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**Application of 5 M's of Management on Indian Railways**

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**ABSTRACT**

*Business environment always remains in a transition phase evolving continuously as per the changes in technology, political situations, changes in policy and economic developments. All the business organizations have to evolve continuously to keep pace with the changing environment following different management techniques to achieve Business excellence. The term "excellence" was introduced by Tom Peters in 1982 and it led to development of various Management theories and principles to evaluate and improve the performance of an organization. Business excellence should be all-pervasive: improvements should be perceptible to all stakeholders — customers, investors, channel partners, supply chain, and so on. Total Quality Management (TQM) and Six Sigma are most commonly used theories to achieve Business excellence.*

*Indian Railways has been the backbone of freight and passenger transport of India over the years spread over a network of around 66000 routes Kilometer carrying over 1.1 billion Tones of freight per annum and more than 3 crore passengers per day. However Indian Railways has been going through a financial crisis through last many years witnessing a continuous decline in the market share of transport. This public transporter is in need of a paradigm change to remain competitive in current environment where larger capacity road trucks, more comfortable buses, cheaper airlines and development of Inland waterways are posing strict challenge and threat of further erosion in the market share. Indian Railways has not changed its business model which worked well in the monopolistic conditions of yesteryear. In this paper we will critically evaluate the performance of Indian Railways and the changes required to remain competitive in transport business in changing technological and business environment.*

**Keywords:** *Indian Railway; Management Process; 5 M.*

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**1.0 Introduction**

Business excellence is the current global term for an integrated collection of proven practices for how a business should operate to become the best it can possibly be – i.e. world class. Business Excellence is applicable to all businesses whether private or public, for-profit or not-for-profit and small or large. It results in substantial productivity improvements.

Other popular integrated collections of proven practices advocated over the past 70 years include World Competitive Manufacturing, Just In Time, Best Practice, Total Quality Management (TQM), Six Sigma, Agile, Business Improvement, Process Improvement, Business Transformation and Lean Thinking.

All of these overlap significantly with each other, and fit within the umbrella term "Business Excellence".

Since man became victorious in the industrial revolution, every business has been using five M's: man, materials, machines, methods and money; to operate with, or without, success. To create any venture without any one of these M's is simply embarking on a journey to Erewhon. It is the careful balancing of these 5 Ms which may decide the course of an organization. Optimum utilization of these 5M guide an organization to profit or loss –Business excellence or disaster.

Indian Railways is the lifeline of the nation. It traverses the length and breadth of the country providing the required connectivity and integration for balanced regional development.

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The system never rests; it has been up and working unceasingly for the last several decades. It is an integral part of every Indian's being. It is one of the pillars of the nation.

In an earlier era, the Indian Railways have been described as “*imperium in imperio*”, an empire within an empire. The size and scale is gigantic. The United States, China and Russia are the only countries that have longer railway lengths, measured in kilometers.

Indian Railways has suffered from considerable under-investment during the last several years. As a consequence, capacity augmentation has suffered and so has the quality of service delivery. Resources have been insufficient for improving customer satisfaction and introducing technological improvements.

Investments in safety have also been insufficient. This has led to decrease in market share of Indian Railways in freight transportation and increase in its operating ratio (Expenses/Earnings).

Despite its problems, Indian Railways is not down and out; it is the only organization in the Government of India that pays for its wage bill, pensions and working expenses in its entirety. It also accounts for replacements and depreciation like any commercial concern should and pays a dividend on the capital it gets from the Government of India.

An effort has been made to stream line the 5 M's to bring back the Indian Railways to its old glory. Through this paper we will critically examine the strategy and effect on the financial health of Indian Railways.

**2.0 Indian Railways**

Indian Railways (IR) is a great national asset. A single transport network connects far flung areas of the country. It is one of the largest transportation and logistics network of the world which runs 19,000 trains everyday of which 12,000 coaching trains carry over 23 million passengers per day connecting about 8,000 stations spread across the sub-continent. It is equivalent to moving the entire population of Australia.

It runs more than 7,000 freight trains per day carrying about 3 million tonnes of freight every day. Its network of 65,000 route kilometers is more than one and half times the circumference of the earth. It has joined the select club of countries comprising

Chinese, Russian and United States Railways with an originating freight loading of 1008.09 million tonnes (i.e. one billion plus) in 2012-13. During 2013-14, Indian Railways carried 1.05 billion tonnes of revenue earning freight traffic and is expected to carry 1.1 billion tonnes in 2014-15.

The expenditure on Railways as a percentage of total transport expenditure has declined considerably. Railway expenditure as percentage of transport sector expenditure used to be about 56% in 7th Plan (1985-90). It has reduced to 30% in 11th Plan (2007-12).

IR in last two decades has remained under-invested whereas the road sector has witnessed a surge in investments. The share of IR in overall GDP has been static at 1% and has, in fact, gone down to 0.9% in 2012-13.

**Table-1 Percentage Share of Transport Sector in GDP of India**

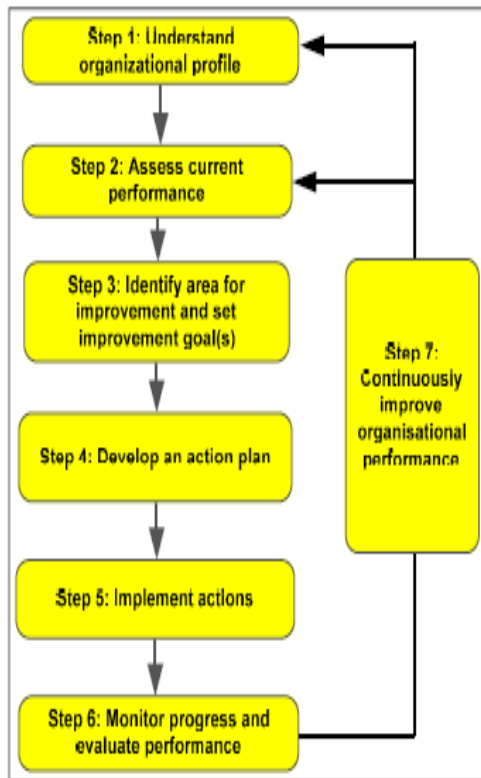
	2008-09	2009-10	2010-11	2011-12	2012-13 (1 <sup>st</sup> RE)
Overall Transport	6.6	6.6	6.5	6.6	6.7
of which					
Railways	1.0	1.0	1.0	1.0	0.9
Road Transport	4.7	4.7	4.6	4.8	4.9
Water Transport	0.2	0.2	0.2	0.2	0.2
Air Transport	0.2	0.2	0.3	0.3	0.3
Services incidental to transport	0.4	0.4	0.4	0.4	0.4

**3.0 Challenges Before Indian Railways**

The biggest challenge facing Indian Railways today is its inability to meet the demands of its customers, both freight and passenger. Apart from the quantum of investment, quality of delivery is also an issue. Cleanliness, punctuality of services, safety, quality of terminals, capacity of trains, quality of food, security of passengers and ease of booking tickets are issues that need urgent attention

The pursuit of Business excellence can be drawn in form of a flow chart consisting of seven steps as under-

**Table 2: Seven Steps to Be Followed for Business Excellence**



Indian Railways has suffered from chronic and significant under-investment as a result of which the network expansion and modernization has not happened at the requisite pace leading to an erosion of the share in national freight and passenger traffic. There is a clear recognition of the fact that for serving as the lifeline of the nation and making a contribution to the country’s growth, the organization needs to become operationally and financially sound.

The high density networks of the Indian Railways are facing acute capacity constraints coupled with a low passenger fares thereby leading to increases in freight tariffs to cross subsidize passenger revenues. However, that only enables recovery of costs and does not leave enough resources for investment in network expansion and replacement of assets.

**Table-3 Capacity Utilization of Railway Network**

Railway	< 80%	80-00%	100-120%	120-150%	> 150%	OTOS*	Total
Central	34	9	11	12	7	1	74
East Coast	16	9	9	16	2	4	56
East Central	16	13	19	22	16	5	91
Eastern	22	22	41	1	--	3	89
North Central	11	3	7	22	2	1	46
North Eastern	12	6	12	6	6	--	42
North Frontier	18	10	4	14	3	11	60
Northern	70	26	29	23	10	4	162
North Western	39	7	6	3	1	4	60
South Central	20	32	23	8	9	--	92
South Eastern	24	13	14	17	1	2	71
South East Central	9	6	9	7	2	--	33
Southern	53	38	25	15	--	--	131
South Western	38	12	--	--	--	1	51
West Central	1	4	7	6	3	--	21
Western	32	18	17	21	4	48	140
<b>Total</b>	<b>415</b>	<b>228</b>	<b>233</b>	<b>193</b>	<b>66</b>	<b>84</b>	<b>1219</b>

\*OTOS : One Train only System

Indian Railways is striving to enhance its market share and improve the quality of service so as to ensure that rail travel is an experience beyond other modes of travel. This can be achieved by eliminating capacity bottlenecks which constrain growth, improve productivity of assets and efficiency of operations and optimal employment of its resources including human capital.

**4.0 Recent Efforts by Indian Railways**

Railways in their Budget 2015-16 made the first effort in this direction by staying away from populist measures and focusing on bringing it back to track of profitability by making multipronged attack on the problem. Major Budget pronouncements of 2015-16 may be categorized on the basis of the 5 M’s as under-

**4.1 Man**

- Human Resource Audit to be undertaken. Focused Human Resource strategy to raise employee productivity in line with global standards. Separate accounting head for HRD. ERP based Human Resource Management System.

- Special training module on soft skills for frontline staff so that our customers feel welcomed. Training in yoga.
- Setting up a full-fledged University during 2015-16.
- Improved delivery of health services to employees: Upgradation of four Holiday Homes.

#### 4.2 Machines

- Train Protection Warning System and Train Collision Avoidance System to be installed on select routes at the earliest.
- Modern track structure consisting of sleepers and heavier rails being used while carrying out primary track renewals. Better welding techniques being promoted; digital type machines to replace analogue type machines.

#### 5.0 Technology up Gradation

- Constituting an innovation council called “*Kayakalp*” for business re-engineering and introducing a spirit of innovation in Railways.
- Technology portal being constituted to invite innovative technological solutions.
- Strengthening of RDSO into an organization of excellence for applied research; four Railway Research Centers to be set up in select universities for fundamental research; ‘Malaviya Chair’ for Railway Technology at IIT (BHU), Varanasi to be set up.
- Consortium of Ministry of Railways, Ministry of Human Resource Development, Ministry of Science And Technology and Industries on to take up identified Railway projects for research.
- IT vision to be unveiled: information on latest berth availability station navigation system, bar coded/RFID tracking of parcels and freight wagons, automated parcel warehouses. Integration of train control and asset management applications.
- Mechanize integrated track maintenance.

#### 6.0 Methods

##### 6.1 Improvements to Management Processes and Systems

- System of on-line applications introduced for two categories of recruitment as a pilot project- to be extended.

- Delegate, de-centralize, de-regulate & simplify to be the new mantra.
- Systems audit to be conducted for review of all processes and procedures.
- Global benchmarks for key operating and maintenance activities.
- Improve appraisal mechanism for the selection of projects and introduce simulation tools for project planning and decision-making; introducing EPC system of contracting.
- Constitution of a working group to modify present system of accounting, to ensure tracking of expenditure to desired outcomes.
- Train operations to be audited.
- Paperless working in material management system to be expanded; Vendors to be integrated through Vendor Interface Management System to provide single window interface to vendors.
- All possible solutions be explored to address menace of corruption.

#### 7.0 Material

- E-procurement value chain being expanded.
- Robust Quality control system
- Constituting a mechanism for making regulations, setting performance standards, determining tariffs & adjudicating disputes among licensees/private partners and the Ministry, subject to review in appeal

#### 8.0 Money

- An investment of 8.56 lakh crores over next 5 years
- Tie up with LIC for a loan of 1.5 lakh crores.
- Funds allocation to capacity augmentation projects-
  - Decongesting networks with basket of traffic generating projects priority; priority to last mile connectivity projects ; fast track sanctioned works on 7,000 kms of double/third/fourth lines and commission 1200 km in 2015-16 at an investment of Rs. 8686 crore, 84% higher Y-O-Y.
  - Commissioning 800 km of gauge conversion targeted in current fiscal
  - 77 projects covering 9,400 km of doubling/tripling/quadrupling works along

with electrification, covering almost all States, at a cost of

Rs. 96,182 crore which is over 2700% higher in terms of amount sanctioned.

- O Traffic facility works a top priority with outlay of Rs. 2374 crore .
- O Award of 750 km of civil contracts and 1300 km of system contracts in 2015-16 on Dedicated Freight Corridor; 55 km section of Eastern DFC to be completed in the current year. Preliminary Engineering cum Traffic Survey (PETS) for four other DFCs in progress.
- O Acceleration of pace of Railway electrification: 6,608 route kilometers sanctioned for 2015-16, an increase of 1330% over the previous year.
  - Expansion of freight handling capacity
  - Improving train speed

**9.0 Future Course of Action**

These efforts have been initiated by the Ministry of railways for bringing it back to the track of profitability, however the efforts need to be continued. Basic challenges for Railways are-

1. Major issues regarding the passenger satisfaction are availability of accommodation, transit time, punctuality, cleanliness at stations and trains, catering services and reservation facilities.
2. Similarly, major issues regarding freight customers are availability of suitable terminals for loading and unloading, timely availability of rolling stock and speedy & seamless transit times of freight trains.

The problems and solutions ailing the Railway system may again be divided in the terms of 5 M’s

**9.1 Man**

Indian Railway is 2nd biggest employer of India after defense. It has a workforce of more than 13 lakh employees of which 15000 are officers and rest are Non Gazetted staff.

The productivity per employee as compared to other Railways is as under-

**Table 4: Comparison of Employee Productivity of Various Railways**

Railways	Employee Productivity (Annual)		Network Productivity		Wagon Productivity (Annual)
	NTKM (million)/ Employee	PKM (million)/ Employee	NTKM (million)/ Network Length	PKM (million)/ Network Length	NTKM (million)/ Wagon holding
Russia	1.81	0.15	21.87	1.80	5.52
China	1.23	0.38	39.66	12.38	4.31
India	0.44	0.66	9.39	14.12	2.73

*Source: UIC Statistics 2009-10 (12<sup>th</sup> Plan document)*

The effort has been to improve this important parameter. This is being done by reducing the number of employees and increasing the loading/ passengers. While for latter, steps may be taken, former involves social and political issues and so the trimming has been gradual and small with filling of only strategic posts on retirement of the incumbent.

Nearly 30% of the expenditure is on account of wage bills, which needs to be reduced to make the Railways a viable option. Outsourcing is also been explored for non critical activities to reduce the pension liabilities, however continuous supervision is required in this case to maintain quality.

**9.2 Machine**

Leveraging technology to reduce dependence on manpower and ensuring quality is to be done. Automation of processes and use of machines in labour intensive processes is required to improve productivity and reliability. For example- Track machines lead to better quality of track with lesser use of manpower thereby saving time, money and providing better quality.

**9.3 Methods**

A paradigm shift in thinking is required by going in for Customer segmentation. At present Indian Railways has only 2 segments- passenger and freight customers. Further segmentation needs to be

done to understand their issues and have a more focused approach.

Passenger segment has two classes of customers-

- a) Ready to pay more money for more comfort, high quality food and hygiene and shorter travel time
- b) Ready to spend more time in travel with lesser comfort in lieu of cheaper travel. They look for cheaper food and have a lower standard for hygiene

Till now Indian railways has been trying to cater to both these segments in same train and on same platform. It needs a paradigm shift to segregate these class of passengers. It is a well known fact that Indian Railways provides subsidized travel to all the passengers with the exception of 3rd AC class of passengers where they break even. Indian Railways may think of running AC express with most of the coaches being 3rd AC on prime slots with more swanky and cleaner platforms and operate general class trains from Tier 2 terminals and stations.

**Table 5: Comparison of Rail and Road Freight Fare**

Cost (Paisa/T/Km)	2011	2014
Rail freight rate	97	138
Road freight rate	189	212

Source: Ministry of Rail, Indian Foundation of Transport Research and Training

Above table shows that there is a big gap between Rail and Road Freight rate, despite this, the share of Railways has been decreasing continuously.

**Table 6: Percentage Share of Indian Railways in Passenger and Freight Transportation**

	1981	1991	2001	2005	2012
IR share in Freight (T km)	62	62	39	39	36
IR share in Pax (pax km)	28	28	18	13	14

Source: IRFC.org

Despite being cheap, Railway is losing its share in freight market because of the last mile connectivity and not so customer friendly business approach. The need of hour therefore is to make the system of allocation of rakes more transparent and introducing a system of maximum time limit for delivery of goods.

Freight customers have further segmentation with coal, oil, iron ore, iron and steel, cement foodgrain and so on. The requirements of these customers are different from one another in terms of type of wagon requirement, demand cycle and sector specific issues. A more focused approach is required to bring them back to rail from road.

Indian Railways have run Suvidha trains which are based on dynamic pricing with base fare equal to tatkal fare and amximum limit of 2.5 times the base fare. It is seen that the ceiling rates become more than the bus services for Non AC Categories and for AC categories, they become comparable to Airlines fare. The Occupancy therefore at highest fare level is not much defeating the very purpose. Railways need to do a detailed market survey of segments and decide the optimal fare carefully to realize the full potential of this service.

**9.4 Material**

Indian Railways makes annual procurement of more than 30000 crores. It has a well defined system for procurement which has been modified from time to time. At present materials are procured annually through e- tendering system for one year and the cycle is repeated every year. This system promotes uncertainty in the mind of the vendors who have no long term assurance and incentive to undertake research to improve upon the quality or take long terms measure for the same. If the procurement of regularly procured items is done for 3 years at a go with Price Variation Clause, it will have dual benefit of reduction of manpower and an assured off take for the vendor to undertake investments related to quality improvement.

**9.5 Money**

Indian Railways gets a substantial part of its money through budgetary support and remaining through its earnings. With dwindling budgetary support, need for raising money through Public private partnerships/ Joint ventures has arisen. Railways also bear social service obligation of around



Rs 25,000 cr every year by carrying passenger services below cost.

Railways need to do away with the subsidized passenger and goods fares in a phased manner similar to the LPG subsidy. Non remunerative services need to be curtailed / compensated suitably by government and timely completion of capacity enhancement projects need to be ensured.

Accounting system need to be changed for cost analysis of each and every activity undertaken by Railways. All the zones may be made independent profit centre to assess their productivity.

### 10.0 Conclusions

Indian Railways has a glorious past, a turbulent present and a bright future. It is a giant emerging out of a deep slumber. Since forward and backward linkages of Railway to economic activity are 5 i.e., an investment of Rs 1 in Railways boosts the economy by a Rs 5, an awake, alive and kicking Indian Railways can lead the country to greater heights of accomplishment.

Though today, its network is congested and finances are not easy to come by, spirit to take it to greater heights is still alive. Plan for resurrection based on management principles including 5 M's has already been prepared and we may hope to see resurrected Indian railways in near future. Indian Railways, like the mythical Phoenix, will rise again to scale new heights.

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