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# Salient Aspects of the Growth Story of Indian Railways 1981-82 through 2007-08

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# Salient Aspects of the Growth Story of Indian Railways 1981-82 through 2007-08

G. Aivelu\*

## ABSTRACT

This paper makes an attempt to provide a broad overview of the salient aspects of the growth story of Indian Railways (IR) since independence. More specifically, the study aims to analyse the trends of output and employment for the period 1981-82 through 2007-08. The entire study period is divided into three sub-periods - Period I (1981-82 to 1991-92); Period II (1992-93-2002-03); Period III (2003-04 to 2007-08). In addition, the study also looks at the 'turnaround' story of IR.

The output of IR is categorised as freight (NTKM) and passenger (PKM) outputs. Labour is divided into three categories - skilled management personnel (group A&B), semi-skilled employees (group C) and unskilled employees (group D). The data on freight output reveal that while the average annual growth rates of NTKM declined in the second period over the first period, high average annual growth rates of freight output were registered in the third period. The rate of growth of PKMs increased over the study period across IR.

The employment scenario across IR shows that the percentage share of the skilled management personnel (group A&B) remained more or less the same over the entire study period, while the percentage share of the semi-skilled labour (group C) increased from around 51 percent in the first period to nearly 63 percent in the third period. The percentage share of the unskilled labour (group D) registered a decline from the first period to the third period (from nearly 49 percent to 36 percent respectively). The rate of growth of labour productivity registered an increase in all the three periods over IR. The contribution made by the skilled management personnel to output is more when compared to the semi-skilled labour. The turnaround story tells us that the high growth rates of output and earnings on IR were made possible through the implementation of various strategies already in place.

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The performance of IR can be further enhanced by completing the 'Dedicated Freight Corridor', aiming to expand the route network, optimum use of resources, developing the asset base through Public Private Participation (PPP) and improving the infrastructural facilities. However, all the above policy suggestions would require best possible mix of budgetary and extra-budgetary resources. Further, for the efficient project execution, there is a need for optimum use of resources and to complete the projects within the targeted time and cost.

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## 1. Introduction

Service sector plays a vital role in the process of economic development. It is a well documented observation in economic history that the share of services<sup>1</sup> in national product tends to dominate once the economy reaches a certain stage of development (Fisher (1935, 1939), Clark (1957)). Analysis of services such as defence and public administration is extremely difficult, as these are considered to be pure public goods. In case of certain other services like insurance, communications, health, trade etc., there are difficulties in conceptualization and measurement of price. However, for some services like transport, the conceptual and measurement problems can be overcome. These services also form a vital component of the economy's infrastructure (Sailaja, 1988) and railways are one such organization.

The journey of railways in Indian sub-continent started modestly in 1853 with 34 kilometers (kms). Iron wheels rolled on rails on 16<sup>th</sup> April, 1853, where the first-ever train, with a capital of Rs 3.8 million, carrying 400 people in 14 carriages, covered the 21-mile distance in about 75 minutes from Bombay to Thane (Sailaja, 1988, Aivelu, 2006). By 1950, India had a net-work of about 34,000 miles. In 1948, immediately after Independence, there were as many as 42 different railway systems consisting of 13 Class I Railways, 10 class II Railways and 19 class III Railways. The class of a Railway is fixed depending on gross earnings. The major task for the Indian Railways (IR) is to integrate the above mentioned divided railway system of the sub-continent such as princely state railways, state owned railways and to bring them under one management. The Railway Board in 1950 decided for the regrouping of the Indian Railways into six zonal systems, namely, the Northern, the North Eastern, the Southern, the Central, the Eastern and the Western Railways. The unequal distributions of workload on some of the railways have led to further bifurcation of zones. Eastern Railway was split into two zones, namely, Eastern Railway and South Eastern Railway. Similarly, North Eastern

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<sup>1</sup> See Stigler (1956), Tucker (1977), Inman (1985), Petit (1986), Gemmel (1986)

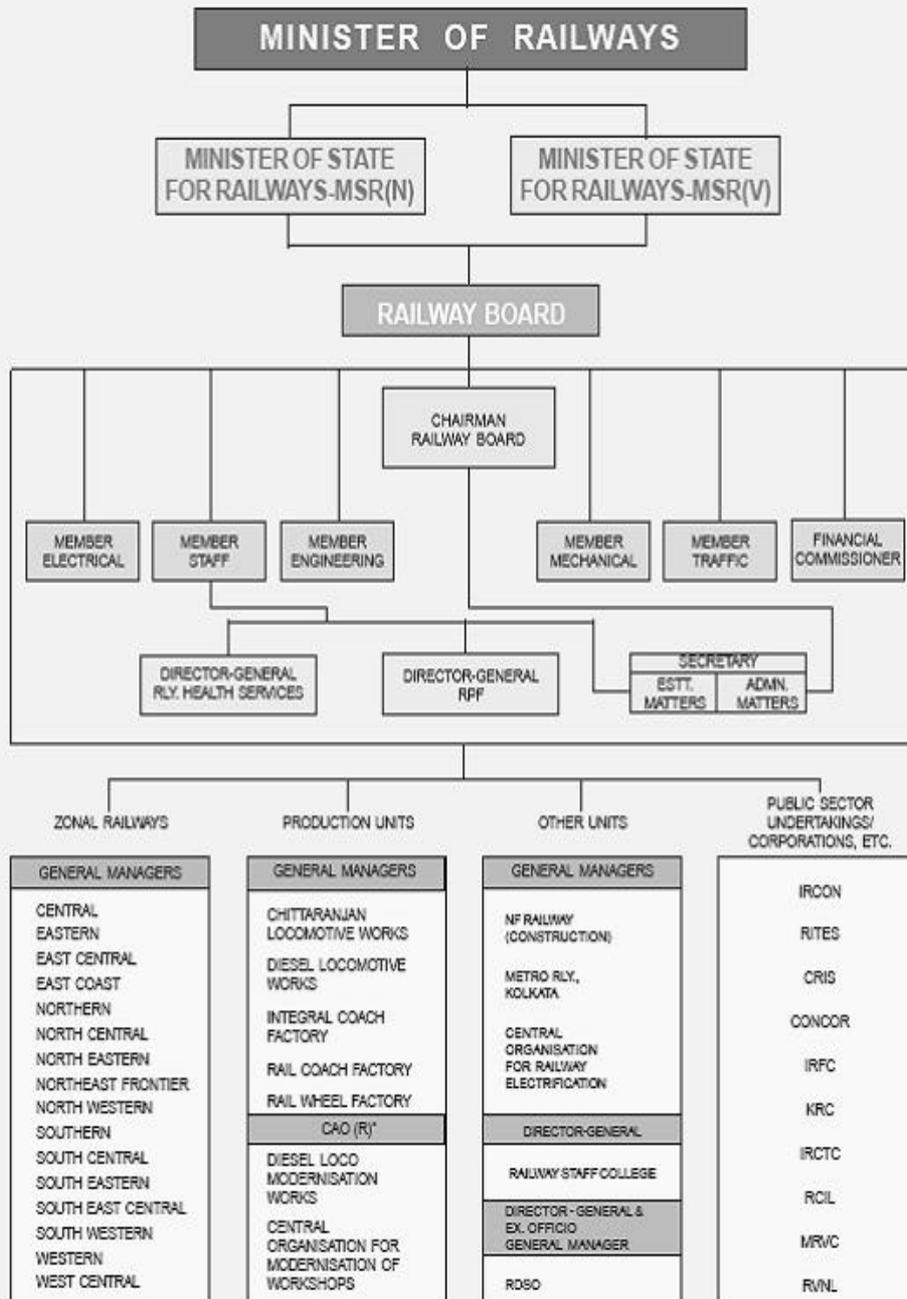
Zone was split into North Eastern Railway and Northeast Frontier Railway. Thus, by the year 1958, there were eight zones on Indian Railways.

The functioning of the new zones continued to be watched closely, and based on regular analysis of their working, minor adjustments are carried out wherever necessary, with a view to improve their utility and efficiency. Particularly close watch is kept on the rapidly increasing workloads of some of the new zones, in order to provide relief and streamline their operation. The formation of South Central Railway in 1966 as the ninth zone, in order to improve the services for the southern parts of India, is made with some marginal adjustments from Southern and Central Railways. Carving out of South Central Railway has resulted in stability in the zonal formations at least for little more than three decades in the history of IR. In order to bring about greater efficiency in administration, speedy implementation of the on-going projects, better customer care, reduction of work load on the administrators of each zone, Indian Railways have decided to create seven new zones by territorial re-adjustment of existing zones. Thus, IR has been reorganized into sixteen railway zones by adding seven new zones to the already existing nine zones.

Five Year Plans from 1950 onwards threw up enormous challenges to the railways for playing a key role in the industrial and all round development of the Indian economy. Thus, what started as a system to the interests of the foreign masters has in the last hundred and sixty three years, developed into a significant means of transportation for socio-economic development of a welfare society like India.

The organizational structure of IR is as follows:

# ORGANISATION STRUCTURE



\* Chief Administrative Officer (Railways)

(As on January 13, 2005)

Source: MOR, 2006, Annual Report & Accounts

Over the last five decades, IR has played a major role in the transportation of both passengers (PKM)<sup>2</sup> and freight (NTKM)<sup>3</sup> (table 1). The table clearly shows that the freight output witnessed a huge jump in 1960-61 over 1950-51, thereafter for two decades the freight performance was not that impressive. Passenger output grew steadily from 1950-51 to 1990-91 and it is during 2000 that both passenger and freight outputs registered an upward trend compared to the earlier periods.

Table 1: Statistical Summary of Select Variables – IR (1950-51 through 2007-08)

Year	Freight		Passenger		Employees	
	NTKM (million)	Earning (Rs crore)	PKM (million)	Earning (Rs crore)	No. of employees (thousands)	Expenditure (Rs. Crore)
1950-51	37565	139.3	66517	98.2	914	113.8
1960-61	72333	280.5	77665	131.6	1157	205.2
1970-71	110696	600.7	118120	295.5	1374	459.9
1980-81	147652	1550.9	208558	827.5	1572	1316.7
1990-91	235785	8247.0	295644	3144.7	1652	5166.3
2000-01	312371	23045.4	457022	10483.2	1545	18841.4
2007-08	521371	46425.5	769956	19783.6	1395	25892.4

Source: *Indian Railways-Annual Report and Accounts, Ministry of Railways, Govt. of India, various issues*

In the year 2008-09, IR carried over 6900 million passengers and lifted 833 million tonnes of freight traffic, making it the third largest railway network in the world in terms of size, the world's topmost passenger carrier (in terms of Passenger Kilometers) and fourth largest rail freight carrier and employs 1.4 million employees (Indian Railways, Vision 2020). In its long journey, the IR has faced many challenges. Although the pliability of this gigantic organization has seen it through difficult times, the challenges that lie ahead are, such that, new strategies that require strong resolve and a highly focused approach are called for, hence, it becomes highly essential to analyze the performance of IR in economic terms.

The intention of this paper is to establish a comprehensive scenario so as to analyse the trends of output and employment<sup>4</sup> of IR during the period 1981-82 through 2007-08.

<sup>2</sup> Passenger kilometres are defined as total number of passengers multiplied by the average distance over which they travel.

<sup>3</sup> Net tonne kilometers is the number of tones of freight carried multiplied by the average distance over which it is transported

<sup>4</sup> See, for instance, Witt Bowden (1933), Edwin Frickey (1947)

Thus, the objectives of this study are to estimate the

- (i) Output growth
- (ii) Employment growth
- (iii) Labour productivity growth
- (iv) Productivity growth by type of labour

Section 2 provides the sources of data and describes the various variables used. The methodological aspects are explained in detail in the third section. The productivity estimates of the previous studies are provided in section 4. The next section deals with the output growth, employment growth and labour productivity growth of the present study. The turnaround story is debated in section 6. The last section provides conclusions, policy implications and challenges ahead.

## **2. Data Sources and Variables**

A notable feature of the railway industry is its multi-product character: there are various types of passenger railway output (long distance, urban, high speed, etc.) and freight output (general, intermodal, parcels, etc.). However, due to the shortage of data, most studies restrict the output vector to two aggregate dimensions, passenger and freight. The measurements commonly used are the number of passenger-kilometers (PKM) and net tonne-kilometers (NTKM) (see Caves et al. 1980, 1982, and 1985; McGeehan 1993; and Cantos et al. 1999). These demand-related measurements for output enable an assessment of the level of user consumption and the value they place on the service. In that case, the indices of passenger-kilometers and tonne-kilometers adequately reflect the efficient productive behaviour of the various production units (Oum and Yu, 1994). A suitable definition of output (Winston, 1985) for a transport industry has to take into consideration the movement of the passenger or a commodity from origin to destination at a given point of time. Hence, output should be treated as heterogeneous in character rather than a single homogeneous unit. Therefore, there is a need of various railway services to be distinguished as separate outputs (Caves et al, 1980). In addition, quantity of output becomes more meaningful in a service sector rather than the value of output because of the complicated issues in the valuation of output. This is especially true for a regulated industry like railways where output is subsidised (Alivelu, 2006). We find that almost all the studies on railways have distinguished between two types of rail services – passenger and freight. Thus, for the present study, we take PKM and NTKM per unit of time, say year, as the basic units of measurement, for the two types of output on IR.

The components of freight output are coal, raw material for steel plants, pig iron and finished steel, iron ore, food grains, cement, mineral oils, fertilizers, and other commodities. The corresponding data on NTKM and revenues for each year and for

the each of the above mentioned commodities are culled out from 'Statement 13' of Annual Statistical Statements published by the Ministry of Railways.

Broadly, in railways the stream of passengers are divided into suburban and non-suburban and classified further under each head. For the present study, the components of passenger kilometres are categorized into four classes namely sub-urban (all classes) upper class (includes air conditioned, first class), mail/express (now includes also sleeper class) and ordinary (includes general class). The data on PKMs and the passenger revenue for the entire study period is obtained from 'Statement 12' of various issues of Annual Statistical Statements published by the Ministry of Railways.

Labour is represented by the number of persons employed. Three labour categories are taken – skilled management personnel categorised as Group A and B in Railway Board publications, semi-skilled labour in Group C and unskilled labour in Group D. Group A&B consists of accounts officers, traffic service officers, engineers (civil, mechanical, electrical), stores officers, signal and telecom officers, personnel officers, financial advisors, medical officers. Station masters, inspectors of work, supervisors, technicians, pharmacists, guards, train ticket examiners, engine drivers, clerical staff all come under Group C. Group D consists of gang men, attendants, train sweepers, office peons, train attendants, hospital attendants etc. The relevant data is culled out from the Annual Statistical Statements (Statement 40-II) and the Year Books published by IR.

The period of study spans from 1981-82 to 2007-08. We have divided the entire period into three sub-periods 1981-82 to 1991-92 (period I), 1992-93 to 2002-03 (period II) and 2003-04 to 2007-08 (period III). This initial periodization of 1981-82 is mainly drawn from the preliminary analysis of both capital and fuel intensities which showed an upward trend during early 1980s compared to late seventies, with the growth in the capital intensity being several times higher than fuel intensity. The second period corresponds to the deceleration of the industry as a whole in the Indian economy. The third period reflects the turnaround story of IR and also the post stage of reorganisation of IR into sixteen zones from the earlier nine zones in 2003.

The paper also makes use of the personal interactions with few top and middle level management of the railways to corroborate the quantitative data with the qualitative data. Further, we also look into the issue whether the turnaround can be attributed to the role of a particular railway minister. The qualitative data mainly focuses on this issue.

### **3. Methodological Aspects: Divisia Tornquist Aggregation**

Divisia index method is used for the construction of both aggregate output and aggregate

labour indices. Divisia index satisfies both time reversal and factor reversal tests. It has the reproductive property and is also a chain linked index, this implies that as weights change with time, errors of approximation are eliminated. The four discrete versions of the Divisia quantity index are Laspeyres's, Paasche's, Fisher's Ideal and Tornquist indices (see Diewert, 1980). Laspeyres's and Paasche's indices use base period prices and current period prices respectively. Fisher's Ideal index is a geometric mean of Laspeyres's and Paasche's indices. Tornquist index is a measure of growth rate of the aggregate of variables used. It is defined as sum of log differences in the variables in consecutive periods weighted by an arithmetic average of value shares over the two periods. Tornquist discrete approximation to the Divisia index is popular in literature because it is a superlative index and can also incorporate the structure of production with multiple outputs and inputs easily.

In order to take into consideration the heterogeneous nature of both outputs and inputs, the compositional changes are to be considered. The two outputs are aggregated as follows:

(i) Let the  $j^{\text{th}}$  output,  $Y_j$  be an aggregate of its individual components:

$$Y_j = Y_j (Y_{j1}, Y_{j2}, \dots, Y_{jm}) \quad (1)$$

$$j = 1 = \text{freight output } (M_1 = 9)$$

$$= 2 = \text{passenger output } (M_2 = 4)$$

Taking the revenue shares,

$$d \ln Y_j / dT = \sum_{m=1}^{M_j} V_m (T) d \ln Y_{jm} / dT \quad (2)$$

Where,  $V_{jm} (T)$  is the revenue share of the  $m^{\text{th}}$  component in  $j^{\text{th}}$  output in period  $T$ .

Corresponding to the above Divisia index, the Tornquist index of growth for  $j^{\text{th}}$  output is given as:

$$Y_{jT^*} = \ln Y_{j^*} (T) - \ln Y_{j^*} (T-1)$$

$$\sum_{m=1}^{M_j} V_{jm} T [\ln Y_{jm} (T) - \ln Y_{jm} (T-1)] \quad (3)$$

(ii) The Tornquist growth rate of  $i^{\text{th}}$  input, which is heterogeneous in nature, is then defined as

$$X_{iT^*} = \ln X_i(T) - \ln X_i(T-1) \quad (4)$$

$$\sum_n w_n T (\ln X_{in}(T) - \ln X_{in}(T-1)) \quad (5)$$

and

$$w_{in} T = \frac{1}{2} [w_{in}(T) + w_{in}(T-1)] \quad (6)$$

Where,  $w_{in} T$  is the value share of  $n$ th class of input in the  $i$ th input in  $T$ th year and  $X_{in}$ 's represent individual quantities of  $n$ th class of input in the  $i$ th input in  $T$ th year

#### 4. Productivity Performance of IR (previous studies)

Sailaja (1988) made an attempt to estimate the productivity of IR covering a relatively long period, from 1950-51 to 1985-86. This period is further sub-divided into three – 1950-51 through 1966-67, 1966-67 through 1974-75 and 1974-75 through 1985-86. The outputs are divided into freight and passenger outputs, while the inputs consisted of labour, capital and intermediate inputs. Her results show that both labour and intermediate productivities registered an increase over the entire study period. For the period as a whole, capital productivity declined by 2.4 percent per year.

Alivelu (2006) estimated the productivity trends on IR and for the nine zonal railways for the period 1981-82 through 2002-03. The study period is further sub-divided into two – 1981-82 to 1991-92 and 1992-93 to 2002-03. The study considered the freight and passenger output while the inputs are labour, fuel and capital. Like in Sailaja's study, both labour and fuel productivities registered an increase over the entire study period. On the other hand, unlike Sailaja's study, capital productivity registered an increase during the study period. Average annual growth rates of the partial productivities and total factor productivity across the different railway zones indicate that fuel productivity showed a declining trend in Southern Railway, South Eastern Railway and Western Railway, while capital productivity is negative in Eastern Railway. Labor productivity is highest in Central Railway; fuel productivity is highest in North Eastern Railway, whereas it is Northern Railway, which registered highest capital productivity.

#### 5 Growth Trends of IR since 1981-82 (3 sub-periods)

It is a known fact that there is a positive and direct correlation between demand for transport and Gross Domestic Product (GDP). In a developing economy, the elasticity of transport to GDP is around 1.25<sup>5</sup>. This implies that a GDP growth of nine percent would therefore translate into increase in demand for transport to the tune of eleven percent<sup>6</sup>. The following table illustrates how much of this growth is captured by IR for the period 2004-05 to 2008-09.

<sup>5</sup> World Bank: India's Transport Sector: The Challenges Ahead, Vol. II Background Papers, May 2002

<sup>6</sup> IR, Vision 2020

Table 2: GDP growth and growth of railway GDP (2004-05 to 2007-08)

Year	GDP growth (India)	Potential growth of railway GDP	Actual growth of railway GDP	Percentage shortfall as per expected elasticity
2004-05	7.5	9.3	7.3	21.9
2005-06	9.5	11.9	8.7	26.4
2006-07	9.8	12.2	10.0	18.0
2007-08	9.0	11.3	9.3	17.5

Source: Reproduced from White Paper on IR, 2009

The table clearly shows that the performance of IR vis-a-vis the economy's GDP growth in recent years is reasonably good. The better performance of railways can be attributed to certain operational initiatives like optimum use of assets, flexible tariffs, optimisation of both loading and carrying capacity of rolling stock and the expansion of capacity in passenger services. However, there is a gap between actual growth of railway GDP and the potential growth of railway GDP based on an elasticity of 1.25 percent. The railways should now aim at bridging the gap between potential and actual growth of GDP.

### 5.1 Output Growth on IR

The performance of output of IR for the study period necessitates the analysis not only of the figures but also the strategies adopted and their efficacies. In the earlier sub-section, we mentioned that the output on IR is categorised into two – freight and passenger.

Table 3: Average annual growth rates of freight and passenger output on IR (1981-82 through 2007-08)

(all figures in percentage)

Year	NTKM	Freight earnings	PKM earnings	Passenger
1981-82 to 1991-92	4.4	15.4	3.7	14.9
1992-93 to 2002-03	3.5	9.5	5.6	11.3
2003-04 to 2007-08	7.0	10.8	7.8	10.4

Source: Indian Railways – Year Book, Ministry of Railways, Government of India, Various Issues

The average annual growth rate of NTKM registered a decline during the second period (1992-93 to 2002-03) over the first period (1981-82 to 1991-92) (table 3). The decline in the growth rate of NTKM during the second period may be due to the general recession in the industrial sector. For instance, during this period the movements of coal, food grains, iron ore etc., which are important bulk commodities grew at a very slow pace. When we looked at the year to year growth rates of freight movement, two periods 1994-95 and 1998-99 registered negative growth rates. In 1994-95, the movement of coal accounted for a decline of nearly 5 percentage points over the previous year. The movement of iron ore and other ores also registered a decline of nearly 3 percentage points, cement declined by nearly 2 percentage points<sup>7</sup>. Similar trends were observed in 1998-99 over 1997-98, with the decline in the movement of coal being the highest when compared to iron ore and cement<sup>8</sup>. Another reason could be the reduction in tonnage originating<sup>9</sup> and also decline in average length of hauling<sup>10</sup> (Sivaprasad et al, 2008).

The average annual growth rates of PKM registered an increase in the second period over the first period (table 3). The increase in the growth rate of PKM during the same period could be due to higher mobility, increase in tourism and introduction of new trains<sup>11</sup>. The fluctuations in passenger and freight outputs echo the fluctuating demand for rail services. It can be argued that the factors behind these fluctuations are, to a large extent, exogenous to the railway sector. Both length of haul and quantity transported are influenced by the overall growth of the economy, regional pattern of production and demand, changes in incomes, urbanisation etc. (Sailaja, 1988). Major factors determining the length of freight haul are the level and nature of economic activity, changes in the patterns of market demand for different commodities as reflected in the product prices (Rao et al. 1985a, 1985b). According to Raza and Aggarwal (1986) high correlation between freight flows and economic development determine the freight haul. Rao and Sriraman (1985b) analysed the demand for passenger services during 1960-61 through 1980-81, they argued that the major source for higher passenger movements was increase in agricultural and industrial incomes. They further stated - the length of the haul of passenger services on IR had also increased due to the movement of people from agricultural to industrial areas.

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<sup>7</sup> IR Year Books, Ministry of Railways, Government of India, 1993-94, 1994-95

<sup>8</sup> IR Year Books, Ministry of Railways, Government of India, 1997-98, 1998-99

<sup>9</sup> Payload of goods carried by a train

<sup>10</sup> Tonne of freight per kilometer

<sup>11</sup> Interview with Rakesh Saxena, Chief Operations Manager, SCR (2nd February, 2010)

With respect to the passenger movement there are two types of services – the sub-urban and the non-suburban. The non-suburban trains include the long distance and medium distance mail express trains, while the sub-urban trains are characterised by short distance travel and accommodate more number of passengers. The increase in the rate of growth of PKM on the sub-urban trains is probably due to the increase in the number of passengers travelling by these trains, increase in the frequency of train services and also increase in the length of the trains. For the long distance and medium distance mail express trains, the growth rate of PKMs would have increased because of the introduction of new passenger trains<sup>12</sup>, movement of passengers in large numbers by increasing the number of coaches of mail express trains depending on the demand. Further, the running of special trains during peak seasons like festivals, vacations and religious congregations could have contributed to the growth in the PKMs. Increase in the frequency of non-daily services (trains) to either twice or thrice a week or daily<sup>13</sup>, extension of existing run of mail express trains and also increase in the number of stoppages for some trains, where there is a necessity, have contributed to the increase in the growth rate of PKMs.

During the third period, we observe that the average annual growth rate of NTKMs increased by 2.6 percentage points over the first period while the PKMs average annual growth rate registered an increase of nearly 4 percentage points in the third period compared to the first period. This increased efficiency of railways has been initiated by uncomplicated entrepreneurial practices, which have induced the appreciation of worldwide prominent institutions and corporations similarly. In a discernible exodus from its inheritance, the focus on capacity utilisation, reduction in unit costs and improvement in the quality of service has capitulated noteworthy domino effects<sup>14</sup> (Dev Mahendra et al, 2008).

The interactions during the third period the top and middle level management reveal that the better performance of IR during the third period is due to the efforts made by the railways to reduce unit costs in core activities, to carry large volumes by increasing the capacities, optimisation of existing infrastructure, increasing the time interval between two successive wagon examinations. This is done by rationalising the carriage and wagon (C&W) maintenance practices (new concepts like 'Premium' examination, increased

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<sup>12</sup> Every year, the railway budget announces the introduction of new trains

<sup>13</sup> For example, recently South Central Railway converted the bi-weekly Secunderabad-Patna express to a daily express train and the Garib Rath between Hyderabad and Visakhapatnam which runs 4 days a week is now running daily

<sup>14</sup> Similar views are expressed by Rakesh Saxena, COM and K. Siva Prasad, CFTM, SCR (Interview on 31st January, 2010 and 2nd February, 2010)

dependency on Closed Circuit (CC) rakes etc), increasing the axle load<sup>15</sup>, decreasing the wagon turnaround<sup>16</sup> have all contributed to the increase in the growth rates of freight movement. On the passenger front, the railways adopted the strategy of increasing the number of coaches of passenger trains from 18 to 24, reduced the fares of upper classes by 10–15 percent, upward revision of the speeds of mail/ express trains, use of technology in the form of e-ticketing, i-ticketing and making the tickets available at post offices<sup>17</sup> etc. A significant strategy adopted during this period was to attach more number of AC III tier coaches in all popular and long distance trains, to attract more volumes of passengers. Incidentally, it may be noted that introduction of AC III tier coach in 1993-94 was a grand success story for IR due to its affordable fares, hence was fully patronised by middle class clientele.

## 5.2 Employment Growth

A higher growth rate is neither a necessary nor a sufficient condition for alleviation of employment. “While growth per se means nothing for unemployment, this growth fetishism can be exploited by finance capital to wrest concessions to the detriment of employment objective....” (Prabhat Patnaik, 2004). The following table throws light on this aspect.

Table 4: Sectoral Employment by Current Daily Status (percentage)

Sector	1983	1993-94	1999-2000	2004-05
Agriculture	65.42	61.03	56.64	52.06
Mining & Quarrying	0.66	0.78	0.67	0.63
Manufacturing	11.27	11.10	12.13	12.90
Electricity, Gas & Water supply	0.34	0.41	0.34	0.35
Construction	2.56	3.63	4.44	5.57
Trade, hotel & restaurant	6.98	8.26	11.20	12.62
Transport, storage & communication	2.88	3.22	4.06	4.61
Financial services	0.78	1.08	1.36	2.06
Community, social & personal services	9.10	10.50	9.16	9.24

Source: Reproduced from Misra and Puri, 2009

<sup>15</sup> Total tonnage divided by four axles of the wagon

<sup>16</sup> Interval of time between two successive loadings of a wagon

<sup>17</sup> This is a recent phenomena

Despite the transport, storage & communication being the core sector, their employment potential remains limited. How about the employment in railways as a whole? IR is considered to be the largest employer in the public sector in India. It employs 1.4 million employees directly and several times larger the number indirectly through forward and backward linkages (IR, Vision, 2020). We will now see how the employment on IR evolved over the study period.

Table 5 depicts the percentage share of three kinds of labour (group A&B, group C and group D) in total labour on IR. The share of skilled management personnel (group A&B) has more or less remained the same during the period of study, while the share of group C in total labour increased (by almost 12 percentage points in the third period over the first period) and that of group D registered a steep decline (12.3 percent) over the study period. As a corporate policy, IR has set itself a goal of 1 percent reduction in the sanctioned strength per annum, assuming a 3 percent annual natural retention to reach an equilibrium level of right-sized staff-strength (IR, Vision 2020).

The percentage share of expenditure for group C is the highest compared to the other two categories. The percentage share of expenditure on group A&B increased marginally while that of group D decreased by nearly 9 percentage points in the third period over the first period. Over the years, conscious steps have been taken to match the skills of the employees with the emerging challenges thrown up by advances in technology and changes in the market environment.

**Table 5: Percentage share of number of staff of different categories in total labour and expenditure on IR**

Period	Number of staff			Expenditure		
	Group A&B	Group C	Group D	Group A&B	Group C	Group D
I	0.8	50.6	48.6	2.9	62.7	34.4
II	0.9	56.9	42.2	2.6	66.9	30.5
III	1.1	62.6	36.3	3.3	71.2	25.5

*Source:* Annual Statistical Statements, IR, Ministry of Railways, Government of India, various issues

Average annual growth rates of number of staff and expenditure in each of the group are presented in table 6. The sub-period growth rates indicate that during the second period, the average annual growth rates of three kinds of labour registered a decline and this trend continued for group D in the third period also.

**Table 6: Average annual growth rates of number of staff of different categories and expenditure on IR (1981-82 through 2007-08) (percentage)**

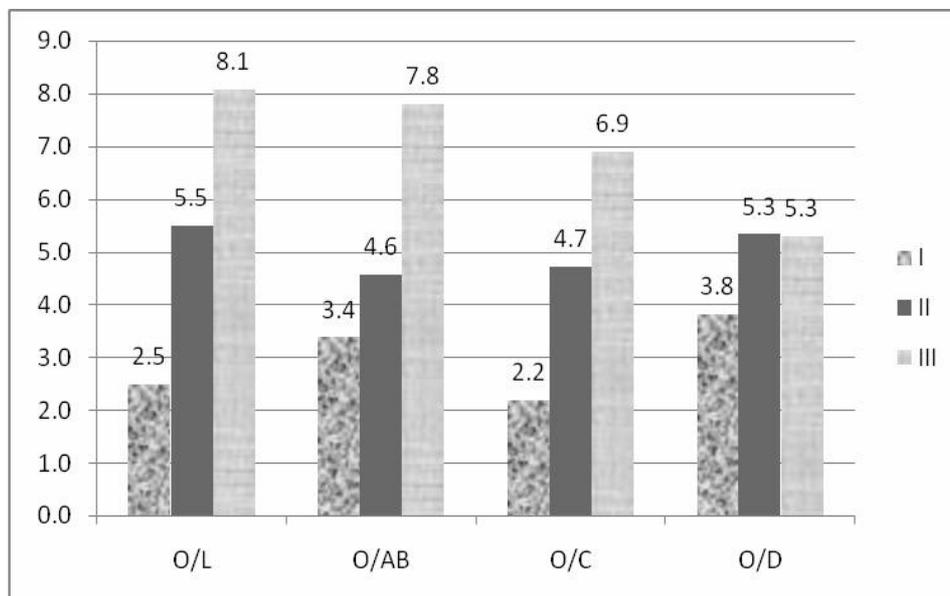
Period	Number of staff			Expenditure		
	Group A&B	Group C	Group D	Group A&B	Group C	Group D
I	2.3	1.9	-1.0	16.2	15.1	13.2
II	-0.4	-0.2	-2.2	14.1	12.8	10.8
III	3.4	0.9	-4.3	10.9	6.7	1.5

*Source:* Annual Statistical Statements, IR, Ministry of Railways, Government of India, various issues

### 5.3 Labour productivity Growth

Analysing the data on the rate of growth of labour productivity across IR, we find that the labour productivity registered an increase over the entire study period. With regard to group A&B, the increase in the rate of growth of labour productivity is more in the third period over second period when compared to the second period over first period. The rate of growth of labour productivity of group C also registered an increase in the third period as compared to the first and second periods, however, this increase is less when compared to group A&B. The case of group D shows that the rate of growth of labour productivity remained almost constant both in the second and third periods (Figure 1). This implies that the contribution to output made by the management personnel (group A&B) is more when compared to the semi-skilled labour (group C). This is probably due to the reason that the effectiveness, with which the higher level decision jobs are transmitted, will have a greater impact on the entire productivity vis-a-vis the efficiency with which semi-skilled jobs are accomplished. More generally, the increase in the growth rates of labour productivity is because of the reorientation of human resource development strategies in accordance with the internal and external changes taking place over time. Apart from the provision of in-house training facilities, railway staff is provided with specialised training in other institutes in India and also abroad. The railway personnel are encouraged to acquire higher educational qualifications relevant to their work. Efforts are also being made to improve the basic infrastructure for the training programmes (Interviews with top and middle level railway personnel and also from IR Year Books, various issues).

Figure 1: Average annual growth rates of labour productivity on IR (1981-82 through 2007-



Source: Annual Statistical Statement, IR Year Books, Ministry of Railways, Government of India, various issues

To conclude, the growth estimates indicate that the freight output registered high growth rates in the third period, while PKMs witnessed an increase in the growth rate over the entire study period. The share of employees belonging to group C increased while that of group D declined. On the other hand, the share of group A&B personnel remained more or less constant during the entire study period. The average annual growth rates of labour productivity registered an increase over the entire study period.

## 6. Recent Turnaround

IR as a whole, experienced high average annual growth rates of both freight and passenger outputs in the third period (2003-04 to 2007-08)<sup>18</sup>. The high growth rates of both NTKMs and PKMs were more visible during the period 2004-06 when the then Honourable Minister of Railways was at the helm of affairs. This period was termed as the “Turnaround of IR”. The essence of the turnaround was in the fact that (i) total revenues increased by a considerable percentage during the said period and (ii) net revenues continued a vigorous growing trend<sup>19</sup>.

<sup>18</sup> See table 3

<sup>19</sup> Raghuram, 2007.

The questions that arise at this juncture are: (i) what policy initiatives are taken by the IR to achieve the turnaround; or (ii) is it because of the then honourable railway minister that this turnaround has taken place? To answer the above questions, first we need to look into the strategies adopted by the IR both on freight and passenger movements. For the freight segment, the slogan was “play on volumes”, for the passenger segment railways concentrated on “quality and volume”. Interactions with the top and middle level management reveal that on the freight side, there has been a reclassification<sup>20</sup> of different categories of goods based on the principle of “what the traffic can bear”. Further, the IR strengthened its capacity generation through optimisation of existing infrastructure, reduced tariffs for some of its important commodities like cement where there was a fear that the cement traffic was being taken away by the roadways<sup>21</sup>.

### **6.1 Strategies – Freight Segment**

The wagon loading capacity was increased and the effort was also towards decreasing the wagon turnaround time. The increase in the number of diesel and electric engines on the Broad Gauge (BG) track facilitated the high and fast movement of bulk commodities. The railways extended the length of the railway sidings to full extent so as to allow loading and unloading to take place in short span of time. The concept of assisted siding was introduced, wherein; IR will share the cost of a new siding for those industries which come up with a long-term commitment of traffic for ten years or more. The IR adopted the strategy of giving incentives to privileged customers in the form of loyalty discount scheme, mini rakes to small customers, seasonal discount scheme etc.

### **6.2 Strategies – Passenger Segment**

On the passenger front, strategies like increasing the speed of trains, adding more coaches to the existing mail express trains, up gradation of passengers from lower class to higher class while travelling, no increase in fares have led to increase in the passenger output.

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<sup>20</sup> The case of freight services shows that there is no across-the-board increase in freight rates. Nevertheless, the freight classification was rationalized and the in ‘fives’ like 95, 105, 135, 145, 155, 165, 175 and 185 were abolished. The highest class was reduced from ‘Class 250’ to ‘Class 240’. Further, freight classification was given a uniform interval of ‘Tens’ between the successive classes from Class 90 to Class 240. Yet another strategy adopted during the period under study is that no commodity was charged for a weight that is less than the carrying capacity of the wagon. Now the Highest Class is reduced to 200 in stages. Railway Budget 2008-09 concluded that the process of freight rationalization on Indian Railways is completed, which began a couple of years ago. Consequently, now the difference between the highest and lowest rates is narrowed down to not more than two times.

<sup>21</sup> Interview with top and middle level management of the commercial department of zonal railways

Majority of these initiatives<sup>22</sup> both on the freight and passenger side have been culled out from within the IR, industries, trade houses, apex business organisations and these were in turn evaluated by various functional departments of the Railway Board<sup>23</sup>

Here comes the critical question? If there is no increase in the passenger fares (in fact during the turnaround period, there was a reduction of one rupee in the second class ordinary fare, while in AC II tier it was 10 percent and 18 percent reduction for AC I class) how is it that the passenger revenues registered an increase? A close look at the various strategies adopted on the passenger segment revealed that charges for cancellation have been doubled both for second and upper classes, more trains were converted to superfast with a reduction in time and thus imposing a superfast charge, booking tickets from an origin dissimilar from the place of reservation (earlier, the passenger was paying the same amount irrespective of the location from where he was buying the ticket, now he has to pay more if he is booking the ticket from a different location other than the origin); division of tickets if a through a journey involved more than one train or a break of journey (cluster ticket no longer exists – if a passenger has to travel by more than one train to reach the destination he has to buy two separate tickets, earlier, he would buy only one combined ticket and travel by the second train). The tatkal scheme, targeting the last minute passenger was extended first from one day to three days and then to five days. This led to increase in earnings through differential pricing, based on the time of booking. Though outwardly, there was no increase in the passenger fares, the railways could earn more revenue in the passenger segment through the imposition of hidden charges mentioned above.

### 6.3 Turnaround and Role of Minister

Next comes the question? What is the role of the then Honourable Railway Minister in achieving the turnaround? The personal interviews reveal that the above mentioned strategies were already in place<sup>24</sup>, a more focused attention on achieving these strategies was given top priority during his tenure. The specific contribution made by him was to increase the carrying capacity (CC) to higher levels like CC+6+2<sup>25</sup> and CC+8+2. In other words, a new strategy of higher axle loading (increasing the load from 20.3 to 22.9) was firmly institutionalised by the then honourable minister of railways. Similarly, the implementation of the dynamic pricing policy strategy (of charging fewer fares during lean season and more fares during peak period) for the bulk commodities led to

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<sup>22</sup> Interview with K Siva Prasad, SCR

<sup>23</sup> Apex body of IR located at New Delhi

<sup>24</sup> For instance see Saxena, 1991; Report on IR, 2001

<sup>25</sup> CC (carrying capacity of wagon)+6 tons ( additionally loadable) + 2 tons (tolerance limit). Now CC+6+2 is universalized on IR.

increase in the NTKM. Ours being a politically strong country, any initiative to be implemented needs political pressure and this is what has exactly happened during the turnaround period. The natural corollary is that sustainability depends on the political leadership. At the same time, the need is for the professional top management of the Railway Board to be able to respond as a commercially oriented organisation with a corporate culture (Raghuram, 2007).

## **7. Conclusions, Policy Implications and Challenges Ahead**

### **7.1 Conclusions**

This paper provides an over view of the performance of the IR in terms of its output and employment during 1981-82 through 2007-08. The whole period is divided into three sub-periods – (i) 1981-82–1991-92 (period I) (ii) 1992-93–2002-03 (period II) (iii) 2003-04-2007-08 (period III). The analysis of the freight movement in terms of NTKMs shows that while the average annual growth rates of NTKMs declined in the second period over the first, registered a higher growth rate in the third period for the IR as a whole. The average annual growth rates of PKMs registered an increase over the entire study period on IR.

The employment scenario shows that the percentage share of the management personnel (group A&B) remained more or less the same over the entire study period, while the percentage share of the skilled labour (group C) increased from around 51 percent in the first period to around 63 percent in the third period. The percentage share of the unskilled labour registered a decline from the first period to the third period (from nearly 49 percent to 36 percent respectively). Despite the share of personnel belonging to group A&B remaining more or less constant during the study period, the growth rate of labour productivity registered an increase on IR with the contribution of the management personnel (group A&B) to output being the highest as compared to the other two groups.

The turnaround story reveals that it was achieved because of more focused attention on implementation of the various strategies by IR. The strategies on the freight side include enhancing the capacities of the wagons, optimum use of assets, increasing the length of the siding for loading and unloading, giving incentives to privileged customers, differential pricing system, reclassification of goods to make them more customer friendly and reduction of tariffs. On the passenger side, the railways increased the speed of the passenger trains, increased the number of coaches so as to accommodate more passengers, up gradation of the passengers from lower class to higher class, reduction of fares in the upper classes, setting up of model stations, tatkal scheme, e-ticketing etc.

## 7.2 Policy Implications and Challenges Ahead

The results we have obtained from the analysis clearly indicate that IR has witnessed rising trend of performance. At this juncture, the question that arises is 'how to make the processes and strategies sustainable in order to have a consistent performance of the IR?' Most essentially, the IR, to further enhance its performance, should strive towards the completion of dedicated freight corridor, along the golden quadrilateral. This corridor will allow the railways to overcome stiff competition from roadways and bring back some of the important commodities back to railways. However, the challenge in this respect is the speedy completion of the dedicated freight corridor. The railways can complete this gigantic project of four high-speed corridors through Public Private Partnerships (PPP).

The railways should further aim to expand its route network at the rate of 2500 kms per annum. Currently the route network is being expanded at the rate of 1000 kms per annum; however, if the railways aim to expand its route network at the rate of 2500 kms per annum, then this is the biggest challenge for the railways. Further, it should endeavour to raise the existing speeds of passenger trains from 110 kmph to 160-200km per hour. The above two can be made possible only when adequate investments are diverted towards building capacity through network expansion, gauge conversion coupled with doubling and quadrupling, track maintenance. The required investment can be raised through internal resources rather than depending on market borrowings.

To enhance the speed of the mail express trains, the railways should adopt best, state-of-art coaches. The challenges here would be to identify the number of intercity routes, based on viability and the next step would be to build the high speed corridors in those specific routes initially and spread to other routes over a period of time.

The productivity of staff on IR has to be enhanced so as to match the technological leap that the railways are planning to undertake. This requires the recruitment and training of employees to enable them to upgrade their skills continuously. This, further, calls for a systematic investment in Research and Development (R&D). Apart from this, the railways should also adopt an optimal mix of external and in-house training.

Yet another challenge is the availability of wagons. As of now, there is a dearth of wagons for freight movement. The demand is more than the supply; as a consequence, we are losing rail traffic to road. To overcome this problem, the railways have to produce more wagons. Similarly, on the passenger side, the coach manufacturing units should be well equipped so as to create the state-of-art wagons at a faster pace.

The railways should also aim towards separation of rail infrastructure and Operations and Maintenance (O&M) in order to allow private sector participation. IR should undertake development of infrastructure for inter-modal connectivity, for the creation of warehouses, logistic parks and Special Economic Zones.

Finally, all the above policy suggestions would require best possible mix of budgetary and extra-budgetary resources. Further, for the efficient project execution, there is a necessity for optimum use of resources and complete the projects within the targeted time and cost.

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