing and for train conductors.

For freight services, the Norfolk Southern Railroad in the US has installed customer relation systems with assistance from IBM using an Oracle (Siebel) platform. The French state-owned railway company SNCF is building on its success in using computerized customer relations based on a Siebel 7.7 application and has engaged Accenture to develop a server solution based on Microsoft 2003 and Microsoft SQL 2000 for performance, scalability, and reliability.

Agenda for Action: 10 Key Recommendations

Managing customer relations is linked to marketing and must be developed simultaneously

For freight services, the Norfolk Southern Railroad in the US has installed customer relation systems with assistance from IBM using an Oracle (Siebel) platform. The French state-owned railway company SNCF is building on its success in using computerized customer relations based on a Siebel 7.7 application and has engaged Accenture to develop a server solution based on Microsoft 2003 and Microsoft SQL 2000 for performance, scalability, and reliability.
The concept of marketing is fairly new at PRC railways since marketing divisions for freight and passenger services were established only in 1998. In the transportation department of MOR, 16 positions are related to marketing freight and passenger services; most activities take place in railway bureaus or stations, especially at major stations. The current focus is on planning, and the marketing staff are frequently involved in activities that are not related to marketing. Marketing surveys should be institutionalized. Skills in pricing are lacking, and pricing systems need to be established.

If the concept of a sellers’ market remains ingrained, very little marketing will be possible. If it changes, there is scope for carrying additional freight traffic through backhauls and for evolving new services and markets based on containerization and train consolidation. Similarly in passenger traffic, yield management techniques can help improve train occupation rates in off-peak periods by developing new products, mainly in collaboration with hotel and tourism operators (Box 6). The future of marketing is limited, however, without a strong market orientation that vigorously seeks to attract multimodal traffic.

6. Pricing should be delegated to appropriate staff in a framework of enterprise norms as a marketing tool to encourage loads in empty directions and to garner additional traffic.

Delegating flexible pricing authority within the norms of an enterprise is a normal business practice in North America and an increasingly common feature in large and small railways worldwide, both privately operated and state owned. It has recently become the norm in Indian Railways for freight traffic, and pricing flexibility with yield management is a revenue-maximizing feature of passenger services in Europe, Japan, and the US. Pricing will require sound costing and statistical databases that are widely disseminated and understood. Unofficial payments and rents can be avoided by establishing pricing variation norms and selecting, training, and monitoring pricing staff carefully.

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7. PRC railways needs to establish a quality assurance system for passenger services.

The system should have the following components:

- standards and a monitoring system;
- a system for customer feedback;
- a suitable evaluation system;
- continuous review of all direct and ancillary passenger services via the Internet including customer information on journey planning, ticketing, and station arrangements;
8. PRC railways should vigorously pursue rejuvenating branchlines with private sector participation to enhance mainline traffic and profitability and to establish branchline operators.

An important area where marketing for additional traffic would be meaningful is short and regional branch lines where traffic is local and volumes are small. The operator taking over such a branchline would base operating and maintenance practices on the scale of activities. Management would be lean, flexible, and responsive to the market. A branchline operator’s costs are clearly identified and are not burdened by average costs of mainline operators. Often, the owner, operator, and maintainer would be one entity. A line that was once financially unviable could thus be a business proposition that yields returns. This has happened on some local lines in the PRC. What is essential is that these lines are allowed to function in an enabling framework that does not hamper entrepreneurship. Combining many of them under a separate umbrella improves the situation but does not fully address it. Branchlines should be given complete independence. Branchlines operated by persons with entrepreneurial skills could start generating traffic that might be large and remunerative for the mainline railway (Box 7). In that case, operating agreements and contracts that guide and govern the interchange and interoperability of rolling stock will be needed.

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Box 7: Best Practices in Branchlines

North American practices are clearly the most advanced and have been facilitated through a legal framework that permits operating and staffing practices on branchlines that are different from those of mainline companies. A total of 25% of carloads on the US rail network originate, terminate, or both on short lines; this traffic adds 18–22% to class I railway profits. Some local railways in the People’s Republic of China could eventually assume this role.

9. Finance rolling stock replacement and purchases with private sector participation, and encourage shippers to buy rolling stock and leasing companies to operate in the PRC.

One area where the private sector can participate relatively easily is to provide rolling stock through leasing companies. This would release funds for other areas of railway investment. For example, for freight operations, US class I railroads owned only 35% of cars used in 2006, short and regional lines owned 9%, and private owners and leasing companies owned 56%. The PRC is a signatory of, but has not yet ratified, the Convention on International Interests in Mobile Equipment (Cape Town 2001). This was primarily for aircraft leasing. On 23 February 2007, the Luxembourg Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Railway Rolling Stock was opened for signature and ratification. The framework for leasing activities across borders is therefore being put in place.

10. Diversify funding sources and provide risk analyses to reduce risks in large investment projects.

Models can be developed for investment in large investment projects assisted by international commercial financing agencies to establish robust traffic forecasts and to develop risk scenarios to attract private equity participation or lending. PRC railways have outsourced a considerable number of tasks, has implemented changes in traditional work patterns, and has encouraged private sector participation in several noncore areas. Enhanced private sector participation can bring cost savings and efficiency and could simultaneously free PRC railways to concentrate on its core competencies with a greater focus on its investments. The areas in freight transport where private sector participation could be greater include the following:

- station management;
- sanitation, water, and electric supply;
- logistics;
- inter-modal operations;
- cash and pay office functions and financial transaction management;
- supply chain management;
- overhauling rolling stock; and
- track maintenance or rehabilitation.

In passenger transport, on-board services offer wide scope for private sector participation particularly in view of the large volume of passengers and the distances they travel. Ticketing is another activity where private sector participation is possible. These activities are not capital intensive. There are currently agencies in the PRC that arrange package tours that include railway tickets. The tourism industry has been opened to external participation as part of the country’s World Trade Organization (WTO) commitments; PRC railways can take advantage of this.
The Way Forward

DRC’s *China’s Key Reforms in Seven Fields in 2004* identified three principles to underpin reforms in the PRC railway sector: separate government administration of railways from enterprise management, introduce competition where suitable, and regulate the industry effectively.

MOR must specify the actions and timing required to implement these principles. It may be desirable to use best practices adapted to national needs. The size of the country and the conditions prevailing preclude the wholesale importation of systems and methods used elsewhere. It is better to choose selectively and continue the methodology adopted in earlier reforms using pilot projects that were then replicated on the entire railway.

There are several international examples of good practices and approaches to separating railway executive functions from ministry functions; no single example may suit the PRC entirely. Establishing new institutions while sustaining ongoing operations and developing plans is a complex process. Changes initiated in Germany in 1991 following European Union Directive 91/440 are likely to be completed only in 2008. The Russian Federation initiated a separation in 2001 to transform the national railway from a government department into a commercial organization. It took 3 years to create a federal transport agency responsible for regulating rail transport and for other tasks such as preparing legislation and licensing. Russian railways then became a joint stock company wholly owned by the Government of the Russian Federation. These changes have, however, not been completely successful because regulatory oversight has not been structured well.

MOR appears to be reluctant to go further with reforms started in 2005 possibly because undertaking changes at a time when capacity is stretched could disrupt rail services and the economy. Higher priority is therefore given to physically expanding the system. The problem is that to make the process sustainable, all available information indicates that structural changes are also required; this is widely known in MOR.\(^\text{13}\)

The NDRC directive to separate the ministry and enterprise functions will make the railway more market oriented: it is the only transport mode that is not yet fully oriented to the changed market conditions in the PRC. The principal administrators responsible for making this change, however, have important day-to-day tasks that are a very high priority for the country. It would be better to establish a working unit to undertake the necessary changes

... three principles to underpin reforms in the PRC railway sector: separate government administration of railways from enterprise management, introduce competition where suitable, and regulate the industry effectively

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and to establish all necessary enabling mechanisms. The members of the unit should have no specific responsibility for the day-to-day functions of the railway and should be answerable to various high-level stakeholders in the Government. The main activities of the unit should be to design and implement the institutional structures necessary and then gradually to transfer activities to them. The unit would operate only until the separation is complete and the sector is functioning effectively at which point it could perhaps become a regulatory body. Persons with diverse backgrounds with the appropriate skills and experience should be recruited. The unit could further support the revitalization of branchlines to attract entrepreneurial talent to railways.

Regarding competition, the railway needs to be empowered to undertake freight and passenger marketing activities to compete with other transport modes. It cannot do so with the current framework for setting tariffs. Rational decisions to determine how public service obligations should be funded in a market-oriented environment should also be made. If the railway sector is to have the leeway that all other modes have to set tariffs, it will need to be regulated appropriately. Presently, the structure and staffing to undertake these tasks do not exist in NDRC.
PRC railways need to be empowered to undertake freight and passenger marketing activities to compete with other transport modes. It cannot do so with the current framework for setting tariffs. Skills in pricing are lacking, and pricing systems need to be established. Without costing and pricing, operating in a competitive market such as that for container transportation is not possible. Similarly the problem of public service obligations has to be resolved so the railways can work in a sellers’ market efficiently. A detailed study should be conducted and a methodology agreed for establishing annual compensation contractually.

Saturation on critical sections of major and intensively used routes is hampering the movement of both passengers and freight; creating new corridors is the primary solution to the problem. A service that could emerge for medium- and long-distance passenger traffic is high-speed services linking major cities. With increasing per capita incomes, dedicated passenger lines could provide serious competition in high-yield markets that are currently dominated by airlines on one end of the spectrum and road services on the other.

Additional capacity will not, however, automatically bring new traffic. Customers, not production targets, have to become the centerpiece of business development. This change not only implies competition with other transport modes but also cooperation with them and the development of innovative products. Products emphasizing timely delivery and innovative combinations of multimodal transport services will gain market share in the future and will develop brand equity for freight services. Currently, marketing and managing customer relations are not well developed at PRC railways. This has to start changing now because developing the skills necessary to compete and cooperate with other transport modes requires times. Customer relations should make it easy for travelers to interact with the service provider. Ideally, PRC railways will devise and implement a charter on services and a customer satisfaction index. Passenger trains in the PRC are of high quality. This can be leveraged to establish brand equity and thereby attract venture capital to fund passenger services including ticketing, station management, and on-board services.

PRC railways should consider eliminating speed differentials and migrating to end-to-end unit train operations with consolidation and container services at terminals to overcome capacity constraints and enhance profitability. Running unit trains will free up line capacity that is currently constrained by handling carload traffic. An increase of 25–50% in the current 21-ton axle load could provide benefits if optimal standards for track infrastructure and freight cars are determined. Containers should be the main mechanism for making railways third- and fourth-party logistics providers and enhancing trainload operations for both external and internal trade. Rolling stock should be provided through leasing companies to release funds for other areas of railway investment.

Customers, not production targets, have to become the centerpiece of business development
PRC railways need to be empowered to undertake freight and passenger marketing activities to compete with other transport modes.
Separating the ministry and enterprise functions will make the railway more market oriented. Reforming tariff setting and allowing flexible pricing will increase profits which will, in turn, attract the outside financing that PRC railways need to compete. Without these changes, the railway sector will not be able to make the shift to a customer-oriented transport market and optimize its share of growth in the PRC's changing market conditions. A particular need is to move away from a production-targeted organization to one that is proactive and responsive to the transport demands of a country that is not only part of global supply chains but also sets their pace in several product lines.
Conclusions
Bibliography


The Railways of the People’s Republic of China: An Agenda for Action

Asian Development Bank (ADB) is assisting the development of railway sector in the People’s Republic of China since 1989, by providing lending and non-lending support. Considerable progress has been achieved since then. However, with increasing market access and growing competition from other modes, PRC railways face many challenges. This paper analyses strengths, weaknesses, opportunities, and threats of the PRC railways and makes ten key recommendations that can be considered by PRC railways to overcome these challenges.

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