Case Study

Turnaround of Indian Railways

1 July 2008
CASE STUDY

TURNAROUND

of

INDIAN RAILWAYS

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# CONTENTS

## PREFACE............................................................................................................................... II

## INTRODUCTION ............................................................................................................................... 1
- Purpose of Case Study .............................................................................................................. 1
- Scope of Work.......................................................................................................................... 2
- Case Study: Reasons and Methods...................................................................................... 3
- Hypotheses and Issues In This Case Study ........................................................................ 3

## BACKGROUND............................................................................................................................... 5
- Railway Traffic Trends ........................................................................................................... 7
- Role of Indian Railways ......................................................................................................... 9
  - Indian Railways Freight Services ....................................................................................... 10
  - Indian Railways Passenger Services ............................................................................... 14
- International Position of the Indian Railway ...................................................................... 18
- Summary ............................................................................................................................... 22

## INDIAN RAILWAYS DECLINE & RENAISSANCE........................................................................... 25
- Low Ebb: Perspectives in the Year 2001 .............................................................................. 25
- Indian Railways Financial Performance ........................................................................... 26
  - Changes in the Financial Yardstick ................................................................................. 28
- Sources of the Turnaround of Indian Railways ................................................................. 29
  - Employment and Labor Productivity ............................................................................... 29
  - Government Investment .................................................................................................. 30
  - Revenue Density of Trains .............................................................................................. 31
  - Management Structures and Change Management ....................................................... 33
  - Managing Change within Indian Railway ...................................................................... 35
- Summary ............................................................................................................................... 37

## SUSTAINING THE TURNAROUND....................................................................................................... 40
- Managing Change in the Future ........................................................................................... 42

## ACHIEVING CONTINUING SUCCESS.......................................................................................... 45

## APPENDIX............................................................................................................................... 47
- Appendix 1: CV of John H Winner ...................................................................................... 47
- Appendix 2: List of Meetings and Interviews ...................................................................... 53
- Appendix 3: SWOT Analysis ............................................................................................... 56
  - Strengths .......................................................................................................................... 56
  - Weaknesses ..................................................................................................................... 56
  - Opportunities ................................................................................................................. 57
  - Threats ............................................................................................................................ 57
PREFACE

This report has been prepared by John H Winner, President of Harral Winner Thompson Sharp Klein, Inc. (HWTSK), a consulting firm with extensive experience in railway management issues, with support from a team of highly knowledgeable specialists. Mr Winner, whose CV is attached in Appendix 1, has over 35 years’ experience in railway management, engineering, finance, and operations issues. He has worked with railway management, ministries, rail sector suppliers, investors, and rail users in over 30 countries.

This report is based on a review of the many documents covering Indian Railways from the Mohan Report to articles, reports, and reviews written by and for management schools, financing institutions, knowledgeable observers, newspapers, and internal documents prepared for Indian Railway.1 Mr Winner also conducted a series of intensive interviews and discussions with Indian Railways officers, government officials, retired officers, shippers, and other individuals familiar with the railway and its past and recent performance.2

Mr Winner’s work for this project was greatly aided by World Bank officials who arranged the meetings, supplied and analyzed many of the various reports and data, participated in many discussions, and provided background and context for the case study project. In particular, Mr Atul Agarwal, a former civil engineer at Indian Railways with specific experience with the Delhi Metro project, identified key people to interview, arranged the meetings, analyzed Indian Railways financial and production data and provided deep insights into Indian Railways culture and practices. Mr Jitendra Sondhi, a long time World Bank consultant and former mechanical engineer at Indian Railway, with more than 30 years experience consulting for railways world wide, was a very important resource for the project. Mr Sondhi provided contact for former Indian Railways board members, advice and counsel and insight on Indian Railways and Government of India practices. Mr Sondhi’s insights were invaluable in understanding the culture of the railway and the difficulties managers and government policy-makers face when trying to make changes in Indian Railways practices, in achieving a consensus agreement for new policies, and for the introduction of new technology.

A special thanks to my colleague, Dr Clell Harral, Chairman of HWTSK, who has extensive experience working on transport policy issues in many developing countries, including India. Clell edited the report, reviewed my analysis, and contributed much to the final paper.

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1 A partial list of the materials, reports and documents reviewed for this report is in Appendix 3.
2 A list of those interviewed is shown in Appendix 2
**INTRODUCTION**

Did the gurus get it wrong? Over the past decade, commissions, financial institutions, development banks, railway experts, and management experts have, after investigating Indian Railways’ (IR) performance, recommended various forms of restructuring, reform, reorganization, downsizing, and outsourcing. As recently as 2001, an esteemed commission declared the railway “in a financial crisis” – only major reforms could save the Government of India from massive infusion of funds to save the railway.

Subsequently, however, the financial performance of the railway has improved dramatically – deferred track maintenance has been reduced or eliminated, investment in new capacity increased, and dividends paid to the government reached $2 billion in 2007. Yet, there appears to have been no major restructuring of the railway – it retains the same vertically integrated, insulated organization structure complained of by the experts. Oh, there have been some reforms – a little outsourcing, some contracting, even some private investment has been permitted. But, the Railway Board and Minister retain essential control of every facet of rail activity in India.

Are the recent financial improvements signs of a real and remarkable turnaround? Or, is the much touted turnaround more appearances than reality, perhaps largely a result of changes in accounting practices or public relations spin? Or, is it something else – modest changes propelled to stardom by a raging economy?

If the turnaround is real, what happened and how? Just as important, can it be sustained over the years ahead, as the railway sector seeks to re-equip itself to play the expanding, more varied role demanded of it, if the Indian economy is to continue to grow toward its potential? Can this success be duplicated in other industries and even other countries?

**PURPOSE OF CASE STUDY**

This World Bank Case Study was commissioned to help determine the answers to these questions. The objectives of the study, as spelled out in the terms of reference, are as follows:

a) To objectively assess the performance improvements achieved, both financial and operational, and validate the data available on these improvements.

b) To articulate the key lessons to be learned from this experience regarding the political economy of state owned enterprise reform.

c) To develop an understanding of the change-management approach used to reform a large, very traditional organization operating in a politically sensitive environment.

d) To assess the sustainability of the improvements achieved, and determine whether the improvements in the financial results are likely to continue into the future.

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4 Ibid, Volume I, Executive Summary, page 3
e) Comment on the need/prognosis for more traditional SOE reforms which are likely to be resisted by various interest groups – e.g. labor reductions, passenger tariff increases.

The World Bank, Indian Ministry of Railways, and many others provided reports, statistics, and other documentation for the Case Study. The Ministry of Railways provided access to members of the Ministry, Railway Board, railway officers, and helped arrange interviews and discussions with retired Railway Board members, shippers and other transport market participants in India. Their help and support was essential in developing and understanding of recent rail sector history in India, but any errors of interpretation are the authors’ alone.

SCOPE OF WORK

The consulting team was guided by the scope of work provided in the Terms of Reference for the Case Study. The scope of work included the following tasks:

a) Review reports and presentations concerning Indian Railways turnaround from a variety of sources.

b) Supervise data collection and analysis by Mr Agarwal and other Bank staff members in the New Delhi office who will be in regular contact with Indian Railways counterparts.

c) Guide the 20 to 30 interviews to be conducted by Mr Agarwal with key Indian Railways officers, clients and other stake holders including the areas to be discussed and the interview reports to be produced.

d) Visit New Delhi for about one week early in the project to meet with Mr Sudhir Kumar, OSD, to get an initial perspective of those responsible for guiding the Indian Railways turnaround.

e) During the visit to New Delhi, meet with 10 or so of the stakeholders previously interviewed by Mr Agarwal, where the consultant may benefit from more in-depth discussions.

f) Review financial and operational data assembled by Mr Agarwal to identify any missing information or inconsistencies, and in general assess the reliability of this data.

g) Develop a case study outline that addresses the objectives (described above) and agree this with the World Bank team leader.

h) Prepare a draft Case Study of no more than 30 pages including Annexes, for review and comment by the Bank Team and key counterparts at Indian Railway, then revise the Case Study to incorporate the comments received.

i) Prepare a slide presentation of the Case Study for presentation at the Bank’s annual Infrastructure Forum in February, 2008.

In general, this scope of work governed the activities in preparing this Case Study report. An important variation included an adjustment in the schedule of activities wherein after the case study outline, due to timing of the trip to New Delhi, the slide presentation was prepared after the draft outline had been approved but before this final Case Study report was prepared.
CASE STUDY: REASONS AND METHODS

A principal goal of World Bank lending is to help achieve lasting improvements in the delivery of public infrastructure and services by helping governments establish institutional structures that encourage effective management and operation of public assets and services. Means to achieve such improvements are always sought; successful efforts are analyzed to find what new lessons can be learned to apply to future cases.

This Indian Railways case study seeks to learn from what appears to be a unique case where a turnaround in public service delivery was achieved without benefit of the usual measures\(^5\) that have, in fact, been repeatedly recommended and pressed on the Government of India. In contrast, this turnaround appears to have been achieved under a coalition government led by a minister who specifically did not allow for conventional policy prescriptions, such as fare hikes, retrenchment, or privatization through sale or concessioning.

The case study method is particularly appropriate for organizations with unique characteristics and special circumstances. The method relies on selecting the best or worst performing organizations; from these, selecting organizations that have reported a sudden change in performance over time (for better or worse), forming hypotheses regarding the causes of the sudden change, then testing those hypotheses using relevant data gathered over the change period. The method is designed to help answer key questions: What factors explain the significant change? Do these factors apply only in this specific environment? What can be generalized from this experience? This report summarizes a case study of the Indian Railways turnaround.

HYPOTHESES AND ISSUES IN THIS CASE STUDY

First it is necessary to establish that Indian Railways has experienced a turnaround. In this case it is necessary to review the financial and operational data to document that a turnaround has occurred. While Indian Railways’ financial performance apparently improved significantly between 2000 and 2007,\(^6\) Indian Railways also instituted changes in accounting practices and conventions that have been well reported. Some have argued that the turnaround is not so much a real change as a change in how financial performance is measured. So, an initial issue to be determined is whether the accounting changes themselves had a significant impact on reported Indian Railways financial performance. If real financial change has occurred, is that change significant, or modest, using common measures of performance? Were the financial reporting changes part of an effort to bring railway accounting systems more in line with international accounting standards, or part of a public relations effort to make financial performance look better?

Assuming the turnaround is real and did not arise from accounting changes, the case study will seek to determine whether the Ministry or Indian Railways attempted to take any actions purposefully designed to improve financial and operational performance. Some have argued that recent Indian Railways performance has benefited from economic growth and investments made in prior periods; that the current minister and railway management team just happened to be in the right place at the

\(^5\) The usual measures include restructuring state owned enterprises, retrenchment or outright abandonment of loss making services, radical staff reductions and reforms involving commercialization of state agencies, sale, licensing or concessioning of enterprises to private investors and operators, and the introduction of competition.

\(^6\) 2000 refers to the period between April 1999 and the end of March, 2000. Indian Railways typically refers to this period as 1999/00. This convention is used throughout the report.
right time. Here, we will review not only past period policy changes and investments, but current period management actions that resulted in policy and operational changes to evaluate which were most important to the turnaround.

Changes in governance structures or major reforms within Indian Railways can also result in significant performance improvements. While the Minister has been clear about not “privatizing” Indian Railway, some reforms have taken place. For example, the Indian Railways monopoly in the rail container business, embodied in the Container Corporation of India (Concor), ended in 2008 and a series of new private container operators and logistics services companies have been licensed to create a competitive market in container services; some projects relying on public-private partnerships are underway; railway rolling stock orders have been placed outside Indian Railways’ manufacturing circle. Have these reforms contributed to significant improvement in the Railways’ financial or operating performance?

Other internal policy reforms or practice changes may have been responsible for part of a turnaround. Over the past few years, the railway has made some changes in practices and standards: increased the permitted axle loadings for freight wagons; increased train speeds; increased the size of passenger trains, among others. The case study will examine whether these and related practice changes had a significant influence on the performance of the railway and what role they may have played in the turnaround.

An important consideration in this study effort is identifying how changes that had a significant impact on performance were accomplished – what forces, decisions, policy changes, or other factors were responsible for the changes and how were those changes accomplished? Has the new minister changed the mission and objectives of Indian Railways? Have the standards by which performance is measured changed? How were those changes made? Similarly, changes in transparency, training and capacity building within critical segments of an organization, company responses to innovation, changes in rewards, both monetary and non-monetary, often are factors in driving a turnaround.

This case study investigates these areas and others by reviewing railway data, budget and financial reports, studies and analyses by those from inside and outside the railway and ministry, and through one-on-one interviews.

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7 The container handling operations of Indian Railways, including all 7 of its inland container depots, were hived-off to Concor when it was established as a separate enterprise in 1988. Originally, 100% state-owned (by the Railway Board), some 36.9% of Concor shares were subsequently sold to private investors, primarily foreign institutional investors (27.6%), but Concor retained monopoly control of rail container handling services until 2007. While 14 licenses to provide container services were sold to prospective private sector competitors in 2007, three have since commenced operations. This development will indirectly affect Indian Railways’ financial performance by developing container services using private sector capital. The operators will continue to hire rail transportation services from Indian Railways.
Background

India has a large, diverse and growing economy. In 2006, India’s economy ranked 12th largest in the world on a nominal GDP basis and 4th largest in the world on a purchasing power parity basis.\(^8\)

While economic growth has been somewhat erratic, it has been positive since the early 1980s and quite strong in recent years. The result is that India has had the second-fastest growing major economy in the world in recent years.

In the early days of its independence after 1947, the Indian economy was largely centrally controlled, many sectors state-owned, and with strict controls over private sector participation and foreign trade. The Soviet Union was India’s major trading partner; its collapse had a major impact on India’s economy. The first Gulf War also caused a spike in oil prices, further affecting India’s economy and causing a major balance-of-payments crisis. Economic growth was anemic; India was not considered

\(^8\) Nominal GDP figures are based on converting GDP measured in country currency at the prevailing US$ exchange rate to put all countries on the same currency basis. Purchasing Power Parity (PP-parity) adjustments recognize that prices for non-traded goods (mostly services) are usually lower where incomes are lower. PP-parity adjustments take into account these lower costs using an index based on the price of a basket of basic goods and services across different economies.
one of the “Asian Tigers.” In the late 80s, the government began to slowly reform the economy. It removed some price controls, reduced corporate taxes, and eased restrictions on investments in capacity expansion. These reforms increased the rate of growth in the late 1980s but also led to high fiscal deficits and a deteriorating current account.

To deal with these issues, then Prime Minister Narasimha Rao and Finance Minister Manmohan Singh began a program of economic liberalization in 1991. Industrial, investment, and import licensing schemes were revised, and some public monopolies were ended (though not those in the railways sector). Since that time, the government has continued the general reform process, slowly liberalizing the economy. Over this period, the economy has grown continuously and India has emerged as one of the wealthiest economies in the developing world.

In the transportation sector, however, chronic – and continuing – underinvestment in infrastructure for all modes of transport has resulted in widespread capacity constraints, and often low service quality standards, that are increasingly impinging on further growth and diversification of the economy.

The shortage of transport capacity has been favorable for Indian Railways, sheltering it to a large degree from the competition from other modes that sharply reduced the role (and financial circumstances) of railways in most other countries over recent decades. Moreover, this protective shield is likely to extend to a substantial degree for many more years, if for no other reason than that the development of a modern high-standard network of inter-city highways in India, and growth of private car ownership, will inevitably take some decades, and the existing inter-city network will not support large, modern trucks – or very many more passenger cars. The deregulation and privatization of air and bus transport has introduced competition from air for business executive travel, and from both urban and inter-city buses, but Indian Railways, with its present structure of lower-class fares cross subsidized by freight shippers and its wide range of service offerings, is likely to continue to fill its passenger coaches, keeping costs as low as possible.

It must further be noted that the recent order-of-magnitude increase in the price of oil – which increasingly seems a permanent shift – and rapidly escalating concerns to abate global warming have not yet worked their ultimate effects through either India’s or the world’s transport markets, and may

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9 Indian Railways and closely associated Container Corporation of India continued to enjoy a complete monopoly in railway and rail container services, respectively, throughout the 2001 to 2007 period under review in this Case Study. Subsequently, Concor’s monopoly was ended in 2008 (see footnote 7 above).

10 Arvind Panagariya, India in the 1980s and 1990s: A Triumph of Reforms, Resident Scholar at the IMF, January, 2005

11 The United States took more than 25 years to construct its originally planned 66,000-km Interstate Highways system. More recently, China has constructed its National Trunk Highway System of more than 44,000 km of expressways in scarcely more than 15 years, but the budgetary resources dedicated to this program ~US$ 150 billion at the prices then prevailing ~ were a large multiple of those now being budgeted in India, where fiscal constraints are far more restrictive, and public policy decisions normally more time consuming. It must also be noted that India, in contrast to China, chose to focus its road construction budgets first on modest upgrading of its vast kilometers of low-standard tertiary and quaternary farm-to-market feeder roads rather than the primary highways connecting its main cities. That reflects, at least in part, the traditional and still prevalent view of central planners in India that railways are the most efficient mode for long distance transport, and the role of road transport should be limited to short distance movements, both to connect rural areas to local markets and to serve as feeders to the rail network.

12 The soon-to-be-completed Golden Quadrilateral connecting India’s four largest cities (Mumbai, New Delhi, Kolkata, and Chennai) will not have limited access for the most part, and recent travel over completed portions revealed many remaining traffic impedance and safety factors, dictating travel speeds and traffic handling capacities well below normal limited access standards. And there are some remaining sections of the National Highway system, and vast kilometers of the lower hierarchy of highways, that still have a single lane serving both directions with severely limited traffic capacity.
ultimately favor greater reliance on railway transportation. Substantial technological adaptations to improve energy efficiency by all transport modes will undoubtedly take place – obviously most quickly in those countries where the full effect of the price changes, including possible carbon taxes, are passed through to the equipment manufacturers, transporters, and private motorists most rapidly. It is conceivable that railways may gain significant advantage as new technologies are developed. In such event those countries, India being a prominent example, where highways and highway transport are not yet well advanced could benefit most, by leapfrogging the dominant mix of transport technologies of the 20th century to advance directly to those of the 21st century. The drive to reduce energy consumption and other transportation costs could also favor reconfiguration of the spatial distribution of industry, further reinforcing reliance on railway transport. If such developments should materialize in large degree, India’s choice not to develop 20th century highway networks would then appear prescient.

The Indian economy is already significantly diversified, with major segments that include agriculture, manufacturing, extraction and processing of raw materials, textiles, and a rapidly growing services sector. About 60% of the Indian workforce, which totaled about 520 million in 2007,13 earn their livelihood directly or indirectly through agriculture. Agriculture represented about 17% of GDP in 2007. Industry and manufacturing represented about 28% of GDP in 2007 and employed about 17% of the workforce; it is a common view that the share of industry would be higher were there fewer transportation bottlenecks. The Indian service sector is growing rapidly and has become a very important part of the overall economy – responsible for 55% of GDP in 2007 and about 23% of employment. The growing number of young and educated people, fluent in English, is gradually transforming the Indian economy as an important destination for global outsourcing of technical services. India is a major exporter of highly-skilled workers in engineering, financial services, and software development.14

**RAILWAY TRAFFIC TRENDS**

Growth in services tends to have lower transport intensity (require fewer transport inputs) than industrial, manufacturing, and extraction industries. On the other hand, growth in the service sector and in average incomes tends to increase mobility, driving increases in passenger travel, including rail and commuter passenger services.

Growth has also been relatively rapid in other sectors like industrial production, including manufacturing, pharmaceuticals, biotechnology, shipbuilding, and aviation. As the population has become more affluent, growth in consumer spending is tending to increase intermodal and road transport.

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14 India has been, and remains, a major exporter of highly-skilled workers in engineering, financial services, and software development, but the ‘brain drain’ has attenuated in recent years and some reverse flows are now taking place, as emigrants elect to repatriate in response to improved opportunities in the Indian economy.
demand. These factors tend to drive freight transport. India’s rapid economic growth, coupled with negligible development of inter-city highway infrastructure, has resulted in rapid growth in railway traffic. The chart above shows intercity passenger-kilometers and freight net-tonne-kilometers since 1960.

Even with rising affluence, emerging (though still quite low) car ownership, and new competition from low-cost air carriers, rail passenger transport has grown more rapidly than freight traffic over the last decade. The chart below shows absolute values for Indian Railways traffic: passenger-kilometers have increased more rapidly than freight tonne-kilometers since the mid 1970s; this trend became more pronounced in the mid 1990s and particularly in the last few years.

The following chart shows unit revenue (as measured in current paise per traffic unit – either freight net-tonne kilometer or passenger kilometer). Revenue trends for both passenger and freight traffic are similar. Note that inter-urban passenger production (average lead about 230 kilometers in recent years) was about 80% of total passenger kilometers until 1999; commuter services (average lead of about 30 kilometers) represent the remaining 20%. In 1999 those proportions began to change and by 2007, inter-urban passenger services (where revenue per passenger-kilometer is about double that for commuter services) were about 84% of total passenger kilometers. Slightly declining prices in both services and the small shift to commuter services account for the flat passenger unit revenue trend to 2007, when averages for both services increased.

As a result of the growth and unit revenue trends, the mix between passenger and freight production and revenue shares has remained remarkably constant.

An analysis of Indian Railways traffic components relative to measures of the Indian economy shows that there has been an unusually strong correlation between freight traffic tonnes and GDP – with a correlation coefficient of 0.995; there is also a strong correlation between passenger kilometers and GDP – with a correlation coefficient of 0.987. Both correlations are shown in the charts below. Since GDP has grown quickly

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15 Correlations with NTK, traffic units, and traffic-unit kilometers are similar but with lower correlation coefficients. The two presented above have the highest correlation coefficients.
in the last decade, and especially rapidly in the past few years, demand for both passenger and freight transport has been high.

The Indian economy grew smartly over the past few years – an average of more than 9% per year. Recently, growing inflation has become a concern. The Government’s response to inflation concerns, coupled with unsettled financial markets worldwide, has resulted in recent reduction in projected GDP growth over the next few years. IMF and ADB are both expecting GDP growth of about 7.9% for 2008 and 8.0% in 2009. Longer range forecasts are quite speculative but typically have Indian GDP growth in the 5% to 7% range on real terms over the next decade. These forecasts portend continuing growth in freight and passenger traffic demands. However, capacity constraints of all types are a growing concern for Indian Railways and other modes of transport.

**ROLE OF INDIAN RAILWAYS**

As illustrated in the charts above, Indian Railways has played an important role in the growth of the Indian economy for many years. In recent years that role is reported to have diminished somewhat as road and air transport have become more significant carriers of both passengers and freight. While mode share trend data are not available for this analysis, many recent papers have suggested that high tariffs and a shortage of capacity has shifted freight to road transport, despite the absence of a modern interstate highway network, and while demonopolization in the aviation sector has spurred the growth of air passenger transport. In recent years, road transport is estimated to have accounted for some 65% of the freight market and about 90% of total passenger kilometers (predominantly, but not exclusively, for shorter distance movements).\(^\text{16}\)

However, it is difficult to discern a significant shift from the GDP and freight traffic data reviewed above. It is also hard to separate mode share trends from economy-wide structural adjustments. As economies develop and become more mature, shifts in sector structure are common – for example, to more widespread distribution and manufacturing centers, located closer to end-users, with a concomitant reduction in centralized manufacturing and long distance bulk transport. In many developed economies, such trends over the last two decades have been responsible for increases in road transport market shares and a shifting of traffic from rail box wagons to road transport, and

more recently, from road transport to containerized intermodal transport combining road and rail transport over different segments.

**Indian Railways Freight Services**

Indian Railways’ transport task is divided between providing passenger and freight transport services. Freight transport services can be characterized by the types of commodities carried. The chart below shows traffic trends for major commodities carried and reported by Indian Railways:

**Coal traffic** is the largest commodity group as measured by net tonne kilometers. Coal represented about 37% of all Indian Railways traffic in 2008. Demand for coal is driven by domestic production of power, steel, and by export markets. In part, increasing transport volumes have been driven by rising coal prices and exports. Coal demand has increased dramatically over the past few years, particularly after 2003, as coal prices have soared. The chart below shows world-traded coal prices since 1980. International coal prices may be affected by the declining value of the US dollar.

India has the world’s third largest coal reserves and is the fourth largest coal producer. Current projections are for Indian power production to increase at an annual rate of about 10% over the next five years or so. Steel production is expected to continue to increase, though the rate of growth may slow as the growth in worldwide demand slows somewhat over the next few

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years. Overall coal transport should be expected to continue to increase with increasing economic growth in India; high current prices will expand the export market. The rapid increase in price has reduced the relative significance of coal transport charges.

**Food grains** are the third largest commodity group, representing about 11% of Indian Railways net tonne kilometers in 2007/08. Food grain transport increased substantially in 2003 and remained at high levels through 2005, after which rail transport of grain declined somewhat (see chart below). World prices for food grains have increased substantially in the last several years (see following chart). Price increases are linked to increased ethanol production (maize), increased population, declining value of the US dollar, and droughts limiting production in several large producing countries. In response to rapidly rising prices, a number of governments have restricted the export of food grains to try to restrain domestic prices and improve availability in home markets.

The Government of India restricted some food grain exports after the flooding and drought in the 2004 season. Some export restrictions remain, reducing export grain transport volumes. While food grain production is generally volatile, consumption is less so. When weather conditions drive local production away from supply equilibrium, food grains are either imported or exported. Of course, rising prices could reduce domestic demand; export restrictions could reduce quantities of grain exported; both could tend to reduce transport of food grains. It appears that a significant spike in grain transport occurred in 2003 (see upper chart); after that, rail transport of grain declined until 2008. Given current high prices for food grains, production in India is likely to increase from current levels, assuming normal weather conditions. Grain transport is likely to grow as agricultural productivity increases. Good weather conditions and greater production will encourage increased exports. As with coal, soaring world prices for food grains have reduced the relative significance of transport prices.

The Indian **iron and steel** industry has grown rapidly as a part of the general growth of the Indian economy and as a result of soaring world demand for steel products. Steel manufacturing has moved into a new development stage, moving India from the world's 12th largest producer to its 5th largest producer in 2007. Inputs to steel production, including iron ore (and iron ore exports), plus steel plant outputs combined represent about 13% of Indian Railways net tonne kilometers in 2008. The chart on the next page shows the dramatic volume increases over the period from 2003 to 2005.
As demand has lifted volumes for both producers and transporters, world-wide demand has lifted prices dramatically. The charts at left show world iron ore prices tripling over the period from 2003 and steel prices doubling in the last few years. Such significant price increases in both inputs and outputs to the steel industry reduce the relative importance of transport prices in overall production costs, enhancing the pricing power of the railway.

**Steel production** in India reached 50 million tonnes in 2006/07 and 54 million tonnes in 2007/08. It is reported that government and industry plan to increase production to 120 million tonnes by 2011 and to 200 million tonnes by 2020. The proposed production increases will increase transport demand for iron ore, coal, coke, limestone, as well as for steel plant outputs. Exports of coal, coke, iron ore will only add to the projected production increases. Industry and government efforts to increase production are already underway. It is possible that a world wide slowdown could delay expansion plans somewhat. However, India’s favorable location in Asia, its production base, the availability of coal and iron ore inputs, and easy access to imported raw materials suggests that recent growth trends can be sustained for some time, provided transport capacity is available.

“**Other Freight**” includes fertilizers, chemicals, containerized freight, oil and petroleum products, and many other commodities. As a group, Other Freight is the second largest “commodity” shown in the bar chart on page 10. Other Freight comprised about 30% of Indian Railways freight tonne kilometers in 2008. Given that this group is composed of a number of different types of rail freight traffic, it is difficult to generalize the trends beyond those shown in the chart below. It shows that other freight traffic has more than doubled since 1991, with the most rapid

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18 IBEF Steel Industry Outlook, 8 Feb 2008
growth occurring from 2003. The grouping is too diverse for a detailed analysis of price history. The second chart at left, however, shows a summary of commodity prices, including an index for crude oil and oil products. It shows that prices for many commodities have increased by at least a factor of 1.5; many, including oil, by 2.5; and iron-ore by a factor of 3. Most of these price increases occurred from about 2003 onwards.

The analysis above has shown that Indian Railways experienced volume increases with a similar pattern – slow but significant growth until 2002 or 2003, then rapid, in some cases, explosive growth to the current period.

The bottom chart shows average rail tariffs by major commodity groups over the same period. The chart shows the path of average freight tariffs for each major commodity. Generally, tariffs increased steadily from 1991 to 1999, then a period of relatively stable prices until 2005, when prices began increasing again.

Some recent price increases were particularly dramatic – for export iron ore, raw materials to steel plants, and even food grains. This reflects the even more dramatic increases in commodity prices in recent years. Rail tariff increases appear to have slowed in the 2008 period, even though commodity prices experienced their most dramatic rise.

The data presented in this chart show the averages by commodity as computed by revenue and tonne-kilometer data recorded by Indian Railways. Within the general commodity categories used in this analysis there are typically a number of tariffs covering different product forms, wagon types used for shipments, shipment sizes, volume allowances, and specific commodity codes, each with different tariffs. Some of the price changes may reflect changes in the mix of these characteristics rather than specific increases in individual tariffs.
In general, the analysis of freight traffic indicates that net-tonne-kilometers increased steadily (CAGR 2¼%) from the beginning of the period 1991 to 2000. Starting in 2001, traffic growth accelerated, continuing at a healthy rate (CAGR 6¾%) to the present time. In contrast, average revenue per tonne kilometer increased at a rapid rate in the earlier period (CAGR 9%) and at a somewhat slower rate in the latter period between 1998 and 2003 (CAGR of 3%), accelerating again after 2003 (CAGR 5.9%). Over the 17 year period between 1991 and 2008, Indian Railways freight volume, as measured by net tonne kilometers, doubled, while average tariff (Rs/NTK) nearly tripled. Combining these effects, overall Indian Railways freight revenue increased by a factor of 5.6 between 1991 and 2008, accelerating in the period after 2003, as shown in the chart at left.

It is clear from this analysis that the trends toward both higher volumes and higher freight tariffs are of long standing and were present throughout the period. Further, freight volumes and tariffs increased at a higher than average rate from 2003, so that the growth in total freight revenue accelerated from that period. Since railway services have a high fixed-cost component, rapidly increasing freight revenue can drive substantially improved financial performance.

### Indian Railways Passenger Services

Indian Railways is an important provider of passenger transport – in fact, it is the world’s largest provider of railway passenger transport, when commuter and inter-urban services are included. Indian Railways provides suburban and commuter services in a number of large cities and inter-urban services – longer distance services between major urban areas. Both basic services face considerable competition. Suburban and commuter services must compete with automobiles, buses and other forms of road transport in the short run; in the long run, they must compete with changing characteristics of urban development – where people live and work. Inter-urban services,

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19 China Railways, which is not responsible for commuter services, is now the world’s largest supplier of inter-urban rail passenger services, carrying 662 billion passenger kilometers in 2006. This compares to Indian Railway’s 632 billion inter-urban passenger kilometers in 2008. With Indian Railways’ 137 billion suburban passenger kilometers, its total of 769 billion passenger kilometers is the highest in the world.
including long-distance train services, must compete with new transport options, including a multiplicity of low-cost air and road transport services arising from demonopolization and privatization of state-owned enterprises, still quite limited but gradually improving highway networks, and the changing geographic distribution of jobs and population in the longer term. Economic development has increased automobile ownership and the number of people for whom the speed of air travel is important.

On the other hand, urban and inter-urban passenger transport increases with increasing population and economic activity. These competing factors, and the quite limited scope of India’s highway networks, coupled with some of the world’s lowest rail fares, have driven Indian Railways passenger traffic substantially higher over the last few decades (see chart at left). Total passengers are up by 85% over the 30-year period from 1978 to 2008 (CAGR 2.1%). Over this period, Suburban passengers grew 92% (CAGR 2.2%); inter-urban passengers grew 76% (CAGR 1.9%). Growth in the number of passengers using both suburban and inter-urban services on Indian Railways accelerated after a slight dip in 2003. In the five year period from 2003, suburban passenger growth averaged about 4.8% per year; inter-urban passengers grew by about 6.4% per year over the same period – both significant increases over the 30-year average.

Over the same 30 year period, journey lengths increased, especially for inter-urban services. Passenger journey lengths in suburban services increased some 75% from about 20 kilometers per trip to 36 kilometers. Over the same period, journey lengths for inter-urban services increased from about 87 kilometers to 230 kilometers per trip – an increase of some 165% (CAGR of 3.3%). As can be seen on the chart above, journey lengths increased steadily until 2003, when they faltered somewhat, then growth resumed, bouncing up again to the long term trend line in 2007 and 2008. Air competition for the railway’s longer-haul, overnight type services became more significant competition in the period after 2000 with deregulation of the airline industry.
The number of passenger-kilometers generated on Indian Railways reflects the combined increases in the number of passengers and longer journey lengths. Overall passenger kilometers increased by 336% over the 30-year period (CAGR 5%). Passenger-kilometers generated in suburban service increased steadily by 235% (CAGR 4.1%), while those generated in inter-urban services increased by 365% (CAGR 6.4%), owing to growth in the number of passengers and increases in average trip length. The combined result is a rather dramatic increase in passenger kilometers, especially in inter-urban services.

A review of data on passenger fares shows that they have been relatively flat over the period from 2001 to 2008. Over the seven-year period shown in the middle chart at left, suburban fares have increased a total of 8% (CAGR about 1%); inter-urban fares have increased a total of 13% (CAGR about 1.7%). Inter-urban passenger prices appear to have increased at a somewhat higher rate in 2008. These fare increases are well below the rate of inflation in India over the period, so real fares have declined in value.

Generally, passenger fares are related to trip lengths. Since both passenger journeys and trip lengths have increased significantly, revenue earned from passenger travel has increased substantially, even though fares have remained relatively constant (or declined in real terms). The chart at left shows that passenger revenue (in current prices) has nearly doubled over the seven years between 2001 and 2008. Most of the increase was in inter-urban services where revenue has increased 95% (CAGR of 9.8%).

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20 Passenger revenue data for years before 2000/01 were not available for this analysis. Since the period of the “turnaround” is between 2003 and 2008, analysis of average passenger fares during this time frame is sufficient to show the case that the turn-around was not financed by significant increases in passenger fares.
Indian Railways passenger services lose money – they are subsidized by freight services. One would expect that increasing passenger services would increase losses associated with passenger services. However, operating costs are closely related to the number of trains operated. If the number of passenger trains increases more slowly than revenue, losses related to passenger services could be reduced. Think of the passenger train network operating with a fixed number of trains; if more passengers and more revenue are on each train, passenger losses can be reduced while increasing the amount of passenger services. The revenue density of the passenger network can be increased while not significantly affecting the costs to provide the service.\textsuperscript{21}

The chart above shows the average number of passengers-per-train in both suburban and inter-urban services. Over the 28-year period between 1978 and 2006, passenger density (and hence revenue density) increased by 89\% for inter-urban services and about 50\% for suburban services. Passenger density in both services increased slowly in the early part of the period but the trend accelerated after about 1994.\textsuperscript{22} Given the increasing passenger and revenue density of passenger trains, it is possible that passenger related losses may have declined, despite the fact that real passenger fares may have declined.

\textsuperscript{21} This is not exactly true as additional station and on-board staff may be needed as the number of passengers increases; additional energy will be required, other costs will increase as passenger density increases. Should additional coaches be added to trains, some additional coach maintenance will be required; capital costs may also increase.

\textsuperscript{22} Data were not available for passenger trains by type for 2007 and 2008. Given the recent policy changes to increase passenger density on inter-urban trains, the trends may have accelerated further after 2006.
INTERNATIONAL POSITION OF THE INDIAN RAILWAY

Indian Railways operates one of the world’s largest and busiest railways. India has the third largest railway network in route length and is fourth largest in traffic units (passenger kilometers plus freight net tonne kilometers). The charts in this section are based on the World Bank’s world railway data base using data current to 2006.

Indian Railways passenger services rank as second largest in the world behind those in Japan for number of passengers; or behind China for passenger kilometers. In any event, China, Japan, and India have by far the largest passenger operations in the world.

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23 Russian, Chinese and Indian Railways (and most railways in this analysis) are state-owned and operated. The five largest US railways, which are privately owned (called Class I in this analysis), are grouped with Amtrak, while Canada's two large private railways are grouped with VIA. Amtrak and VIA are government-operated passenger services running over the private rail network, though both VIA and Amtrak own some railway infrastructure.
India has the fourth highest freight loadings as measured in tonnes, and generates the 5th highest number of tonne-kilometers. Russia, China and India largely have a single system under one management, while the US numbers represent five different companies and five different managements. By traffic measures, Indian Railways is one of the world’s largest rail entities.

Based on measures of asset productivity, Indian Railways are also world class – recording high asset productivity in most measures. The charts below are measures of network productivity (traffic units per route kilometer) – Indian Railways is 4th in the world. In passenger coach productivity (passenger kilometers per coach), Indian Railways is the world’s most productive railway.

On a measure of freight wagon productivity (net tonne kilometers per wagon), Indian Railways were 7th most productive in 2005; and in locomotive productivity as measured by traffic units per
In contrast, Indian Railways’ pricing is generally lower than found on other railways. Of the 21 largest railways, India’s freight prices, as measured by US$ per net-tonne-kilometer, are fourth from the lowest; for passenger traffic (as measured by US$ per passenger-kilometer), they are second from lowest.  

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24 Average tariffs were computed using current exchange rates and prices, not adjusted for purchasing power parity.
The chart at left shows the ratio of average passenger fares (US$/PKM) to average freight tariffs (US$/TKM), a typical measure of relative pricing. On this measure, Indian Railways passenger tariffs are extremely low, the lowest relative to freight tariffs among the world's largest 21 railways.

Given that passenger services generally operate at a loss and are typically subsidized by relatively high freight tariffs, India's freight shippers provide a significant subsidy to railway passengers.

The extent of this subsidy can be better appreciated by considering freight and passenger tariffs on a purchasing power parity (PPP) basis. Adjusting prices for purchasing power parity uses the long-term equilibrium exchange rate to equalize their purchasing power. Purchasing power parity takes into account differences in the cost of non-traded goods and services (such as transport prices) where there are significant differences in incomes and the cost of living (adjusting for differences in average wages and living standards, for example a US dollar, exchanged into Rupees will buy more services in India than the same dollar spent in the US). The chart below shows PPP adjusted rail freight and passenger tariffs in India over the last 25 years.

The chart shows that on a PPP adjusted basis, average Indian Railways passenger fares have about doubled since 1980 (purple line); freight tariffs, on the other hand, have increased by a factor of 3.5
times (red line). In contrast, US freight tariffs have remained relatively constant across the period. This comparison indicates that Indian freight shippers are paying a high price for low passenger fares, but more importantly, that both railway passenger and freight customers are paying a high price for a relatively inefficient rail system. In many parts of the developing world, governments have reformed and deregulated transport, restructured monolithic railway enterprises introducing competition both for transport and for rail transport related services (e.g., container services—an area that India has just reformed this year—construction and maintenance, equipment design and manufacturing—an effort that has begun to introduce standardized and lower cost equipment in Europe). Railway costs and staff numbers declined as a result, but the economies of reforming countries benefitted through lower transport costs (through slower rises in PPP adjusted tariffs). The chart at left shows the overall ranking of Indian Railway productivity as measured by traffic units (millions) per railway employee. On this measure, Indian Railways ranks 12th among the worlds’ 21 most productive railways.

**SUMMARY**

This chapter describes the current economic environment in which Indian Railways operates, and then describes the characteristics of Indian Railways and how those characteristics have evolved over time. We find that:

- India has a large and growing economy. Its growth has been steady since the 1960s with a few recessionary exceptions. Economic growth has accelerated in recent years with liberalization of government regulatory policies to encourage greater competition and a greater role for private sector development. The economy appears to be set to continue these recent trends.

- Chronic – and continuing – under-investment in transportation infrastructure for all modes of transport has resulted in widespread capacity constraints and low transport service quality standards, that are increasingly impinging on further growth and diversification of the economy.
• The shortage of transport capacity has, however, been favorable for Indian Railways, sheltering it to a large degree from the competition from other modes that sharply reduced the role (and financial circumstances) of railways in most other countries in recent decades. Moreover, this protective shield is likely to extend for many more years, if for no other reason than that the development of a modern high-standard network of inter-city highways in India, and growth of private car ownership, will inevitably take some decades, and the existing inter-city network will not support large, modern trucks – or very many more passenger cars. The deregulation and privatization of air and bus transport has introduced competition from air for business executive travel, and from both urban and inter-city buses; but Indian Railways, with its present structure of lower-class fares cross subsidized by freight shippers and its wide range of service offerings, is likely to continue to fill its passenger coaches, keeping costs as low as possible.

• The recent order-of-magnitude increase in the price of oil – which increasingly seems a permanent shift – has not yet worked its ultimate effects through either India’s or the world’s transport markets, and substantial technological adaptations to improve energy efficiency by all transport modes will undoubtedly take place – obviously most quickly in those countries where the full effect of the price changes are passed through to the transporters and private motorists without delay – but it seems likely that railways stand to gain a technological and market advantage, particularly in those countries, like India, where highways and highway transport are not yet well established.

• There is a strong correlation between GDP and Indian Railways traffic; since the economy has grown, so too has railway traffic. Railway passenger and freight traffic growth has been accelerating since the mid 1990s.

• The relative share of passenger and freight traffic has shifted slowly over the last several decades, starting at about 52% passenger in the 1960s, as measured by traffic units, increasing to 60% in 2007.

• Freight traffic, as measured by tonne-kilometers, has grown steadily over the last 40 years; growth has accelerated since 2000, across all major commodity groups.

• Prices paid on world markets for major commodities carried by Indian Railways were relatively steady until the year 2000; since then, prices for most commodities have increased rapidly.

• Rising commodity prices have permitted Indian Railways to increase rail freight tariffs steadily in the 1990s and more rapidly since the early 2000s.

• Increasing freight volumes and prices have driven Indian Railways’ freight revenue rapidly higher. Since railway services have a high fixed-cost component, rapidly increasing freight revenue can substantially improve railway financial performance.

• Passenger service volumes have also grown rapidly, particularly inter-urban passenger services.

• Current prices for passenger services have remained relatively constant since 2000 and have declined in real terms. Passenger revenue has increased largely because of growing inter-urban passenger services. On a Purchasing Power Parity basis, Indian Railway passenger customers have experienced a relative doubling in passenger fares since 1980.

• Passenger train density (the number of passengers carried per train) has increased steadily since 1994. Increasing the density of passenger trains tends to reduce the cost of passenger services.

• Indian Railways asset utilization is high compared to other large railways.

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25 Traffic units are passenger kilometers and freight tonne-kilometers.
• Using current exchange rates, Indian Railways’ prices and tariffs are low relative to other major railways; passenger tariffs are very low relative to other railways, and especially relative to freight tariffs.

• Based on Purchasing Power Parity, Indian Railways freight tariffs have increased substantially relative to the increasing incomes and purchasing power of Indian companies and individuals. PPP adjusted freight tariffs have increased by a factor of 3.5. Higher prices are driven by Indian Railways mediocre productivity relative to other major world railways.
The Indian Railways is a remarkable institution with a long and lustrous history. In its earliest years it was an important instrument in alleviating the effects of famine by carrying foodstuffs from surplus to deficit regions. Over the ensuing decades it has provided the backbone for economic development of India and has contributed mightily to the growth and development of the country. It has been responsible for integrating the country’s markets and its people. Over its long history, the railway became a powerful political and economic institution.

However, slowly, over the last decades of the 20th century, development and maintenance of Indian Railways lagged, and the condition and relevance of the railway waned. By the turn of the century, most of the world’s transport experts within and outside India thought that Indian Railways was in serious trouble, and many studies conducted by both national and international groups recommended various kinds of reforms to revive the railway, but there was great resistance to change. The Railway Board recognized that the railway was drifting into increasing trouble and needed investment. In late 1997 the Railway Safety Review Committee, headed by retired Supreme Court Justice H. R. Khana, was established to develop recommendations for improving the safety and condition of the railway. In late 1998 the Railway Board and Ministry of Railways constituted a wider Expert Group with a much broader remit: to study not only the financing requirements of the railway in light of the safety concerns and the demands of the expanding Indian economy, but also to make recommendations on whether structural changes in the sector would be needed to facilitate renewal and further expansion.

LOW EBB: PERSPECTIVES IN THE YEAR 2001

The Expert Group’s report, commonly known as the Mohan Report, concluded that Indian Railways was in an extremely difficult situation, both operationally and financially. By 2001, many problems were apparent:

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26 Crossing a line that is never to be broken – crossing a line in the sand. From a story about Lakshmana, his brother Rama, and Rama’s wife Sita. Rama is out chasing a golden deer (actually Rakshasa Maricha in disguise) and is gone for a long time. Sita pleads with Lakshmana to go search for his brother. Kakshmana, who cannot bear to see Sita cry, decides to go but draws a protective line around their forest cottage and admonishes Sita not to cross the line. After he leaves, the Rakshasa king Ravana comes in the form of a beger asking for alms. Not expecting a trick, Sita crosses the line to provide alms and Ravana kidnaps her.

27 There are a variety of reasons for the slow decline: share of government expenditures going to railway investment projects declined at the same time that total government spending as a proportion of GDP declined; opening of the economy in the early 1990s coupled with industrial sector deregulation began shifting some railway traffic to road transport; pay settlements caused large increases in the cost of labor – a large part of Indian Railway’s operating expenses; institutional inertia.

28 Indian Railways had been subject to many studies conducted by development banks, universities, industry groups, and private consulting firms working for other government agencies, the railway itself, industry associations, and by internal departments and units of Indian Railways. Indian Railways is one of the most studied institutions in modern history.


30 After Dr Rakesh Mohan, the well regarded Chairman of the Expert Group who had been the Director General of the National Council of Applied Economic Research and Executive Vice Chairman, Infrastructure Development Finance Company, Ltd. The Expert Group included a star-studded list of members that included Kito De Boer, Director of McKinsey & Company and author of an earlier report on organization of the rail sector, as well as a number of former
• Loss of market share to road transport, despite limited development of modern highways and perhaps due as much to capacity limitation of the railway as to competition from road transport
• Lack of operational flexibility, especially in pricing
• High working expenses that were growing faster than revenue (working expenses were growing at 18% while revenue growth was averaging 13%)
• A deteriorating operating ratio that reached 98.8 percent in 2001
• A huge pension liability that had grown to 13% of working expenses in 2001
• High labor costs accounting for 52% of annual revenue in 2001
• Dividends had to be deferred
• Provision for depreciation was significantly below requirements
• The railway had been ill served by poor investment decisions

By 2001, India’s railway system was run down with huge arrears of renewals and replacements (track renewals alone were estimated to require Rs 15,000 crore) with asset failure rates 7 to 10 times higher than other railway systems.  

It was in this environment that the Expert Group made a number of recommendations for major changes in the Indian rail sector, concluding in the letter delivering its three volume report to the Railway Minister “Of one thing we are convinced: if Indian Railways is to recapture its past glory, and serve the transportation needs of India in the 21st century, radical structural change is necessary, along with a new strategy for investment.”

Now, some 7 years later, only a few of these recommendations have been implemented. For the most part, the report was put on a shelf to collect dust. Yet, today Indian Railways has eliminated maintenance deferrals, paid back deferred dividends, replenished its depreciation reserves, and is making record surpluses. There certainly has been a turn-around. What happened?

### Indian Railways Financial Performance

The chart at left shows the essential features of Indian Railways financial performance over the last dozen years. The bar chart shows Working Expenses broken between labor (wages and pensions) and non-labor costs. The red line shows the labor proportion of total working expenses. An important feature of this line is the large increase in labor share in 1998, the result of the Vth Pay Commission which increased wage and pension costs for all government entities in that year.

Railway Board members, professors from the esteemed Indian Institute of Management, executives from Ministry of Finance and many other well known institutions and enterprises in India.

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31 Ibid, page 1
32 It appears that the pay commission recommendations were implemented in two stages, the first involving direct wage rates, the second, about two years later, involving pension funding. This is the reason for the double peak in wage shares.
While the labor share of working expenses has declined steadily since 2004, it still remains near 52% and a new Pay Commission is expected to increase wage rates substantially again later this year. The most important relationship is that between the green line showing Gross Receipts and the bar chart, showing total Working Expenses. Even before the Pay Commission, operating expenses were growing more rapidly than gross receipts. By 2001 total Working Expenses nearly equaled gross receipts. But since that time, Gross Receipts have grown more quickly than Working Expenses, particularly after 2003.

The chart at left shows several key financial indicators derived from the base data from the prior chart. Of particular note is Indian Railways’ operating ratio which varies from 0.82 in 1996, reaches 0.98 in 2001 and then declined to a respectable 0.78 in 2007. The chart clearly demonstrates the mechanism for this improvement – the green line charts Surplus after Dividend. In this case, the railway made up its deferred dividends and yet the surplus increases by a factor of almost 14 from 2001 to 2007.

In addition to the improvements in revenue, Indian Railways has also been able to reduce unit operating costs (Working Expenses per traffic-unit kilometer), in part by reducing employment and in part by changes in practices permitting the movement of greater volumes while constraining operating cost increases. The chart at left shows total employment, declining from about 1.63 million employees in 1990 to about 1.4 million in 2007. It also shows unit costs, which plateau in 2000, and then slowly decline. The decline in unit operating costs is a result of increasing volume at a faster rate than operating costs. This is generally a characteristic of network businesses, especially railways, as traffic volumes increase – an extra wagon on each train or a few extra tonnes or

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33 Operating Ratio is normally derived as the ratio of operating expenses to gross revenue. This is a commonly used railway performance measure for railways adhering to GAAP or IAS accounting standards. Operating expenses include typical operating costs (labor, energy, utilities, etc.), including depreciation and pension costs, but exclude funds spent on long-lived capital projects, interest charges and dividend payments. Gross revenue includes all revenue from railway operations covered by operating expenses, excluding interest earned on cash surpluses, foreign exchange gains/losses, and income unrelated to the operating expenses included. This is the inverse of a gross margin calculation used for many industrial and commercial businesses. Many analysts consider an operating ratio less than 0.75 to be excellent. The Canadian National Railway has one of the lowest operating ratios (0.60) among large, common carrier railways.
passengers on the same train allows volume to increase much faster than incremental costs. This fortuitous relationship tends to break down as a network becomes saturated and there is insufficient capacity. At some point, new trains, additional equipment, or more infrastructure is required. Operating a network near saturation tends to increase interference causing delays and deteriorating quality of service and equipment utilization: ultimately, capacity limits are reached and additional volume cannot be accommodated. There is some evidence that Indian Railways is approaching the capacity limits of some of its assets (infrastructure line segments, wagon types, locomotives, coaches, etc.). These constraints can be mitigated by making better use of existing capacity (e.g., getting more tonnes or passengers per train), and by expanding existing capacity by increasing the velocity and utilization of assets (e.g., turning wagons and coaches faster, running trains at higher average speeds, reducing unused time, etc.), and by incentivizing the use of excess assets while increasing prices for assets in short supply.

Changes in the Financial Yardstick

A review of Indian Railways accounts and accounting practices indicates that some of the changes in its financial performance, as reported above, were due to changes made to Indian Railways accounting practices in recent years. That is, they reflect a change in the financial yardstick rather than a change in actual financial performance. Our review indicates that all practice changes were made to fit with ICAS standards and move Indian Railways’ accounts into line with international practices. Some of them resulted in reported improvements in financial performance indicators:

1. A change in accounting for long-term lease charges was made in 2005/6 to conform to international accounting practices. In the past, both principal and interest charges related to equipment leases were included in Working Expenses. After this change, the capital portion of lease repayments (principal repayment) is recognized on the balance sheet but not the income statement. Only interest charges related to capitalized leases now flow through to Working Expenses. The change does not affect overall cash flow, but reduces operating cost (Working Expenses), increases reported surpluses, and improves operating ratio. This change in accounting system effected a reduction of Rs 1,616 crores in operating expenses in 2005/06 and amounted to 26% of the extra surplus in that year. The operating ratio, reported as 84%, would have been 87% without the accounting change.

2. In the past, government reimbursements for losses made on Strategic Lines were deducted from dividends payable, completely outside railway financial performance measures. An accounting change treats these payments as a reduction in Working Expenses. This change reduces IR’s operating ratio and increases reported surpluses. Cash available is not affected.

3. Finally, railway fund balances earn interest. In the past, these interest payments were credited to the fund balances directly and did not affect railway Earnings. An accounting change will treat such interest payments as a miscellaneous receipt, increasing Earnings, reducing operating ratio, and increasing reported cash surpluses, but would have no effect on the cash available for investment or other use.35

34 From the 2006 Budget statement
35 In many international railway enterprises relying on ICAS or GAAP accounting, interest earned from fund balances is not included in the operating ratio calculation, tending to increase operating ratios. Government payments for reimbursements for mandated services are typically treated as revenue rather than as a reduction in operating expenses. Treatment as a credit to expense rather than income has no effect on surplus or cash flows but results in a slightly lower operating ratio.
The combined effects of these changes would be to increase reported cash surplus by about Rs 2,200 crore in 2007 according to Indian Railways accounting officials. The accounting changes resulted in about a 4-point reduction in the operating ratio from prior accounting methods in 2006/07. The reported operating ratio with the accounting changes for 2007 is about 78%; without the accounting changes the operating ratio would be about 82%.

Indian Railways financial performance indicators, even adjusted for accounting changes, show that financial performance has improved substantially. Indian Railways’ worst financial period in recent history was in 2001 when financial performance was poor and the condition of the assets, particularly infrastructure, was also reported as poor. Since the 2001 nadir, financial performance has improved substantially as has the condition of its infrastructure. That the railway turned a corner starting about five or six years ago cannot be disputed.

It is also clear that volume increases helped drive improved financial performance; however, much more than volume increases were required to achieve the scale of turnaround apparent in IR’s financial results. In the next section other sources of financial improvement will be discussed.

**Sources of the Turnaround of Indian Railways**

As shown in the previous sections, Indian Railways’ financial performance has been improving since the 2000/01 low point, accelerating in recent years. Here we examine more closely the operational factors that have driven those financial results, and consider whether, and if so, how they may be sustained in the years ahead.

There are many reasons for the improvement. We have seen in the background review that Indian Railways’ freight and passenger traffic has been increasing steadily. In addition to the volume growth, freight tariffs have increased while passenger tariffs have declined. Even though freight tariffs have increased, rising commodity prices have left the cost of transport a smaller percentage of the delivered cost of most goods. Powered by increasing pressure from traffic increases and rising tariffs, gross revenue has increased dramatically.

As a network business with a high fixed cost component, rising volume has helped Indian Railways improve asset and staff productivity. However, the railway has not been passive in the face of increasing traffic, letting volume drive productivity improvement. Rather, it has quietly made some of the changes recommended in the Expert Group Report of 2001 and implemented other significant changes in operating practices, all of which have enhanced the productivity of railway assets and staff. The key factors can be grouped into three major sets:

- Employment and Labor Productivity
- Government investments
- Management changes

**Employment and Labor Productivity**

The chart below shows Indian Railways staff numbers by major functional department since 1990. From a peak of 1.62 million staff in 1992, Indian Railways staff count has slowly declined to about

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36 In response from Rajya Sabha Sabha on 10 Jan 08 to written questions to the Minister of Railways.
1.35 million staff in 2001. The red line shows average staff productivity as measured by traffic unit-kilometers-per-employee. On this measure, Indian Railways staff productivity increased by 60% between 1990 and 2004, and increased by 86% from 2001 to 2007, or altogether, by a factor of three from 1990.

The chart shows the largest percentage reductions in Mechanical, Operations and Traffic, and Commercial Departments. In fact, all departments except Electrical (included in this chart in Other) have experienced staff reductions. The reductions have been occurring steadily since 1993; but Indian Railways began a policy of “right sizing” staff in 2000. Staff reductions along with volume gains have helped push productivity substantially higher. Given the nature of a railway network, some productivity gains come from increasing volume – the network doesn’t get any bigger, it is just used a bit more intensely.

**Government Investment**

The Railway Safety Review Committee, headed by retired Supreme Court Justice H. R. Khana, developed recommendations for investments to improve the safety and condition of the railway. The report and recommendations of this Committee, coupled with the alarming findings of the Expert Group on Indian Railways, induced the Government of India to set up a special Railway Safety Fund in 2001. It contributed Rs 17,500 crore (approximately US$3.7 billion at the time) to the fund to be used to improve the condition of the infrastructure. Over the next few years, Indian Railways renewed and upgraded much main line infrastructure with heavier rail, improved bridges, overhauled rolling stock, introduced new signaling and upgraded information systems. All of these improvements were made over the years after 2002. The impact has been significant, as shown in the chart at left.

The chart shows generally declining numbers of incidents throughout the 20 years from 1988 with a plateauing in the period after 1998 to a peak in 2001. As the safety improvements were implemented, the number of incidents resumed their decline. Moreover, these safety improvements also left Indian Railways with greatly improved infrastructure, built to a heavier standard, and new signaling and information systems that would play

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37 From Indian Railways Annual Statistical Supplements

38 Net tonne-kilometers plus passenger-kilometers

39 The original report recommended an injection of 25,000 crore in government capital to improve railway safety.
a vital role in increasing the productivity of the railway in the immediate future – by providing for increased axle loadings, higher line capacity, and improved equipment utilization. The grant investment by the government of India was presaged by the Expert Group Report of 2001 and helped establish the conditions for a turnaround in financial performance.

Revenue Density of Trains

On many parts of the Indian Railways main lines, maximum train length is controlled by the distance between passing sidings. As a result, many trains are fixed length, containing a certain number of wagons or coaches.\(^{40}\) The capacity of a railway line is measured by how many trains it can carry in a given time period. Growth in both passenger and freight traffic has left Indian Railways operating near its capacity limits on some of its principal main lines.

One of the most important changes in policy and practice that has been made in the past few years has been the increase in axle loadings for bulk commodities.\(^{41}\) Indian Railways has a standard axle load limit of 20.3 tonnes per axle. The capacity of wagons is set based on this axle loading and maximum railway tariffs are based on the capacity of wagons for specific commodities. Given the limited number of accurate scales, shippers are typically allowed a certain amount of latitude in wagon loading (typically expressed as carrying capacity +2 tonnes) and loadings are based on the honor system. Overloaded or underloaded wagons of a particular commodity pay the same tariff based on the carrying capacity (and allowance) and tariff for that commodity.

As a result, when commodity prices and demand soared, many shippers found it to their advantage to overload wagons. The extra tonnage was not captured by Indian Railways and was not subjected to any tariff charges. Subsequent to the upgrading of infrastructure, a long discussed policy change to increase permitted axle loadings was first tested and then implemented on certain routes carrying a large proportion of bulk traffic.\(^{42}\) This change permitted the railway to capture tonnage it was already carrying\(^{43}\) but not counting, and it permitted a change in the carrying capacity of wagons so that not only was the tonnage counted, it earned revenue. Even if no other changes were made, the increase in official axle loading increased reported volume and earnings by about 10% on bulk commodities such as iron ore and coal that were most subject to the improvement. This change increased the revenue density of a typical freight train without increasing train length (or, in

\(^{40}\) A train’s worth of wagons is called a rake on IR. For freight trains, a full length train is about 50 wagons, for passenger trains, it is 24 coaches.

\(^{41}\) Indian Railways began experimenting with increased axle loadings in the mid 1980s but the experiment was not sustained due to concerns about safety and the declining condition of railway infrastructure. Even so, some additional loading (an additional 2 tonnes) was permitted in the late 1990s for some commodity types.

\(^{42}\) Implementation of increases in axle loadings required some wagon modifications, improvements to some bridges, and relied on the heavier infrastructure that was part of the track renewal effort funded in part by the Railway Safety Fund. Additional experimentation with higher axle loadings started in 2003 but was formally approved by the Minister in 2004.

\(^{43}\) Many test weightings had indicated that wagons were commonly loaded above capacity for bulk commodities.
many cases, its actual weight) – increasing revenue generating capacity even on lines that are operating near their physical capacity. The effect of increased axle loadings can be seen in the chart above. Broad gauge tonnes-per-train increased steadily at about 1.7% per year until 2003 when it shot up by 9% (shown in the circles on the chart).

IR also simplified its tariff system, consolidating some 800 different tariffs into around 100 more simplified tariffs. This process provided an opportunity for Indian Railways to reclassify some commodities, in particular coal and other bulk commodities, to a higher classification, effectively increasing tariffs on these commodities. The net effect was to recognize tonnage that was already being carried (in overloaded wagons), increase the permissible axle loadings, particularly for bulk commodities, and then to increase some tariffs – each action adding to the financial performance of the railway as trains remained the same physical length but carried additional revenue from tonnage realization and higher tariffs.

An equally important set of policy and operating changes was implemented to improve wagon utilization. Just as the capacity of a rail network can be defined by the number of trains that can be run per day, so too, is it defined by the number of wagons and locomotives available. The effective number of wagons and locomotives can be increased by increasing the rate of utilization of those assets. For wagons, utilization is typically measured in the number of days between loading events. So a reduction in the length of the wagon cycle can effectively provide a larger wagon fleet. Indian Railways went about improving wagon utilization several ways. First was to increase the velocity of wagon movements. The improvements in infrastructure reduced the number of train speed restrictions for track conditions, reduced accidents and derailments also resulted in de-congesting important parts of the network. The railway was also able to increase posted train speeds on parts of the network. In addition, the railway implemented policy and operating changes designed to reduce wagon turn-around time:

- Shippers were given preferred placement and discounts for accepting full rakes for loading
- A policy of supporting 24 hour loading and providing incentives to shippers to load at any time
- Instituting faster train examination procedures to reduce the time wagons are out of service
- Instituting longer times between train examination, to reduce delays en-route

Better management of wagons and coaches through improved IT systems, tracking wagons and matching them with loads, minimizing waiting times for both passenger and freight trains

The effect of these changes was to reduce wagon cycle times by almost 15% over the last four years. As the chart at left shows, the trend in improving freight wagon utilization is of long standing.44 Wagon cycle times have

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44 In the early 1980s, under the guidance of Railway Board Chairman M S Gujral, Indian Railways began implementing operating and policy changes to improve wagon utilization. These changes included the move to trains composed of
reduced by nearly 60% since 1982; recent efforts have allowed the underlying trend to continue. The chart also shows another utilization measure tracked by Indian Railways – net-tonne kilometers produced each year per tonne of wagon capacity. This is a useful measure that combines velocity and cycle time and compensates for larger wagons. The axle loading increases are likely to have a significant effect on this measure of utilization, permitting continued increases in utilization measures based on tonnage.45

Passenger equipment also experienced improvements in utilization. The line capacity added by the infrastructure investment program and increased train speeds improved physical utilization of passenger rolling stock. Indian Railways also increased the number of coaches on passenger trains. Both improved IT systems and better management of equipment downtime resulted in improved utilization of locomotives, coaches, and freight wagons. These improvements resulted in added equipment capacity without increasing the amount of rolling stock in the fleet.

A similar process was used to improve financial returns from passenger services. In this case, Indian Railways developed policies to increase the number of passengers carried on passenger trains. The changes included physically redesigning coaches to increase passenger densities and a policy of upgrading passengers to ensure that every seat and berth was occupied by a paying passenger. On busy routes, the number of passenger coaches on a train was increased so that now more passenger trains operate with 24 coaches.

The chart at left shows the trend in passengers per train (passenger kilometer/train kilometer) over the past 30 years for both suburban and inter-urban trains. After a long period of stable values, the number of passengers per train began increasing in the mid 1990s. After a slight stall in 2002, the number of passengers per suburban train began increasing at a higher rate after 2002. For inter-urban trains, passengers-per-train increased steadily until the most recent year where it increased sharply. These trends reflect both population growth, and Indian Railway’s efforts to better match capacity with demand and maximize the number of passengers per train. The effect of these techniques was to increase revenue per passenger train – a kind of physical yield management. Passenger fares did not increase substantially in recent years. However, improved financial performance was driven by operating the same basic passenger network but carrying additional passengers and thus additional revenue for each train while not increasing costs substantially.

Management Structures and Change Management

Indian Railways is a vertically integrated railway – it operates passenger and freight services, maintains and builds railway infrastructure, and its units design, build, and maintains rolling stock. The

block rakes, eliminating the need for intermediate marshalling, segregation of wagon stock with different speed and safety characteristics for more uniform train performance, and relaxing the en-route examination requirements.

45 The as-built capacity of existing wagon fleet does not change but permitted axle loadings increase, allowing heavier loading and more tonnes. This drives this capacity utilization measure higher.
organization includes geographically defined zonal railways, production units, construction and design units. Indian Railways also has various public sector undertakings including research groups, consultancies, construction and design groups which compete for work in the private sector. Indian Railway’s organization also includes a railway standards unit which sets standards for equipment and infrastructure design and maintenance practices.\(^{46}\)

The railway is generally organized by major department along traditional disciplines (engineering, mechanical, electrical, traffic, financial, etc). The chart below shows the overall organization structure.\(^{47}\) The Railway Board is a management board, composed of members from each major department. Reporting to the Members are Additional Members and Executive Directors, each director typically in charge of a directorate. Management staff generally rise in the organization within a departmental unit. Promotions are seniority based. Appointment to the board of directors is also seniority based but the Minister has some ability to manage appointments through early retirement and persuasion.

One result of this process is that departmental board members are very senior and, in the past, often reached board level with little time remaining before retirement. In recent years, the Board and Ministry have modified appointment rules to ensure that Board members have at least a year and, when possible, more than 18 months of service remaining prior to mandatory retirement.

In general, Railway Board decisions are made with the concurrence of all members; a single member can object to a proposed measure on safety principles and the measure is not likely to carry. As a result, Board decisions that may cause one department additional expenses or expose it to additional safety concerns, often do not pass. The process makes the Railway Board a very conservative organization, risk averse, slow to change, and slow to adopt changed practices.

\(^{46}\) In most industrial economies, a standards unit falling under the same management structure as production units would be seen as a conflict of interest but seems to be accepted in India.

\(^{47}\) Organization structure from the Ministry of Railways, 2006-b.
Indian Railway's organization structure is also quite bureaucratic – a tradition in government agencies and units. Special attention must be given to documenting the decision making process and to addressing all possible outcomes. Indian Railways operates within a governmental structure that is itself very bureaucratic. Management processes are complex and require multiple levels of approval and documentation; often inter-departmental decisions must go to the Board for resolution. The bureaucracy slows decision making, discourages experimentation and evolution in technology and in management practices.

These management and institutional characteristics are, in part, responsible for the risk-averse nature of Indian Railways as demonstrated in its slow adoption of new technologies and management structures that may be better suited to its market position in India. Existing management structures and institutional arrangements also make changing organization structures difficult. Internally, Indian Railway's departmental structure is supported vertically throughout the entire organization to the Board level. There is little cross-departmental or cross-discipline personnel movement. Decisions and adoption of changes that may generate more income or save one department operating expenses while costing another additional operating expenses must be coordinated at the Board level, slowing decision making and cross-departmental evaluations. Finally, since the organization follows strict pay and sonority policies, management can offer few incentives – either through quick promotion or financial reward.

Managing Change within Indian Railway

Even so, some significant changes have been made in the past and more are underway. One of the most significant changes was made in 1988 with the formation of Concor, a semi-independent enterprise created to enhance the use and movement of containers within India. Setting up Concor required a substantial change in how transport of containers was organized and in the formation and finance of container terminals. The line-of-business type restructuring embodied in Concor proved highly successful; first, in improving the quality of container handling services thereby greatly extending usage of container transport in India; and, second, proving its profitability. Of potentially greater significance was the decision in 2007 to sell licenses for container services to 14 private container service competitors. If current industry plans materialize, by April 2009 the private sector is expected to have added at least an additional 120 container trains per day, as compared with Concor's present 148, constituting more than an 80% increase in capacity.

Recent initiatives have also required significant management change within Indian Railway. These include the aforementioned simplification in tariff structures, increases in approved axle loadings, design of high-density passenger rolling stock and train configurations, institution of 24-hour freight loading, extension of inspection and maintenance schedules, among other small and large changes in practice and process. Given the risk-averse nature of Indian Railways and Indian Government structures, managing this kind of change is difficult.

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48 See for example the IIM case study titled “Turnaround of Indian Railways: Increasing the Axle Loading, a Case Study” by G Raghuram and Niraja Shukla, IIM Ahmedabad, September 2006 for an extensive discussion of the process to increase axle loadings, a process that took more than 25 years in total.

49 Although the profitability may be attributed to the fact that Concor was allowed to retain a monopoly on rail based movement of containers until recently.

50 Constituting an investment of more than Rs 1,900 crores plus 550 crores in license fees.
It is important to have an understanding of the fundamental strengths and weaknesses of the current management structure to successfully manage change within the organization. The Ministry identified and accepted these fundamental strengths:

- A skilled, educated, and intelligent management staff
- An organization of individuals with integrity
- Robust system of training and promotion so that staff are increasingly capable as they rise through the organization
- An ethos and culture of loyalty (in a hierarchical organization, that loyalty is also hierarchical)

According to senior Ministry officials, Indian Railways weaknesses include a poor understanding of economics and finance and a culture where profit was considered distasteful and not an appropriate measure of performance. The culture and ethos has resulted in an organization that is risk averse and parochial in nature.

The Railway Minister and Mr Sudhir Kumar, officer on Special Duty to the Minister of Railways, have developed a unique management style to manage change within the railway. Here, we call this approach “Zen Management.” It is based on the acceptance of fundamental constraints of India and the railway structures but seeks to find ways to manage around those constraints. Primary fundamental constraints include:

- The Minister’s political position - acceptance of the mandate of the democratic process driven by the decision of voters; this mandate delimits and guides the Minister's political positions.
- Physics – acceptance of the limits of what is physically possible
- Institutional Structure – major change is outside the scope of the Railway Board and beyond the sole authority of the Minister; the current institutional structure depends on and requires consensus management.

The Ministry’s Zen Management approach to change in the organization began when the Minister took office with the communication of several important messages:

- Recognition and acceptance of the strengths of the railway organization, showing respect for the management and culture of the railway.
- While the railway is in poor financial condition, there is hope for the future – the railway is too important an institution to fail.
- An organization only wins the battles that it engages, but it must first discern which battles to enter and separate that which is feasible from that which is only possible and attack the feasible first, the possible only later.
- Change does not require a revolution or rejection of the railways strengths; rather change is evolution that is built on those strengths.

Consensus management has the benefit of building coalitions for change throughout the organization so that implementation is less complex and not divisive. Senior ministry officials used a political management process to move Indian Railways to a consensus position on many issues. That political management process involved identifying and building a group of supporters for change.

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51 Zen is used here after a school of Buddhism noted for its emphasis on the mindful acceptance of present conditions. It emphasizes experiential wisdom, spontaneous action, and letting go of judgmental thinking.
issues throughout the organization (and, of course, identifying those who oppose the change). Often, resistance within the organization was significant and constant support and attention was needed to move the decision process forward. Mr. Kumar calls this process “Management by Nagging.” Senior Ministry and railway management officials report that they use all levers of power to create incentives for change, including managing promotions and awarding assignments. It is a process of placing the supporters in positions of power while moving non-supporters into positions where they cannot block the change.

The management process involves convincing managers to accept the change – first by accepting the premise on which it is based, then by helping identify ways that the change can be accomplished. This process takes time to evolve and progress must be initially measured in smaller steps while the consensus is being built. Early successes were celebrated, and associated with both the individuals and the organization unit that helped earn the success. Further, early successes were shared widely within the entire organization, celebrating those who helped identify and implement them while also associating rewards made possible from the success with the specific changes.52

While “Management by Nagging” is labor intensive and requires constant effort, it has been effective in changing the culture of the railway under the present administration. There now is acceptance that profit in freight services produces results which can expand social services and allows the railway to more effectively meet the needs of the economy.

The most difficult part of achieving a quantum improvement in railway financial and physical performance is identifying the levers that can be manipulated to achieve greatest improvement in performance while requiring the least effort of manipulation. “Management by Nagging” works only if one knows what to nag about – what changes will be most effective in improving performance. An important part of “Zen Management” is to correctly discern the leverage presented by the current situation and understand which levers will most effectively tip the scales toward the necessary changes throughout the organization.

In the case of Indian Railways in early 2004, while the situation with the railway was still thought to be dire, government grants in the Safety Fund had already begun improving the condition of the infrastructure. At the same time, the Indian Economy was experiencing rapid growth and demand for freight transport was high across all commodities. These conditions provided the essential leverage with which to change railway performance substantially. A lot of groundwork had been laid in earlier efforts to improve performance. However, it took real insight to identify, among the myriad of actions that could have been pursued, those which would have significant impact on performance, those that could be achieved, and, further, to determine how to go about implementing them.

For this analyst, the success of Indian Railways Renaissance of 2004 to 2008 rests to a large degree (an uncomfortably large degree) on those insights.

Summary

This chapter first benchmarks the financial condition of Indian Railways at its low ebb in 2000/01 and then traces developments over the subsequent seven years, identifying three sources of the turnaround:

52 As financial performance improved, the railway increased bonus payments made to each railway worker, identifying the increased payment as a specific result of the new policies that had been adopted by the Railway Board.
• Selective investments totaling Rs 17,000 crores (US$3.7 billion) focused on removal of bottlenecks which allowed increased outputs and improved productivity of infrastructure, equipment, and labor

• A gradual reduction of the labor force (totaling about 280,000, or 4.5%, over the seven years) while also increasing both passenger and freight throughputs, resulting in an approximately 85% increase in labor productivity

• Management actions to increase revenue density of passenger trains both by adding coaches and implementing yield management systems to fill seats

• Selective investments to support higher axle and train loadings

• Management actions to recognize and capture revenues and higher train loads factors

Economic Environment

• A robust economy enjoying substantial growth sustained for some years and similar prospects for the years immediately ahead, including a particular boom in commodities (e.g. coal, iron ore, limestone, iron and steel products, cement) which are especially suited for railway transport.

• Chronic underinvestment in transport infrastructure for all modes well below the rate of growth of the economy and transport demand over earlier years had created capacity shortages and, combined with robust demands, a ‘sellers market’ for rail transport, especially freight, but also passenger services.

• Persistent failure of India to construct a network of modern highways – the four largest cities of India have yet to be connected by limited-access expressways – severely restricted inter-modal competition from the roads sector, thus affording Indian Railways a degree of protection unequaled today in any other of the world's major economies.

Public Policy and Political Environment

• Indian Railways, operated as a government department, with its annual budget requiring Parliamentary approval, has traditionally been vulnerable to diverse and often conflicting political pressures that led, inter alia, to:
  - Maintenance of very low fares for lower-class rail passenger travel, cross-subsidized by high tariffs on railway freight in a time honored tradition
  - Dispersal and significant misallocation of limited investment funds across a wide, disparate basket of politically-favored rail investments of limited benefit.
  - Chronic under-investment in badly needed new capacity, modernization, or even maintenance of existing rail infrastructure and equipment.

• During much of the period under review, Indian Railways enjoyed the support of a politically powerful Minister of Railways who took the position seriously. The political mandate for cross-subsidies to support low fares for lower-class passengers remained in place across 2001-2007 and survives to the present day.

• In the face of Indian Railways’ compound crises – of deteriorating safety, physical and financial capacities – political consensus was reached in 2001 on a substantial government investment (Rs 17,000 Crores, equivalent to US$3.7 billion), and, of particular significance, the management of Indian Railways was somehow shielded from the usual political pressures and allowed to
allocate these funds to the most urgently needed investments to reduce constraints on capacity and productivity, as well as enhancing safety.

Railway Operating Environment

- Some slack existed within the Indian Railways system in 2001 which adroit Indian Railways management was able to exploit by a combination of well placed marginal investments (e.g. to eliminate safety hazards that had limited train speeds, thereby reducing throughput and productivity of track and equipment) and process re-engineering (e.g. increasing load factors and revenue densities of both freight and passenger trains).

- A sense of urgency in the face of crisis provided the stimulus and leeway for prompt and effective action by Indian Railways management in contrast to its more usual deliberative, consensus-seeking processes in the absence of crisis or compelling competitive pressures.

Actions Taken to Achieve the Turnaround 2001-2007

As noted in the preceding chapter, the turnaround can be traced to four major groups of factors:

- Significant government investments, without political misdirection.
- Actions by Indian Railways management to exploit available slack in a capacity-constrained system by selective removal of key impediments and process re-engineering to maximize throughput.
- Actions by Indian Railways management to maximize revenue density of trains.
- Labor productivity improvements: not only did total output (tkm+pkm) increase by 67% over the 7 year period, there was at the same time a very gradual reduction in the total labor force cumulating to 4.5% over the 7 years, with the result that output per employee increased by some 86%.
**SUSTAINING THE TURNAROUND**

*Moving the Lakshman Rekha*

Is the current turnaround sustainable in the long-term? The current turnaround had several important antecedents: strong traffic growth; rising commodity prices that have permitted substantial tariff increases; investment in strengthening the infrastructure and easing bottlenecks; earlier experimentation with higher axle loads; operating practices based upon solid block train; and a devastating Expert Report that put the entire organization and the government on notice that change was needed. From May 2004, a new, politically powerful Minister of Railways was brought to this set of circumstances. Each of these factors helped set the conditions needed to continue past efforts and initiate new programs to improve productivity and financial performance.

Better financial performance can sustain the improvement in the condition of infrastructure, but continued growth of the Indian Economy depends critically on the ability of the railway sector to provide capacity for large scale traffic growth. Some modest additional capacity can be created by improving equipment utilization, incrementally increasing train speeds, and making further increases in axle loadings and net tonnes per train. However, to achieve significant increases in capacity, major new investment in infrastructure and rolling stock and fundamental changes in operating philosophy will be required. New methods to finance and execute these significant investments may also be needed.

A particular concern is that the financial health of Indian Railways is highly vulnerable to the substantial increases in wages and pensions expected to be mandated by the next Pay Commission later this year. The railway has a labor force in excess of 1.3 million staff, and labor costs comprise some 52% of total Working Expenses, even after increasing productivity by 86% since 2001. Another 25% increase in labor costs (wages and pensions) would erase the operating ratio improvements made since 2001. To contain staff costs per unit of output, it is critical that improving staff productivity become a core goal for the future. Norms for staffing levels need to be reviewed in light of best-world-practice and, where possible and over time, technological and process changes to improve productivity implemented to reduce unit staff costs.

It reflects well on the current management and employees of Indian Railways – from the Minister of Railways through to the lowest cadres – that Indian Railways is once again profitable; and, as shown in the international comparisons above, by many measures, one of the world’s more efficient railways, in keeping with its proud traditions. Possibly for the first time, Indian Railways management was given permission to pursue commercial and business objectives in which profit maximization was an important and integrated goal. The organization sought to achieve its objectives by reducing the unit-cost of transport and maximizing revenue. Indian Railway Board and the Ministry took the political risk of failure to achieve bold targets for traffic volume and profitability improvement.

It must be recognized, however, that it took a major crisis – in deteriorating safety and transport bottlenecks disrupting Indian economic growth, as well as railway finances – to forge the political consensus that won the Ministry of Railways and Indian Railways management the freedom of action and resources to achieve the vital turnaround over 2001-2007. The question now is whether the railway can sustain its new-found profitability and expand capacity to meet the rapidly growing transport needs of the Indian economy.
Currently, Indian Railways staff morale is high as a result of improved financial and operational performance in recent years. However, the motivation to do better has so far not percolated to levels below the top management in the railway Board and some Zonal Railways. Even though morale is high, Indian Railways management continues to be obsessed with “control of the railway business” in India and reluctant to permit the participation of the private sector in many areas. In modern economies, competition drives innovation, efficiency, and improved performance. Yet, management’s obsession with control has limited competition in many aspects of India’s rail sector – from equipment manufacturing, to maintenance, to operation of rail services and terminals. The recent opening of inter-modal services to competition is a step in the right direction; further opening of the rail sector to competitive forces and innovation in service design and customer service will help the rail sector continue to achieve growth and financial improvement targets.

Complicating this need for control is a lack of a sense of urgency in arriving at important decisions. The Indian Railways decision making process continues to be slow and cumbersome. Delays in working out the modalities of financing and implementing the Dedicated Freight Corridors is a typical case of both the need to control and of not recognizing the cost of delays in decision making. Partly this is a result of insufficient capacity for strategy and vision development, and for project planning and implementation. Indian Railways needs to take strong measures to remedy these deficiencies so that projects are recognized, planned, and implemented over a reasonable period.

Efforts to improve strategy, make urgent decisions, and take risks to improve performance are stunted in the current organization by the lack of management incentives that characterize Indian Railway management processes, practices, and management structure. The result is a risk-averse organization where decisions are delayed, risks not assessed properly, and cross-departmental cooperation is discouraged. Indian Railway needs to develop an incentive system that encourages its management to be innovative. These incentives need not be entirely financial, but should include new paths for more rapid advancement, increased responsibility, the ability to achieve cross-functional experience and skills.

An example of this lack of vision and incentives is a lack of any meaningful long term effort to improve service quality in passenger and freight businesses. Several different projects have addressed wagon utilization and are being used to address the quality of some passenger services, but there is no long term effort to systematically identify service quality and design an integrated program for addressing improved customer services over the long term. Service quality should be an integral part of Indian Railways long-term vision and strategy.

On the demand side, the Indian railway sector is likely to continue to enjoy robust traffic demands; first, because of likely continued strong markets (both domestically and internationally) for commodities and other transport-intensive products – particularly coal, iron ore, other inputs to steel plants, iron and steel products, cement, and food grains – for which railways normally enjoy strong comparative advantages. Second, because, for the foreseeable future, competition from road transport will continue to be restrained by the limited state of India’s highway network, which will take decades to develop, even if the government were to decide today that doing so is an overriding priority. The demands for inter-modal transport – long-distance movement of containers by rail and local pickup and delivery by road – can be expected to grow particularly strongly, provided that the railway system and inter-modal transfers can be dimensioned and operated to deliver consistently high service quality. Thus, unlike railway markets in many countries, the major issues of concern are not on the demand side. The major concerns in sustaining the turnaround of Indian Railways lie on the supply side.
INSTITUTIONAL CONSTRAINTS

Can Indian Railways continue to deliver transport services of sufficient volume and quality to meet the expected demands of the Indian economy while containing the growth of costs to levels that leave sufficient surplus over revenues to maintain the existing system and service any debt needed to expand capacity to meet demand? Rising labor costs, resulting from the next Pay Commission decision alone could erase the operating ratio improvements made over the last few years, without even considering other increases in operating costs (e.g., energy, the rising cost of steel, cement and other materials). Innovative management will be required to continue making productivity improvements and contain the unit-cost of rail transport.

New capacity can be created in many ways – increased speed, higher axle loads, longer trains, double tracking, and new railway lines. Matching capacity to traffic will require many decisions and choices – new types of wagons, new infrastructure standards, new train control and signaling technology, improved information systems, perhaps longer trains. An essential feature is that the decisions will require insights and choices that cut across departmental boundaries and may require change in many current practices. Who will have the breadth of vision and insight to identify the overall most effective change efforts?

The capital costs to expand output to meet the expected large increases in demand pose an even greater challenge. Today, most slack has already been drawn out of the system, and the existing rail network is approaching what may prove ultimate capacity limits in India’s most important transport corridors. Impending traffic growth will necessitate investments of a large scale if a transport crisis is to be avoided. Plans have been prepared for a series of dedicated freight corridors that will add substantial capacity in major corridors. Key policy decisions are yet to be made regarding the ownership of these corridors, their relationship to Indian Railways, and the possibility of creating intra-modal competition over them. The magnitude of the required capital investments, and the potential for introducing meaningful competition into the railway sector, is such that the Government of India is considering private public partnerships to finance these new corridors. Who will manage these large investments and potentially complex relationships?

Indian Railways has made few fundamental internal changes. Some cultural changes have taken place: “Profit” is no longer viewed as inappropriate, but is seen as a means to extend the organization, expand railway capabilities, and support economic growth. However, Indian Railways remains a “stove-pipe” organization with little incentive for cross-functional cooperation, one where all issues must rise to the board level or be smothered by inter-departmental conflicts.

Innovation is hard to ignite or sustain in the current insulated bureaucratic environment. It is difficult to provide incentives for compromises needed between departments to find the overall least costly and most effective solutions, most of which will require cooperation between departments and changes in standards and practices across departments (e.g., still higher axle loadings, new equipment types with greater capacity, trade-offs between train control systems, increased speed, higher infrastructure standards, new rolling stock, and new physical capacity). There are no mechanisms to incentivize the search for optimal solutions on issues that necessarily cross departmental boundaries.

MANAGING CHANGE IN THE FUTURE

When the current leaders of improved performance leave the scene, what and who will continue to guide and push the organization to make the substantial changes still needed to drive capacity
improvements and higher productivity? The achievements made so far can be laid at least in part to the Minister’s Zen Management method and to Management by Nagging. While these concepts have provided the basis for a continuation of improvement in financial and physical performance, when the Zen Managers retire or are replaced in the normal political process, when Management by Nagging is insufficient to bridge departmental boundaries, there is great danger that the management of change will stall and perhaps die out. The organization remains monolithic and focused inward; cross-departmental decision making is still difficult.

Some initiatives could be even reversed. For example, a serious accident resulting from the increased stresses present in higher axle-load operations could result in a withdrawal of these gains. Many in the engineering department fear that the effects of higher axle loads may decrease safety.\(^{53}\) Other changes are less likely to be reversed; among these are the efforts to increase revenue density of train operations.

Current success has increased the morale and excitement of officers and staff; should these successes stall, maintaining morale and the willingness to pursue changes will be difficult. Innovation is hard to generate in the current insulated company environment. It is even more difficult to provide incentives for compromises needed between departments to find the least costly and most effective solutions, most of which will require cooperation between departments. Management by Nagging is an inefficient way to achieve cooperative, integrated decision making. Someone must independently determine what to nag about. The process is not easily institutionalized. There are no mechanisms to incent finding optimal solutions on issues that necessarily cross departmental boundaries.

Sustaining the renaissance of Indian Railways will require massive investments in new infrastructure as well as changes in the structure of the organization that will encourage private investment and changes in operating practices and standards that can maximize the value of new investments. The private sector has much greater ability to finance major investments than Indian Railways or even the Government of India. However, the current sector structure excludes private investment except in extraordinary and very controlled circumstances, and there is no mechanism to incorporate market signals in investment decisions. Under the current structure, solution of critical issues involved in making the capacity and operating costs of the railway match the needs of a growing economy depend on the practitioners of Zen Management properly judging which constraints are truly immovable and which must be relaxed. Under the current structures neither Zen Management nor Management by Nagging can be institutionalized so that optimum solutions automatically evolve from the give and take of the market place, they rely too much on the talents and insights of a few individuals in a position to effect decisions.

Indian Railways have so far not articulated a “long-term vision” for the future that could inspire and energize not only its top management but also the rank-and-file to aim for really high growth and efficiency over the next 10 to 15 years. Recent achievements in IR’s performance were possible partly due to the IR Board’s decision to aim for growth rates much higher than the average for the past decade. A vision statement, say for the year 2025, supported by an integrated master plan, including a road-map for network expansion, service improvements, volume growth, technology improvements and operational and financial performance could act as a catalyst to raise railway performance to greater heights and minimize the risk of slowing the momentum for improving performance built in the past few years. The proposed vision statement should include an estimate of the capital

\(^{53}\) This fear persists, even though many railways with similar infrastructure design have been operating at higher axle loadings than currently approved on Indian Railway. It is possible that infrastructure spending and new rail stress management techniques may be required (e.g., rail grinding, improved metallurgy for some rail segments, improved rail lubrication techniques, etc). There is little sensitivity to the cross-departmental evaluation of costs and benefits.
investments that would be required and a general approach to how the investment programs can be financed.

In summary, the successes gained in recent years that have resulted in the recent financial turnaround of Indian Railways are not likely to continue under the present organizational structure. Absent structural changes or the introduction of new competitive forces in the rail sector, it is likely that the improvement in rail sector performance will at best plateau as long as demand is high. While most of the recent gains are likely to be retained, the substantial boost to wages and pensions expected to be mandated by the Pay Commission will substantially reduce Indian Railways’ financial profitability in the near future. Moreover, for the longer term, the prospects for future development depend too critically on the personalities and talents of a few individuals under the present structures.
Over recent years, Indian Railways has achieved a very important and significant improvement in financial and operational performance. Even so, continued growth in the Indian Economy depends critically on transport capacity generally, and rail transport capacity in particular. Limited railway capacity is a critical issue in several major transport corridors. To provide the physical capacity to meet the anticipated growth in traffic, plans have been prepared for a series of dedicated freight corridors. The magnitude of the required capital investments and the potential for introducing meaningful competition into the railway sector is such that the Government of India may wish to consider expanding the role of private public partnerships to introduce competition and inject private sector finance for railway investments. Key policy decisions yet to be made are those relating to the ownership and relationship of the dedicated freight corridor lines to Indian Railways and the possibility of creating intra-modal competition between them.

The Government of India should move ahead on Dedicated Freight Corridors as quickly as possible. If necessary, separate the first two projects; don’t let available finance determine what gets done first or the technical specifications for the corridor. Determine what is needed first, and then find finance. These projects will require further changes in the rail infrastructure connecting the corridors to major railway centers of trade and operations. Their great expense may also require private finance and even a different structure for integrating the added capacity into the national rail network.

These issues should be addressed by the development of a strategy to manage rail capacity over the long term, identifying the characteristics for the most effective type of capacity (e.g., electrified, double track, capable of double stack service, capable of 30+ tonne axle loads, capable of handling longer and heavier trains, capable of higher speeds, some combination of the above phased over time) and the time phasing of the necessary capabilities. The capacity strategy study should address the most effective way to finance necessary investment projects. This may involve development of different structures (e.g., internally financed, public-private partnerships with Indian Railways as the major public partner, or privately financed and operated with the Government of India or Indian Railways as a minority partner). Once a capacity strategy is developed, the first or most important expansion projects should be initiated. This will require the development of specifications, a business plan and revenue model, and then a financing plan.

In general, India should develop greater reliance on markets and private finance for major railway investments. Not everything needs to be a public private partnership with Indian Railways; private investment has been very effective in market economies. The government and railway should allow and encourage shipper ownership and control of rolling stock – the current incentives are too small, and hurdles to the use of private equipment too great. Currently, private ownership of rolling stock gains shippers or private investors no particular advantage except to help Indian Railways finance equipment that it continues to control.

Development of design and manufacturing capacity for new wagons, coaches, and locomotives is costly. The Indian railway equipment market is large enough to sustain several private equipment builders. A problem in India now is that there is a single buyer for rolling stock. In such an
environment most manufacturers (either internal units or private companies) are order takers building equipment to specification, not competitors and innovators. Developing methods to encourage private ownership will broaden the market and infuse it with new creativity and innovation. Competition between designers and builders will spur innovation, the application of new materials, and new ownership structures (e.g., leasing companies).

Private owners and builders must be assured that their equipment will be approved to operate on Indian Railways lines for which it was designed. Since builders will compete with Indian Railways units, a new equipment certification process will be required (certification is now handled by a unit of Indian Railways – private investors will be reluctant to invest to compete with internal units with an internal certification process). A new certification body and process outside Indian Railways will be needed. Should the Line Capacity analysis indicate a form of private sector ownership of the new rail freight corridors, then a new safety office to set performance standards for infrastructure will also be needed. The new technical standards body could be at a university (e.g., IIT), or in the Ministry of Railways, outside the purview of the Railway Board.

Within Indian Railways, new ways to foster innovation and to solve complex railway problems with inter-departmental solutions must be developed. Indian Railways staff are well educated, smart and can be very innovative. The current departmental structure limits their ability to work cross-functionally, and keeps the departmental organizations too insulated and isolated. There are no incentives for taking risks, or for reaching across departmental lines to achieve better performance.

New ways should be developed to move managers between departments and into operating roles. One way to start this process is to slowly modify the way the railway is organized. The first step may be to form units based on lines of business (e.g., freight, inter-urban, suburban passenger). These units could operate similarly to Concor. An improved financial system to provide cost accounting by line business and a method to allocate common costs will be needed so that the new units can have responsibility for their financial performance.

Once the new units are formed and have management and financial reporting capabilities, focus of managing the railway should be shifted to these new departments. The new departments should have control of and responsibility for operating expense budgets and for a significant portion of capacity spending.

Over time, Indian Railways would sell its major manufacturing units, and the new units would rely on competitive tendering. These types of changes will foster cross-functional decision making and innovation in equipment and rolling stock developments. Eventually, even the railway board could be modified to have outside members responsible to the Minister to represent the interests of public stakeholders.
APPENDIX

APPENDIX 1: CV OF JOHN H WINNER
Mr Winner is president and CEO of Harral Winner Thompson Sharp Klein, Inc. (HWTSK), a transportation industry consulting company specializing in rail industry restructuring, mergers and acquisitions, privatization, and finance. He has spent more than 30 years in transportation industry management and consulting. He was vice president at Mercer Management Consulting and director of the rail management consulting practice and the analytic and techniques group at Booz, Allen & Hamilton. While at Mercer and Booz, Allen, Mr. Winner also served as contributing editor and columnist for Progressive Railroading magazine where his column, Smart Managing, covering rail and transit management issues, appeared monthly for more than a decade. Prior to that, he worked for a major US railroad, the L&N (and later CSX), for more than a decade in a range of operating and executive positions and conducted the railroad’s first operations research and strategic planning studies.

Mr Winner has advised investors and financial institutions in transactions involving more than $13 billion in railway equipment, workshops, and infrastructure. He has managed rail passenger and freight assignments all over the world, including many countries in Western, Central and Eastern Europe, South America, the Asia-Pacific region, and in the former Soviet Union, the United Kingdom, Canada, and, of course, the United States.

His work for passenger transportation companies has involved strategy formulation, market analysis, organizational alignment, capital planning, operations planning, service improvement and process reengineering. He has also completed a number of assignments for transport industry suppliers concerning the introduction of new products and technologies, analysis of proposed mergers and acquisitions, assistance in consolidation, and market forecasting. Mr Winner has also directed a number of high level transport policy, organization, econometric forecasting, technology assessment and restructuring assignments for government transport enterprises, government agencies, ministries, and other organizations involved in transportation. Recent rail industry assignments include:

• Working with a series of investors, over the past few years Mr Winner has acted as rail advisor in equipment financing transactions for railway rolling stock, infrastructure and facilities valued at more than $10 billion. The transactions covered a wide range of equipment, including, for example: double-deck commuter rail equipment operated by Sound Transit; light rail vehicles operated by Bi-State Transit in St Louis; metro equipment operating in Paris, Stockholm, Berlin; high speed TGV equipment operated by SNCF and EuroStar; conventional locomotive hauled first class coaches for many railways; overhead maintenance equipment operated by ÖBB, the national railway of Austria, and the Hudson-Bergan Line equipment, workshops, and infrastructure for New Jersey Transit.

• For development banks and private financing institutions, Mr Winner served as rail advisor in equipment financing transactions in a number of CIS countries. This equipment, mostly freight cars and locomotives valued at about $3 billion, has been privately acquired by leasing companies and railway operators.

• For the International Finance Corporation, Mr Winner led an HWTSK team in an analysis of the potential valuation for Russian railway operators, carriers, forwarders, and leasing companies. The
report considered concessions, IPOs, and other mechanisms for the sale of rail enterprises throughout the world. This analysis is being used by IFC to help guide its activities in financing the sale of several rail oriented companies in Russia.

- For EBRD, Mr Winner led a review of the future requirements for freight wagons in Ukraine. The project included the development of a detailed forecast for rail freight traffic by commodity from 2007 to 2022. Mr Winner reviewed freight wagon statistics, ownership structures, maintenance methods, and equipment design standards for freight wagons in private and state-owned railway fleet. He reviewed manufacturing capacity, interviewed wagon builders, and private fleet owners to develop a forecast for future wagon needs in support of an investment by EBRD in railway wagons for use in Ukraine.

- Working with Booz Allen Hamilton and a number of other rail industry restructuring experts, Mr Winner led a multi-person team assessing the condition of railway facilities, infrastructure, equipment, management systems and organization and legal structures for a USAID sponsored project to help restructure the Georgian Railway. He also led the restructuring strategy effort and, working with a number of experts, the railway management, and government of Georgia, to develop a restructuring program for implementation over the next five to eight years.

- For the World Bank, Mr Winner working with Richard Sharp, another HWTSK partner, analyzed methods to increase private participation in the rail sector in the Republic of Georgia. The analysis included options for increasing private sector participation in railway rolling stock and infrastructure as well as the potential sale of the railway or of railway rights through an IPO or concession structure. The resulting report has been used by the World Bank in its consultations with the Government of Georgia in developing a plan for increased private sector participation in the Georgian rail sector.

- Working with the government of Armenia and the Armenian Railway, Mr Winner led an HWTSK team in the development of a restructuring and investment plan to help the railway survive and prosper in this growing region. Buoyed by several years of high GDP growth, the Armenian Railway was struggling with an old asset base and insufficient revenue to replace assets as needed. Private sector financing, new management practices and a changed rail sector structure are part of the restructuring. HWTSK advised a cabinet level commission of government officials in considering restructuring options. A concession model was chosen by government and HWTSK provided continuing assistance in the concessioning of the railway including development of terms and conditions, model concession contracts, restructuring of Armenian Government responsibilities, advice on employee and environmental issues. Mr Winner organized a Road Show for the concessioning in London and Yerevan in mid 2007 that resulted in two qualified bids. A winning bid selected and a contract negotiated in early 2008.

- In some recent work for the World Bank and the national railway of Turkey (TCDD), Mr Winner reviewed restructuring plans, investment strategies and passenger and freight operations. He developed an analysis of the likely financial performance of TCDD under various operating and restructuring alternatives. The recommendations from this analysis form a part of ongoing discussions between the World Bank and the Government of Turkey about future financing of railway investments.

- Working with a number of development banks including the World Bank, EBRD, and the ADB, the Ministry of Transport and Communications of Kazakhstan, and railway management, Mr Winner directed a team of railway and economic specialists in a number of projects to introduce free-market concepts in marketing, accounting, organization, and customer management to the railways of Kazakhstan (KTZ). These assignments were conducted over a period of six years and saw a substantial restructuring of the railways of Kazakhstan, the introduction of a number of
new management techniques, and confirmation of more than $300-million in loans and grants from the development banks. Several of these transforming assignments were conducted for KTZ management at their cost.

- HWTSK served as Financial Advisors for the South Balkans Development Initiative (Bulgaria, Macedonia, and Albania). Mr Winner served as a member of a team of Financial Advisors for the US Trade and Development Agency to the South Balkans Development Initiative. The focus of Mr Winner's activities was railway operating processes, practices, and investment needs.

- Mr. Winner led a team of railway transport and macroeconomic experts in the first western review of Soviet railway and transport capabilities. The landmark *Rail Sector Survey* report, prepared for the EBRD, developed a transport sector investment strategy for the countries of the former Soviet Union. It included the development of a comprehensive traffic forecast for all transport modes and a multi country railway investment strategy which was used by the EBRD to guide its lending strategies and practices in CIS states over the next decade.

- For the United States Senate, Mr Winner provided testimony to the Commerce Committee and the Committee on Transportation on the potential for the reform of Amtrak, the national rail passenger carrier in the United States.

- For the Secretary of Transportation and the Federal Railway Administration, analyzed the policy and regulatory environment currently facing US railways. The analysis also considered competitive and economic forces on the industry. The final report, The Future Structure of the North American Rail Industry, was prepared to help the Department define a position and strategy for dealing with future consolidation among the major US rail carriers.

- For two large US railways, working with the United States Department of Energy and the Tennessee Valley Authority (a regional quasi-governmental hydro and coal based power generator), Mr Winner conducted an analysis of the potential benefits from electrifying the main coal carrying lines in the eastern United States.

- Mr Winner worked with MultiModal Applied Systems and CSX Railroad to develop a new CSX operating plan to improve traffic flows, reduce car-handlings and other operating costs. This plan, the CSX One Plan, has resulted in improved velocity across the CSX network and is substantially reducing CSX operating costs.

- Mr Winner worked with MultiModal Applied Systems and the Union Pacific Railroad to develop a new operating plan to improve traffic flows and reduce congestion across this major US railroad. The plan, called the Union Pacific Unified Plan (UP2), has resulted in improved velocity across the UP network and substantially reduced UP operating costs.

- Assisted CSX and NS in the acquisition of Consolidated Rail Corporation. Helped define practices and procedures within Shared Asset Areas near New York City, Philadelphia, and Detroit. Shared asset areas will increase rail and transport competition in these cities and the surrounding region. Prepared testimony for submission to government regulatory authorities for approval. The $10.5-billion acquisition was approved by regulatory agencies, based in part on the competitive improvements provided by the shared asset area concept.

- For CSX Transportation, directed a long run program to improve service reliability and reduce costs. The work included process reengineering in operations management, service design, equipment management, as well as the development of new organization structures and strategies. The program established that service reliability was associated with low operating costs and improved equipment utilization. The Service Reliability Project developed and implemented improved practices in crew and locomotive management and established the service lane concept of operations management at CSX.
• Mr Winner has led a series of technology and environmental transport studies. For example, he directed and managed a study for the State of Florida that resulted in the development of a commercially viable technology for converting diesel powered metropolitan buses for methanol operation. The technology and fueling system was tested in commercial service in Jacksonville, Florida. He also directed a major study to determine how rail operations contribute to air pollution in California. This study also developed a series of technology and policy recommendations for reducing and controlling air pollution arising from rail operations in several air basins in Los Angeles.

• Mr. Winner led a series of major assignments for the London Underground. He helped the Underground in its first strategic planning effort. The strategy focused on productivity improvement and strategic investments in technology for capacity and cost reduction. Over a seven year period he helped the Underground implement the strategy, which resulted in an improved physical plant and much improved financial performance. He was asked to lead the development of a comprehensive commercial strategy and organization structure for the Underground. As a result of these efforts, the Underground is one of the world's most efficient urban transport systems and one of the very few that operate on a commercial basis.

• For the government of Australia, as well as for several of the Australian states, Mr. Winner helped establish The National Rail Corporation (NRC). NRC was established to operate interstate freight services, while the states continue to operate urban passenger and intrastate services. The NRC was created to provide better service, better compete with road transport for freight services in Australia, and to operate as a commercial enterprise. Its formation ended massive losses associated with interstate rail freight transportation in Australia. Originally formed as a state owned enterprise (owned by federal and state governments), National Rail Corporation was recently sold to private owners and currently operates as a private enterprise.

• Developed recommendations for restructuring Queensland Rail, including options of separating infrastructure, maintenance facilities and other assets. Consultancy to the Queensland Rail Corporatisation Taskforce, State of Queensland, Australia.

• For Westrail, the state railway of Western Australia, Mr Winner directed a team of railway, Ministry and consulting personnel, including members from Booz, Allen & Hamilton, Mercer Management Consulting, two local law firms, and two major financial institutions, in the development of strategies for privatization of Westrail's passenger and freight services and its infrastructure. Running counter to the trends in closely watched European rail systems, Westrail was privatized as a vertically integrated rail system, including infrastructure, and rail passenger services.

Mr. Winner has also been involved in the development of business, investment, and new product strategies for many worldwide transport industry suppliers. Most of these assignments have involved forecasting technology changes and developing business plans designed to capitalize on that change. Examples include:

• Mr Winner led a team in developing a new organization structure for a major world wide signal supplier. The company had been acquired and was expanding its manufacturing and service businesses in North America.

• For a major worldwide locomotive manufacturer, Mr. Winner led a major technology assessment that identified several critical locomotive technologies and resulted in the development of a new research program for the manufacturer and the introduction of new locomotive technologies including AC traction, articulated trucks and integrated in-cab electronic systems.
• For a company involved in long term financing of railroad equipment, Mr. Winner led a team analyzing the future value of rail cars and locomotives. To develop a method of determining the value of rail equipment in the long term, the team developed life cycle costing models sensitive to new technologies, changing maintenance conditions and costs, and changes in intensity of use.

Mr. Winner is a member of the Transportation Research Forum, where he served on the international steering committee, AREMA, and the American Society for the Advancement of Science. He has appeared as a speaker on many platforms and written widely in the industry. He wrote and edited sections of a John Wiley and Sons engineering handbook on energy efficiency in transport systems. Other recent publications are listed below:

• JH Winner, “State of the North American Rail Industry,” (Keynote Address, North American Railway Finance Conference, Palm Springs, California, USA, March 5th, 2008

• JH Winner, “Railway Restructuring Options for Georgian Railway,” Railway Restructuring Workshop, Guldara, Georgia, Georgia, July 19, 2005

• JH Winner, “Private Railway Activity in Europe: Lessons Learned,” Transportation Research Board Annual Meeting, Washington, DC USA, January 2004


• MB Lawrence and JH Winner, “Private Finance of Public Sector Infrastructure,” Journal of Transportation Law, Logistics, and Policy, Spring 2003 Issue

• JH Winner, “Competition and Private Investment in Rail Transport” European Transport Conference, September, 2002


• JH Winner, “Private Rail Networks in the New European Economy” European Logistics Conference, Bologna, Italy, 24 May 2001


He has served as a member of the board of directors for several companies and transport associations. He is an instrument rated aircraft pilot. Mr. Winner received a BS in civil engineering from Carnegie-Mellon University, where he also did postgraduate work in operations research, industrial management, and the law.
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APPENDIX 3: SWOT ANALYSIS

Strengths

- A well established, well functioning system supplying effective transport services
- A ‘sellers market’ for transport services with demands in excess of capacity and likely to remain that way for at least the next decade and probably longer.
- To a greater extent than any other developing country, Government policy sheltered railways in India from competition from road transport, particularly during the decades in which road transport was the ascendant technology worldwide. A network of modern inter-city highways is yet to be built in India and likely would take several decades.
- The recent order-of-magnitude increase in oil prices will foster major worldwide R&D to improve the fuel efficiency of all modes of transport, which could potentially shift the net balance of technological advantages that the railway lost to modern trucking in the latter half of the 20th century back to the railways.
- Recent turnaround in finances and productivity has created momentum for further improvements needed for the future

Weaknesses

- The persisting absence of competitive pressures, whether inter-modal or intra-modal, either in the provision of rail infrastructure or train operating services, precludes the most important – indeed, the only compelling – incentive to pursue innovations or otherwise accomplish improvements in service quality or reductions in costs and tariffs.
- Indian Railways remains a 100% state owned enterprise closely interrelated with the Ministry of Railways, generating conflict of interest between public policy and enterprise management objectives, and subject to frequent political interventions both at the central and state level that have to a considerable degree hamstrung railway management and dissipated investment resources across many negligibly productive applications. (The application of the Rs 17,000 Crores capital infusion from 2001 to an agreed set of high-priority requirements was an exception to the normal modus operandi, and renewed conflict must be anticipated for the future.)
- As a vast, vertically integrated enterprise – really an entire industry – Indian Railways management attention is spread across a vast array of disparate activities that divert management attention from the core business of operating and maintaining the railway network.
- The magnitude of IR’s labor force is a substantial vulnerability, particularly in light of the periodic Pay Commissions that mandate substantial increases in wages and retirement contributions. Despite the three-fold increase in labor productivity since 1990, the labor force of 1.35 million is well in excess of that required for an efficient railway of the magnitude of Indian Railways, even allowing for the fact that passenger services comprise fully 60% of Indian Railways traffic.
- The potentials for productivity improvements that would add additional capacity to the existing system with limited investments have already been largely exhausted.
• Far larger-scale investments will be required to expand capacity to meet forecast demands, including separation of passenger and freight traffic by entirely new lines on separate rights of way, viz. dedicated freight corridors.

• The magnitude of future capital requirements to fulfill market expectations and realize the opportunities for lasting improvements in market shares exceed any likely magnitude available from government, compelling development of new sources of capital.

Opportunities

• The current shortage of transport capacity in India, and the country’s continued delays in development of a network of modern high standard inter-city highways, provides the railway sector with an extended window of opportunity to resolve its own problems, expand its network, and lock in a greater share of the market.

• The necessity for development of separate freight corridors, and the magnitude of capital requirements extending beyond the likely range of prospective government contributions, offers a rare, excellent opportunity to engage both the management capabilities and financial capacities of the private sector and also to introduce a significant element of competition in the railway sector.

Threats

• The immediate threat to the solvency of Indian Railways having been averted for the time being – not least because the inadequacies of past public infrastructure investment and competition policies have created a sellers’ market for Indian Railways – Government may draw the erroneous conclusion that the problems have been solved and feel under no compulsion to address the underlying structural issues. If it continues to operate Indian Railways as a government department, and reverts to the practices that led to the degradation of the railways sector and the crisis of 2001, history is likely doomed to repeat itself – and the cost to the Indian economic growth will be of far larger magnitude, given that most of the previous slack in the system has now been squeezed out.

• The Government may yield to the arguments by Indian Railways to give Indian Railways management control of the new dedicated freight corridors, leaving Indian Railways monopoly still largely in place and foregoing the benefits of competition or significant private sector participation.

• The next Pay Commission may burden Indian Railways with formidable wage and retirement requirements for its 1.35 million employees.

54 With the recent exception of container and logistics handling companies and the demonopolization of Concor.