MANAGEMENT INNOVATIONS IN TATA STEEL

Hemant Kumar Yadav*, Mukesh B. Gupta & Abhishek singh****

ABSTRACT

In changing work environments, innovation is imperative. Yet, many teams and organizations fail to realize the expected benefits of innovations that they adopt. A key reason is not innovation failure but implementation failure. The failure to gain targeted employees' skill, consistent, and committed use of the innovation in question. We review research on the implementation process, outlining the reasons why implementation is so challenging for many teams and organizations. We then describe the organizational characteristics that together enhance the likelihood of successful implementation, including a strong, positive climate for implementation; management support for innovation implementation; financial resource availability; and a learning orientation. In this paper I focus on various researches and development programmes in Tata Steel and try to find out its impact on the firm performance.

Innovation is very critical for any organization as well an individual. Innovation indicate developing something new e.g. idea, technology etc. In innovation managers strive new way to achieving their objective. In the process of innovation firstly innovation is adopted there after adopted innovation is implemented. Innovation implementation, in contrast, is "the transition period during which [individuals] ideally become increasingly skilful, consistent, and committed in their use of an innovation. Implementation is the critical gateway between the decision to adopt the innovation and the routine use of the in novation."(Klein & Sorra, 1996, p. 1057). Major Research and Development in Indian steel sector over the years has remained confined to a few steel companies like TATA Steel Ltd and SAIL.

However, gradually, it has been following up by newly commissioned main/major steel plants like RashtriyaIspat Nigam Ltd (RINL), JSW Steel Ltd., Essar Steel Ltd., Ispat Industries Ltd. Etc. research works in these firms however, relate to incremental research addressing the day-to-day problems of the steel plants or the industry, and investment in large-scale R&D work for development of path-breaking innovative technologies has been limited. Naturally, R&D investment in steel sector as a whole remains very meagre and the actual investment in different steel companies as percentage of their turnover vary in the range of 0.15% to 0.25% which is roughly 1/10th when compared with known steel plants abroad.

Innovations at TISCO

In Tata Steel Group there are five major research centres across the world.

1. The Ijmuiden Technology Centre, Netherlands: IJTC located on the site of the Corus Steelworks in Ijmuiden. At Ijmuiden Technology Centre process and product

* *Lecturer, S.M.S, Varanasi.*

** *Research Scholar, Faculty of Commerce, Banaras Hindu University.*

research is done for the strip products and its application in the automotive and packaging sectors.

2. The Swinden Technology Centre, United Kingdom: STC is located in Rotherham. This research centre mainly focuses on the product research and application research. Research is done for the implementation in transport, building and construction sector. Process research is undertaken for the mills operations primarily concentrating on the environmental research.

3. The Teesside Technology Centre, United Kingdom: TTC is situated in Grangetown, Cleveland operates as a satellite focusing on process and long product research. Capability of TTC is 8 tonnes heavy pilot plant facility with an arc melting furnace and steel casting capability.

4. The Automotive Engineering Group, United Kingdom: AEG was established in 19696. The main purpose for the establishment of this research centre was to eliminate gap between Corus and its automotive sector customer. It focuses on the cost-effective light weighting, to keep steel positioned as the automotive material of choice in the transition to a low carbon economy. AEG employs automotive specialists using CAD design, structural and formability CAE, manufacturing feasibility, cost estimation and knowledge-based engineering techniques to service the automotive, construction, material handling and defence market sectors.

5. The Jamshedpur R&D Centre, India: The Jamshedpur Research and Development Centre was establishment in 1937 at Jamshedpur, India. This research centre is one of the oldest research centres in India. This centre working with 145 officers. With the help of this centre Tata steel is able to get 36 patents in recent years.

Key Research Segments in Tata Steel

1. Raw Material: Cost of raw material plays a significance role in the cost of finished goods. Various research programmes are undergoing to control the cost of raw material. Besides this TISCO seeks to maximise use of raw material with the help of new technology. Various research project related to raw material includes new technology to produce low ash clean coal, beneficiation and a new coal agglomeration technology to increase the use if low cost non-coking coal for coke production.

2. Cost and Productivity: With the help of technology, it is possible to reduce cost of product as well a positive change in production. Research in cost and productivity includes agglomerates research, reduction in zinc consumption, blast furnace distribution, integrated through-process modelling,

3. Market and New Product: For this segment, 14 research groups are engage round the world, out of which4 are working in India.

4. Energy and Environment: Tata Steel's R&D centres conduct many programmes to improve the life cycle and sustainability of the Company's products. These include projects to reduce energy consumption, CO2 and other emissions. One current example is the construction of a pilot plantto trial the new HIsarna iron making process at Corus' IJmuiden in the Netherlands. This new process, which was developed jointly with partners in the ULCOS consortium (www.ulcos.org), is expected to drastically reduce the energy consumption and CO2 emissions associated with the production of iron from iron ore.

Technology absorption, adaptation and innovation

Efforts made on the Process Front: At Bamnipal, CO-Gas has been used for sintering of pallets andpreheating of charge materials and heating of laddles. This hasreduced the

consumption of Smelting Power by increasing hot charge feeding rate into Furnace during the year.

Raw Materials

- Development of the cold bonded briquettes from Iron ore slime.
- Development of Iron Ore nuggets from iron smile and Jhana Coal.
- Development of a chemical to agglomerate slime particles for better of process water.
- Use of Sodium Silicate in Joda Classifier circuit for reduction of alumina in iron ore fines.
- Cutting in standard deviation of alumina in iron ore despatches through development of software for rake loading.
- Establishment of plant Information Management System in coal beneficiation.

Iron Making

- Creation of knowledge base on pelletizing technology; and blue print for testing facility and plan.
- Development and application of cohesive zone model for diagnosis of disturbances in BF process condition.
- Benchmarking Ijmuiden practices to achieve better productivity and quality.
- Making coke, sinter and BF process performance and quality data of last six years - accessible on-line via the intranet to users across the company

FLAT PRODUCTS

Product Development

- Improved product properties of Cold Rolled IFHS 340 to atpar with continuously annealed material.
- Developed High strength - 600 MPa Hot Rolled Steel for
- Wheel application.
- Developed High strength (440 Mpa) Galvannealed steel.

Process Improvement

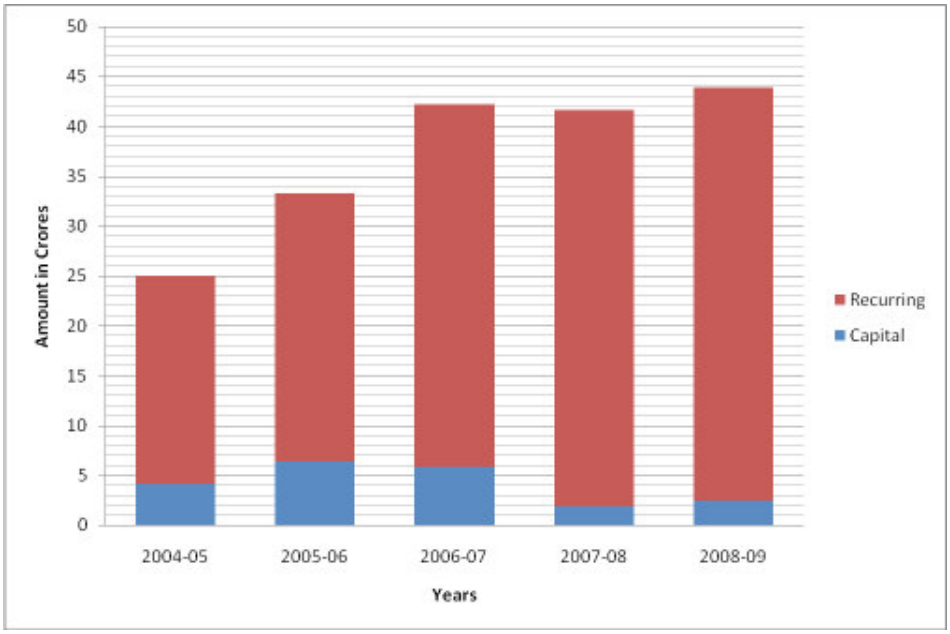
- Improvement in product yield by reduction in central line segregation.
- Improvements in overall IF yield by reduction in RIS defect.

Table: 1

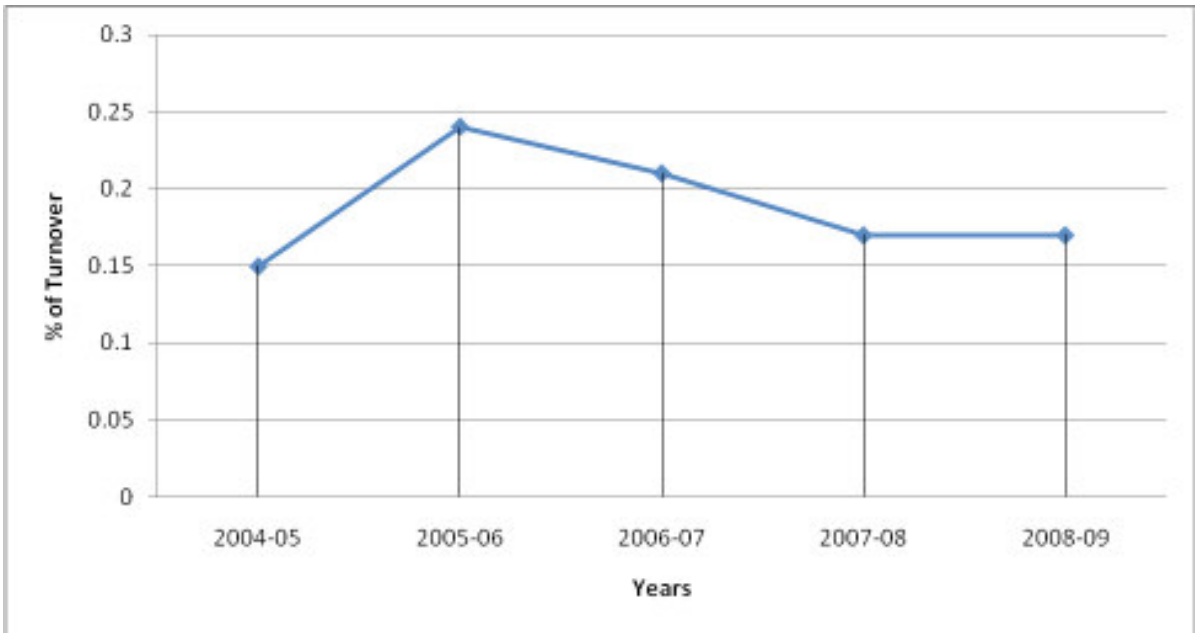
Serial No.	Particular	Amount (Rs.) Years				
		2004-05 In Crores	2005-06 In Crores	2006-07 In Crores	2007-08 In Crores	2008-09 In Crores
1	Capital	4.14	6.40	5.83	1.89	2.43
2	Recurring	20.84	26.85	36.37	39.70	41.43
3	Total	24.98	33.25	42.20	41.59	43.86
4	Total R&D expenditure as a percentage of total turnovers(%)	0.15	0.24	0.21	0.17	0.17
5	Total turnover	16033	22000	25650	131534	147329

Source:- Financial report of TATA

Graph:1

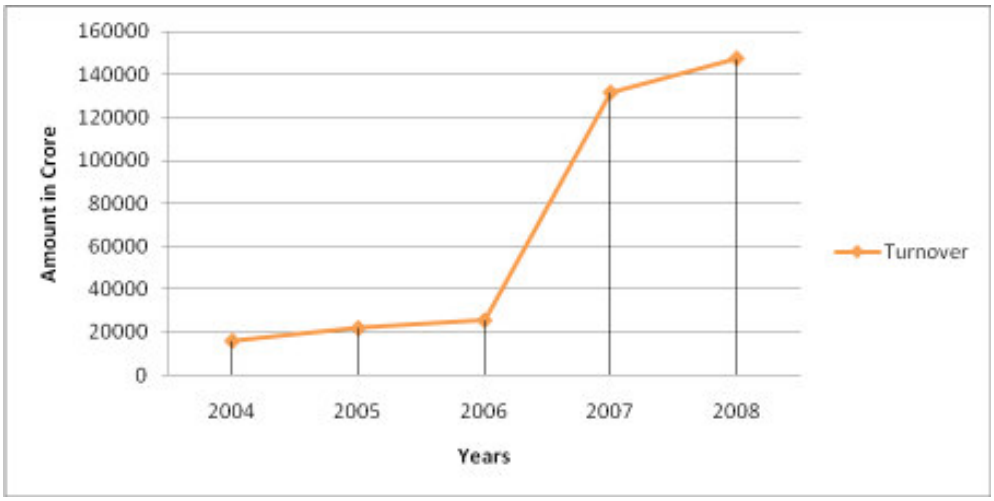


Expenditure on Research and Development in Tata Steel (In Crore)
Graph: 2



Total R&D expenditure as a percentage of total turnovers (%)

Graph: 3



Total Turnover in Tata Steel

Process Improvement:

- Data visualisation at NBM has been strengthened by the use of software designed and implemented by TG (GW&L).
- Development of cryogenically treated dies for wire drawing has resulted in doubling of die life at its Tarapur plant.
- A new philosophy of producing high carbon wire rods at WRM(E) has been introduced. The product has significantly low-scale and improved ductility compared to the conventional high-carbon wire rods.

TUBES DIVISION

ST Mills:

- Modification of Galvanising Bath #1: Galvanising bath #1 of ST Plant was modified to install air wiping system in place of conventional steam blowing system for reduction in zinc consumption.
- Installation of Online Mair packaging line at HF3 mill for improving the productivity.

PT Mills:

- State-of-the-art SINICO cutting machine commissioned in PT Plant for precision unit length cutting of high end application like Telescopic Front Fork (TFF), Shock Absorber tubes.
- Some Major New products Developed through newtechnology absorption.
- Development of 5 new sizes of Telescopic Front Fork tubes for two wheelers.
- Development of 159 mm diameter tubes for Idler application.
- Development of 42*5 mm CEW tubes as a replacement of seamless tubes for Tata Motors Ltd.
- Development of 10 mm thk tubes in 175 NB & 300 NB round tubes for structural applications.
- Development of heat transfer enhancing tubes through CEW route.

Efforts taken on Process Technology at Bearings Division:

- Wear resistance material developed for use in Face support to improve Track

Grdperformance. Improvement in life by more than 4 times, observed during trial.

- Honing Oil was developed jointly with Indian Oil R & D with increased weld load after optimising the honing process conditions.
- Grinding coolant performance improved and rust problem eliminated.
- Rubber seal developed to withstand high temperature grease application.
- Higher load rated capacity bearing developed for engine bearing application.
- Carbo-nitrided bearing developed to enhance bearing life for crank shaft.

Expenditure on R&D in Tata Steel:

We can say that R&D expenditure as a percentage of total turnovers have been increased in financial year 2005-06 and shows a slight decreasing trend in next financial years. It is so because sales volume has increased many times in these years. That's why R&D expenditure shows reduction trends in spite of increased R&D total expenditure in 2006-07.

Benefits of R&D in Tata Steel:

- Raw material costs play a key role in the competitiveness of the steel industry. Various R&D programs are underway to address the issue of escalating raw materials from captive sources. These projects include low ash clean coal and the benefits citation of low grade iron and plant rejects to produce concentrates.
- Tata Steel becomes lowest cost steel producer in the world with the help of continues improvement in the technology.
- Tata Steel developed new product range as four research groups are working in this area.
- R&D of Tata Steel works on a range of products to increase energy efficiency. Various research programmes in Tata Steel concentrate on reduction in green house gases.

R&D Incentives by Ministry of Steel:

To encourage and step up R&D investment in the steel sector, Government of India, Ministry of Steel has been extending financial assistance from the interest proceeds of Steel Development Fund (SDF). The empowered committee constituted under the chairmanship of Secretary (Steel) in the Ministry of Steel for this purpose has approved 64 R&D projects costing Rs. 422 crore, of which SDF contribution is Rs. 177 crore. So far approx. Rs. 120 crore has been disbursed and 31 R&D projects completed, and results in several cases implemented yielding benefits to the industry. During the year 2008-09, a sum of Rs 7.27 crore and during 2009-10 (upto 31st January 2010), a sum of Rs. 8.47 have been disbursed from SDF for different new and on-going R&D projects. In addition to the above, Planning Commission, Government of India, has approved a new scheme viz. "Scheme for Promotion of R&D in Iron and Steel Sector" for which an amount of Rs. 118 crore has been allocated for the 11th Five Year Plan period. But still there is needof more investment in this area.

The scheme was formally approved for implementation by Finance Minister on January 23, 2009 for implementation from April 1, 2009. The scheme focus as on the following areas:

- Development of innovative/path-breaking technologies utilising Indian iron ore fines and non-coking coal.
- Improvement of quality of steel produced through induction furnace route.
- Beneficiation of raw materials like iron ore, coal etc. and agglomeration (e.g. Pelletisation).

Budgetary provision of Rs. 35 crore has been allocated for the scheme in 2010-11 (BE).

In consultation with a Panel of Experts 7 nos. of R&D proposals have been short listed for consideration by the Project Approval and Monitoring Committee. The first meeting of PAMC was held on 11th February 2010 when 4projects have been approved. Follow-up action towards release of funds is being taken by the Ministry. There is a need to look at innovations holistically, both from the creation and the management perspectives. Today, technical aspects of innovation,is receiving a lot of attention. The extent and type of innovation should be determined by current business performance and future expectations. A clear business strategy should be adopted, that integrates innovation appropriately at its very heart combined with effective and efficient operations which allow innovation to flourish will stand a greater chance of success.

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