CHAPTER ONE

INTRODUCTION

This chapter sets the context of the study. First it discusses evolution of the material management function in the context of the Indian railway. It is seen that in the Indian Railways the material management organization was given very high priority by creating a post of Member stores in late 19th century. It briefly describes the organizational structure, functions and objectives of materials management function in the Indian Railway. Material management function is most important strategic function for an organization as it amounts to roughly 60%-70% of working expenditure. A 5% reduction in Bill of Material (BOM) is having same impact as increase of more than 200% in sales in terms of bottom-line of an organisation. Material management function is managing flow of material across the organisation. In Supply Chain Management (SCM) the scope of flow is widen and it is managing the flow of value (Goods and Services), finance and information from vendor to the final customer. Supply chain is integration of key business process from the end user through the original supplier that provides product, services and information that add value for the customers (Felix and Chan, 2003).

1.1 Materials Management in the Indian Railways

National Association of Purchasing Management of the United States of America (Monczka, Petersen, Handfiled, & Ragatz, 1998)define materials management as the organizational concept in which a single manager has authority and responsibility for all activities, principally concerned with the flow of materials into an organization. This Include purchasing, production, planning, scheduling, incoming traffic, inventory control, receiving and storage. In the Indian Railways the complete control on the materials is vested in its stores department.

The purchase of stores and materials for the Indian Railways was conceptualized as early as in year 1859. The Court of Directors of the East India Company directed the Governor General-in-Council that a great proportion of the stores in use might be anticipated and provided for by order from its parent country England and that the Indian Stores in ordinary use should be provided by periodical contracts on tenders called for by advertisement. In

pursuance of this policy the total expenditure on the State Railway Stores and rolling stock purchased in England in the year 1885 was approximately £1,895,778 in British Pounds Sterling while the amount spent on these items in India was around Rs. 40, 00,830 only(Ovasdi, 1990).

The storekeepers of the East India company railways (later renamed as Controller of Stores) were instructed by their Home Boards to import as much as possible from England. In the first quarter of the nineteenth century the supplies required by the Indian Railways were divided into stores having items of indigenous origin which were purchased in the country, stores having imported component procured in India and stores having items procured direct by from abroad. Purchases of indigenous stores were arranged for by each railway administration except that in the case of large items such as sleepers, coal and rails where the Railway Board negotiated the purchases. As a matter of principle everything procurable in the country was utilized in preference to articles of foreign manufacture. In those days" locomotives, tools and electric plant which were not procurable at all in India made up the greater part of the foreign purchases (Ovasdi, 1990). Table 1.1 depicts Evolution of the Indian Railway at a Glance.

Table 1.1: The Evolution of the Indian Railway at a Glance

Parameters	Years	
	During fifties	**Current decade**
	1950-51	**2014-15**
Capital at charge (in crores)	827	2,42,116
Total investment (in crores)	855	3,68,758
Route kilometres- electrified	388	22,224
Total route kilometres	53,596	66030
No of stations	5,976	7173
Wagons	205,596	2,54,006
Personnel: number of employees (in thousands)	914	1326
Personnel: wage bill (in crores)	114	84,748
Average wage per employee (in rupees)	1,263	6,57,829
Passengers kilometres (in millions)	66,517	11,47,190
Passengers earnings (in crores)	98	42,189
Average rate per passenger in kilometres (in paisa)	1.48	36.78
Revenue earning traffic million tonne	73	1095
Total traffic million tonne	93	1101
Net tonne kilometres (in millions)	-	-
Total traffic	44,117	681696
Gross revenue receipts	263	156710
Working expenses including depreciation etc.	216	1,42,995
Net revenue receipts	48	16,838
Operating Ratio (percent)	81	91.2

Source: compiled by researcher from the Indian Railway Year Books up to 2014-15

1.2 Shifts in Nature of Procurement

At the time of independence the Indian Railways was running primarily on steam locomotives. Most of the components required for steam locomotives were made in workshops and very few components were required to be purchased. The stores requirements for track, signalling, Carriage and Wagons (C&W) and other general items were also very limited. In early 1950s the industrialization of India had just started therefore a substantial number of store items were to be imported through the mechanism of India Supply Mission. During those days the function of stores department was limited and mainly centred on store keeping. There was however a reversal of this trend after Independence when India entered the era of planning and there was need for a rapid expansion of the railway infrastructure. The indigenous component represents 94.3 per cent of the total purchase bill.

The import content of materials used by the Railways has been steadily coming down but there is still a residual need for import of certain essential raw materials, propriety items diesel and electric loco components and other rolling stock parts and fittings. The import content has come down from 8.2 per cent in 1983-84 to 5.7 per cent in 1984-85. Currently in 2015-16 it is approximately 3% (data compiled by researcher from Indian Railway Year Book 2014-15).

With the start of dieselization during 1950‟s and speeding up of electrification from 1960‟s the face of the Indian railways started changing. Electric locomotives, compared to steam locomotives, required more number of items which were sophisticated and had to be purchased. It is mainly with dieselization and electrification, the purchase function of railways started evolving though other changing areas of railways such as signalling, production of coaches, track laying and maintenance activity etc. also significantly contributed to purchase of more and more items. Apart from more number of purchase items, the issues like quality and reliability of items and the firms who were supplying them also became relevant as diesel and electric locomotives, required sophisticated items for which credentials and capabilities of vendors needed to be pre assessed. This necessitated the process of registration of firms and their subsequent approval. As the railway system was expanding, the funds become scarce and need was felt to keep inventories at optimum level so that capital can be used elsewhere and activity of inventory control thus gained prominence. Similarly the scrap sales function also became more and more important over the years. Purchasing and its allied activities became complex as the traffic and train services

increased in number and size. Purchase activity which was clerical in nature had to respond to the needs of time and had to become professional.

During mid-1980s, railway reforms committee headed by Mr. H.C. Sarin in 1981 it had Dr.Manmohan Singh as one of the members observed that distribution of materials from major depots to individual points on the division through monthly rail based stores delivery van does not meet the needs of consumers Ovasdi(1990). It is inherently slow, inefficient, and insensitive to user's priorities and leads to excessive holding of materials in transit and inventory. In line with the needs of the railways, stores depots should be set up on each division from where material should be distributed to the individual consuming points. The committee recommended that the railways should graduate to divisional pattern of warehousing and distribution of stores with purchase functions also partly vesting with the division. A senior stores executive should function under the Divisional Railway Manager (DRM) with charge of divisional stores depot to be located a centrally convenient place on the division. Accordingly, stores organisation was set up in divisions in late 1980s under the overall control of Divisional Railway Manager (DRM).

1.3 Evolution of Procurement Policy

The Parliamentary Committee on Public Undertakings, in their fortieth report on materials management in public undertakings (Third Lok Sabha) has observed that:

It has been found that in the Indian industries, cost of materials accounts for nearly two-thirds of the total cost of production, i.e. more than the combined amount spent on labour, overheads and management. Therefore in any scheme of cost reduction, the determining factor must be the efficiency of materials management.

Considerable attention is being paid to the materials management in other industrialised countries. For example, in Japan, the materials cost which was 61.55 per cent of the production cost was reduced to 58.45 percent. In the context of the United States of America the adoption of one scientific inventory control technique, namely, the economic lot size in place of purchases on judgement basis has been responsible for reduction in total inventory investment by 20 per cent to 30 per cent without sacrificing customer service.

Unfortunately the importance of proper materials management has not been fully realised in India and very little attention has so far been paid to the task of controlling investment in inventories through the application of various scientific techniques.

The committee regret to note that the administrative ministries have not given enough care and attention to the materials management problems in the undertakings under their control.

The remarks of the committee were illustrative of the awareness of the importance of materials management at the highest levels in India and this augurs well for planned development of industries in the country. The 1980‟s and 1990‟s saw more type of rolling stocks and improved maintenance practices. As practically the railway network in terms of track kilometres have remained more or less the same, the increase in traffic and customer expectation has put severe constraints on resources like track, rolling stock sheds and workshops. Less and less time became available for the maintenance of system. From mid1990‟s safe running of trains has emerged as a very important issue and compared to olden days more number of items have become essential for safe operation of trains. All these issues have put severe challenges on railways purchasing system. Over the years, as the Indian Railways were evolving, its purchases have gone manifold both in terms of value and number of items. The technical, industrial and commercial scenario of the country has also changed significantly. There are now more number of standards, specifications, accrediting bodies and also more central, state and local laws. Purchasing in today's world is done in a complex environment. Table 1.2 depicts IR‟s working expenses across various heads as percentage of its gross earnings.

Table 1.2: Working Expenses share (Excluding Suspense and Payment to Worked Lines) as Percentage to Gross Earnings (Indian Rupees in thousands)

SN	Heads	Amount and Share (All Gauges)					
		2005-06		2010-11		2011-12	
		Amount	%	Amount	%	Amount	%
1	General Superintendence & Services	19,13,79,19	*3.54*	43,09,75,15	*4.56*	46,10,47,94	*4.43*
2	Repair and Maintenance of Permanent Ways & Works	36,11,29,92	*6.64*	72,85,03,62	*7.72*	77,23,04,36	*7.42*
3	Repair and Maintenance of Motive Power	18,03,86,03	*3.32*	33,50,12,25	*3.55*	34,91,34,92	*3.35*
4	Repair and Maintenance of Carriage & Wagons	38,40,51,17	*7.07*	75,62,59,61	*8.01*	81,54,91,54	*7.83*
5	Repair and Maintenance of Plant & Equipments	19,64,06,25	*3.61*	40,99,75,42	*4.34*	43,80,72,24	*4.21*
6	Operating Expenses (Rolling Stock & Equipments)	28,24,43,46	*5.20*	59,36,01,70	*6.29*	66,70,02,98	*6.40*

SN	Heads	Amount and Share (All Gauges)					
		2005-06		2010-11		2011-12	
		Amount	%	Amount	%	Amount	%
7	Operating Expenses (Traffic)	56,33,92,72	*10.37*	1,17,15,21,26	*12.41*	1,29,61,09,82	*12.46*
8	Operating Expenses (Fuel)	1,02,18,86,12	*18.80*	1,67,30,13,17	*17.72*	1,88,09,08,63	*18.08*
9	Staff Welfare & Amenities	15,37,71,18	*2.83*	35,45,30,42	*3.75*	38,42,08,13	*3.69*
10	Miscellaneous Working Expenses	15,21,36,81	*2.80*	30,45,62,34	*3.23*	36,26,31,09	*3.49*
11	Provident Fund, Pensions & Other Retirement Benefits	40,78,80	*0.07*	3,11,51,39	*0.33*	3,57,50,90	*0.34*
12	Appropriation to Depreciation Reserve Fund and Pension Fund	1,05,09,63,94	*19.34*	2,12,90,14,84	*22.55*	2,41,63,70,72	*23.22*
13	**Total Working Expenses**	**4,54,21,25,59**	**83.59**	**8,91,81,21,17**	**94.45**	**9,87,90,33,27**	**94.95**

Source: Compiled by researcher from the Indian Railways Statistical Handbooks 2005-06,2010-11 and 2011-12.

1.4 Strategic Level of the Indian Railways: The Railway Board

At the time of Independence, the Railway Board consisted of a Chief Commissioner, a Financial Commissioner and three members in charge of Engineering, Staff and Transportation. There were six Directors, who held charge of Civil Engineering, Establishment, Finance, Accounts, Mechanical Engineering and Traffic. In addition to the Secretary and Deputy Secretary, there were eight Joint Directors, nine Deputy Directors and five Assistant Directors. The constitution of the Railway Board has not undergone any major change since then except that the presiding officer, previously designated as President and later as Chief Commissioner, was called Chairman Railway Board (CRB).

In 1960, five Additional Members to assist the Railway Board in the Commercial, Finance, Mechanical, staff and works department were appointed and gradually the number was increased to seven, additional portfolios of Health and Electrical Engineering having been created. An additional Member Vigilance, drawn from the civil service, was placed in position in pursuance of the recommendations of a Committee appointed by the Government of India. These posts of Additional Members were, however, abolished in 1977, but partially resurrected and re-designated as Advisers Finance, Industrial Relations and Electrical Engineering. With the growing volume of legal work, dependence on the Ministry of Law was not considered convenient and one of its officers was drafted to the Railway Board as its legal adviser. The Board has two Directors-General, one in charge of security and the other to overlook Railways‟ health services(Ovasdi, 1990).

Functions of Directors There has been quite a proliferation of Directors since 1947 and their number has reached to nearly thirty. These fall into three board categories. Some directors

look after subjects which represent new responsibilities that the railways have accepted, namely First category such as safety operations. In the second category fall‟s health, metropolitan transport, tourism, electrification and security. In the third category fall such posts as Directors in charge of finance, stores, planning, efficiency bureau and statistics. The post of Directors, safety was created in 1964, in pursuance of a recommendation of the Railway Accidents Enquiry Committee, 1962, so that prevention of accidents and investigation especially in the psycho technical sphere, could receive greater attention.

1.5 Consolidation of the Indian Railway Network

On March 31, 1978, the Railways were split into nine zones. The Northern zone with its headquarters at Delhi (Delhi junction), the North Eastern zone with its headquarters at Gorakhpur, the North East Frontier with its headquarters at Maligaon (Guwahati), the Eastern Zone with its headquarters at Kolkatta (Howrah junction), the South Eastern Zone with its headquarters at Kolkatta again (Howrah junction), the South Central Zone with its head offices at Secunderabad, the Southern Zone at Chennai (Chennai Central) and the Central and Western Railways with their administrative headquarters at Chatrapati Shivaji Terminal (CST) and Churchgate respectively. Moreover, each Zonal Railway has a certain number of divisions, each having a divisional headquarters. As of now, the Indian Railways are divided into sixteen zones and 68 divisions

1.6 Materials Management Cadre

All senior level posts in stores department are manned by the Indian Railway Stores Service (IRSS) personnel. It is an organized Group “A” service of the Government of India. It is one of the nine organized services of the Indian Railways. The officers of this service are the public procurement and logistics specialists. The members of the IRSS on the Indian Railways are the public procurement and logistics specialist of the Indian Railways responsible for procurement of various goods and services for the Indian railways to the tune of Rs. 45,000 Crores per annum as well as the disposal of scrap to the tune of Rs. 3500 Crores per annum (Indian Railway Year Book 2016). They also manage huge warehouses attached with the major coaching and wagon workshops as well as the electric and diesel

locomotive sheds. The job profile has evolved and changed from stores keeping activities during 1950‟s to following principles and practices of supply chain management in 21st century. Table 1.3 depicts The Indian Railway at a glance.

Table 1.3: The Indian Railway at a glance

SN	Item (s)	Unit	2013-14	2014-15
1	**Assets**			
	Route length	Kilometres	65,808	66,030
	Locomotive	Numbers	10,499	10,773
	Passenger service vehicles	Numbers	59,589	61,558
	Wagons	Numbers	252,833*	2,54,006
	Railway Stations	Numbers	7,112	7,137
2	**Operations**			
	Passenger origination	Millions	8,397	8,224
	Freight traffic (Revenue)			
	Tonnes origination	Millions	1,051.64	1,095.26
3	**Employment and Wages**			
	Regular employees	Thousands	1,334	1,326
4	**Financial results**			
	Revenues	In crores of Rs.	1,39,558.18	1,56,710.54
	Expenses	In crores of Rs.	1,30,320.76	1,42,995.88
	Miscellaneous transactions	In crores of Rs.	2,511.65	3,123.83
	Net revenue (before dividend)	In crores of Rs.	11,749.07	16,838.49

* Wagons are characterized in terms of units to normalize various types such as covered and open wagons.
Source: Data compiled by researcher from the Indian Railway Year Book 2015 and 2016

Though materials management or stores department existed in the Indian railways prior to independence, there was no Group „A‟ cadre till 1944‟s to man senior level posts. All senior level posts were manned by officers from other departments such as mechanical, electrical, civil, etc. With the expansion of railway's operations, a need was felt to have a separate specialized cadre of Group „A‟ officers to handle materials management functions professionally. The Government of India thus created IRSS or Indian Railway Stores Service in early 1950‟s. The members of this service are recruited through Indian Engineering Services (IES) Examination conducted annually by the Union Public Service Commission (UPSC). The basic qualification for appearing in this examination is a bachelor's degree in basic disciples of engineering such as mechanical, electrical, civil etc. As of now the total sanctioned strength of cadre is 656(Bansal, 2015)

1.7 Roles of Materials Management Cadre

The officers of the IRSS man the senior posts of stores department and also general administrative posts of the Indian Railways. They perform diverse functions depending on their seniority and place of posting. At the apex level of the Railway Board, Indian Railway

Stores Service (IRSS)officers are posted as Additional Member (Railway Stores), Executive Directors, Directors and Joint Directors. In the Zonal Headquarters, the department is headed by Controller of Stores (COS) assisted by Chief Materials Managers (CMM), Deputy Chief Materials Managers (Dy. CMM), Senior Materials Manager (SMM) and Assistant Materials Managers (AMM). If posted in depot, they are designated as Deputy Chief Materials Managers (Dy. CMM), Senior Materials Manager (SMM) and Assistant Materials Managers (AMM). When posted in division, they are designated as Senior Divisional materials Manager (Sr. DMM) or Divisional Materials Manager (DMM). They can also be posted in general Management executive cadre post like general manager (GM), additional general manager (AGM), Senior Deputy General Manager (SDGM), Divisional Railway Manager (DRM), Additional Divisional Railway Manager (ADRM), Deputy General Manager (DGM), Senior Electronic Data Processing Manager(Sr. EDPM) etc.

1.8 Functions of Materials management Department

Material Planning: This consists of ascertaining the need of the various departments in the matter of materials and stores and devising such policies that all the materials which have constant demand and also some critical non-wearing materials are constantly available so that they are supplied to the user departments without delay. This includes classification as well as categorization of items, codification, designing of recoupment policies, taking `make or buy' decision and also preparation of stores budget.

Procurement of Stores: This includes purchase of materials of required quality and quantity at reasonable prices. This activity also includes development of sources of supply with due emphasis to development of ancillary industries, small scale industries and indigenous sources for imported items (import substitution). This also includes, maintaining constant touch with the market to ensure steady flow of materials.

Objectives of Purchase: The principal objectives of purchase can be summarized as the procurement of goods of right quality, in right quantity and at the right time from the right supplier at the right price. To state it broadly, the main objectives of purchasing are as follows:

- Maintaining continuity in supply of materials to support the business activity.
- To do so with the minimum investment consistent with organizational safety and economics, keeping investment as low as is consistent with maintaining the production.
- Avoiding duplication, waste and obsolescence with respect to materials.

- Maintaining standards in quality of materials.
- Procuring materials at reasonably low prices consistent with quality and obtaining the best value for money spent.
- Developing good and reliable suppliers and ensuring satisfactory buyer-vendor relationship.
- To secure good vendor performance including prompt deliveries and acceptable quality.
- To develop locally, new materials and products that may be required by the organization.
- To develop good systems and procedures.
- To implement such programmes like value analysis, cost analysis and make or buy decisions, with a view to reduce costs.
- To Maintain organization‘s competitive position in the industry and by optimizing material costs.

Receipt and Quality assurance of Stores: This includes taking delivery of materials from carrier, checking of quantity and quality and their accountable.

Stocking and warehousing: This includes stocking of materials in the wards, their handling, issuing on demand by inventors and maintaining proper records.

Distribution of Stores: This includes timely dispatch and distribution of materials to various users by adopting quick and right mode of transportation.

Waste Management: This activity is main revenue earning activity of Stores Department these days.

Inventory Control: This includes maintaining an economic level of investment in inventories coupled with fulfilling user's requirements of materials satisfactorily.

Cost Reduction: Materials. Management Department can contribute a lot on cost reduction. Some of the techniques used for this purpose are Variety Reduction, Standardization, Value Analysis and Forecasting.

1.9 Objectives of the Materials Management Function

To ensure availability of raw materials, semi-finished and finished components, consumable and general stores, Machinery and Plant and spares for production/ maintenance/ Operational requirements.

- To maintain uninterrupted supplies and quality materials in time to the user Departments, at a minimum cost.

- To minimize investment in inventories, purchasing cost, inventory-carrying cost, number of stock-outs and percentage of obsolescent materials.
- To reduce materials costs through standardization, variety reduction, value-analysis, import substitution and by application of other techniques, contributing towards reduction of the overall cost.
- To satisfy the public accountability at all stages of the transactions relating to purchase, storage, issue and sale of materials, in the best interests of the organization.
- To release the working capital for, more useful purposes by efficient control of inventories.
- To avoid losses to the Government due to deterioration of materials.

1.9.1 Materials Management Function

It has three tiers structure involving Railway Board, Zonal level and field level. In Railway Board, Member (Mechanical) looks after the material management function that has one full time Additional Member (Railway Stores) to assist him. Additional Member (Railway Stores) is the head of Railway Stores Directorate. There are Executive Directors, Directors, Joint Directors and Deputy Directors in this Directorate. Organizational structure of the Indian Railways and positioning, roles and responsibilities of materials management function is depicted in figure 1.1

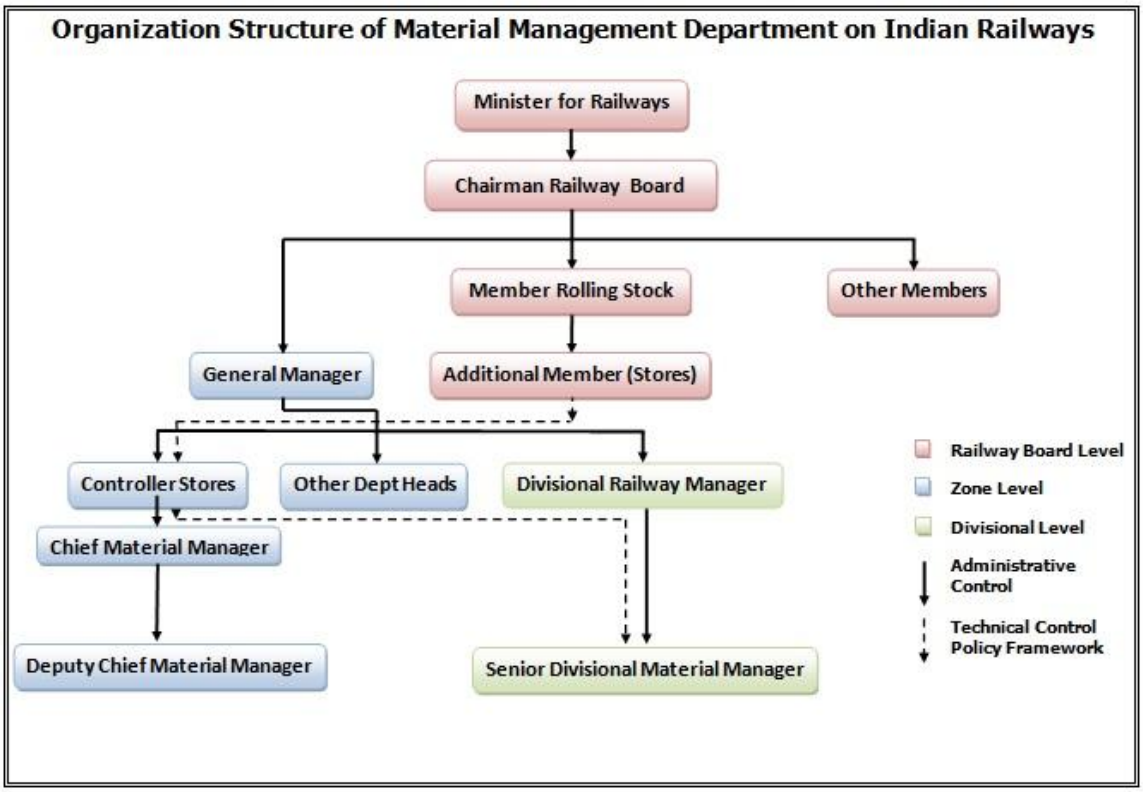


Figure 1.1 Organization Structure of the Material Management Department in the IR
Source: Conceptualized by researcher as per reporting structure as on 01/10/2016

The functions of Railway Stores Directorate in Railway Board are in terms of:

Providing policy framework: Framing policies for efficient materials management on Railways and issue of policy directives to all Zonal Railways and production units on stores and purchase matters coordinate various activities of materials management.

Inventory Control: Railway Board evolve policies for efficient inventory management of Indian Railways. For this integrated materials budget is processed by this Directorate. They also monitor inventory performance of Railways and production units by getting periodic returns from the Railways and issue directives from time to time.

Centralized Purchase: Railway Stores Directorate is also doing field function of purchases. Some of the items of Railways are centralized for purchase through Railway Board only. Some of these items are complete units of rolling stock and importation of Wheel Tyres and Axles (WTA),

Selected critical items for which capacity is either equal to or less than Railways demands. These items are centralized for purchase through Railway Board to ensure equitable distribution as per needs of Railways. Some of these items are train lighting batteries, train lighting lamps, central buffer couplers, some rubber products, special steel items, Petroleum Oil and Lubricants (POL), Textiles items.

Liaison with other Ministries in case of purchases done through Directorate General of Supplies and Disposals and in cases of imports when clearance from Ministry of Industry & Chief Controller of Imports & Exports is required to maintain good liaison with DGS&D and other Ministries, Railway Stores Directorate have posted one Junior Administrative/Senior Scale (JA/SS) Grade officer in Director General of Suppliers and Disposal (DGS&D) who is designated as the Railway Liaison Officer. Coordination for supply of steel from main producers to various Zonal Railways and production Units. For this purpose Railway Stores Directorate have one Director at Calcutta who is participating in various meetings of Joint Plant Committee for drawing Rolling program and also reviews supply position of steel to various Zonal Railways and Production Units. Director (Iron & Steel), Calcutta is also coordinating for planning and supply of steel to various wagon builders.

1.9.2 Materials Management Organization in Zonal Railways

In the railways an integrated concept of materials management is already prevalent. All Zonal Railways and Production Units have got separate department known as `Stores Department' for performing all the functions related to materials management. The head of Stores Department is known as Controller of Stores who functions at the same level as other Heads of departments. The Zonal Railway organization of stores department is at three levels of headquarters level, divisional level and extra divisional or district level in the form of stores depots and printing presses.

1.9.3 Organization at Head-Quarter Level

At headquarters level, Head Controller of Stores(COS) is responsible for both coordinating various activities of stores depots and divisional controller of stores and also purchases. Organization at Head-quarter level of the Department (HOD) of Stores Department coordinates all the activities of material management functions for estimation of needs, flow of materials, to disposal of scraps. All purchases on the Indian Railways are centralized in COS office only except for items of petty value. For discharging these duties Controller of Stores (COS) is assisted by few Chief Materials Managers (CMM) who are in Senior Administrative Grade, Dy. Controller of Stores (DCOS) who are in Junior Administrative or Selection Grade, Sr. Stores Officer in Sr. Scale and Asst. Controller of Stores in Assistant Grade.

Some of the officers are looking after functions of Inventory Control and disposal of scrap also in addition to purchase.

Office of COS is organized in various purchase sections. But there are some non-purchase sections also such as Tender Section, General Section, Inventory Control Section, Firm's Registration Section, etc.

1.9.4 Organization at Divisional Level

Divisions have a Senior Divisional Controller of Stores or Divisional Controller of Stores who is to coordinate with Controller of stores to meet the material requirements of his Division. He has been delegated some purchase powers also to locally Purchase items required for his division. Divisional stores depots are also being planned for many of the divisions.

1.9.5 Organization at Depot Level

The problems on railways are more complex than those of manufacturing organizations. There are thousands of consignees spread over a large geographical area. The Railways therefore, have to plan locations of the various stores depots with care. Normally stores depots are located attached to the major workshops and are known as attached depots. In addition, stores depots for materials of general nature which are required by most of the inventors are situated at one or two convenient locations from where the supplies can be affected. These are called as General Stores Depots. Stores Depots are generally under the supervision of Gazetted officers of the Stores Department referred to as Depot Officers. A Depot Officer may be in Selection Grade/JA Grade or Senior Scale or even Jr. Scale. The Depot Officer is responsible to the Controller of Stores for the efficient maintenance of stocks of stores and for the prompt service to the inventors in his territory. The depot officer is assisted in his work by Asst. Depot Officers and other Senior Staff such as Depot Materials Superintendents (DMSs).

1.10 Purchase Budgets

Purchase Units: In terms of manufacturing units the targets of production are fixed by Railway Board. The production department then steps in and makes the schedules of production to match the target. They will consider various factors when preparing the schedules and they may slightly deviate from the Targets if the economic batch of production so indicates. Once the schedule of production is decided, the production department prepares the bill of materials showing the description, specification, quantities and time when required using manufacturing requirement planning (MRP-II). The purchase department now steps in to prepare the purchase budget based on the bill of materials. They plan the materials, phase the deliveries and project the finances required period wise.

In framing the purchase budget, the purchaser will have to take cognizance of current stocks, materials already on order, estimated production requirements phased out in terms of time, lead times, price trends, etc. and then project the finance required period wise.

Zonal Railways: In complex organisations like the Indian Railways, different departments forecast their material requirements for capital works, revenue and maintenance purposes, etc. for the budget period. The Controller of Stores who is the principal Head of Department in charge of materials coordinates the requirements furnished by different departments and

prepares the purchase budget for approval by the Railway Board. In doing so he takes into account the inventory holdings at the commencement of the year (which includes materials paid for but yet to be received), materials likely to be returned by departments, etc. and frames his requirements of finance needed for his purchase budget. He also decides what materials will be manufactured internally and what materials will have to be purchased outfight. His effort will be to project the minimum requirements of finances so as to have as low in inventory as is workable.

1.11 Rationale of the Study

Public procurement constitute the major spending of the Government expenditure in India which is estimated to be around 25% of Gross Domestic Product (GDP) (source http://trade.ec.europa.eu/) which translates into more than Rs.15 lakhs crores per annum. In India the Public Procurement is handled by pool of talented human resource however, public procurement faces challenges such as:

- Failure to buy the right quality in right quantity at right time resulting into higher cost of acquisition.
- Inefficient and in-effective procurement process resulting into higher cycle time.
- Lack of transparency and ambiguity in the procurement process resulting into leakage and corruption.
- Inadequate infrastructure to support procurement including flaw in organisation and government.
- Ineffective and in-efficient vendor development and management.

Although the importance of public procurement is very high but in the Indian context this area is not much researched. Recently it has attracted the attention of academicians However, such studies are very limited in number. Moreover, not much work has been done in the context of public procurement in the Indian Railways. A mere saving of five per cent on public procurement will result into substantial amount which can be channelized towards building social and infrastructure sector of the Indian economy. Moreover, efficiently spent public money enables achievement of laid down policy objectives to achieve macro level policy outcome such as safe and tolerant society, educated citizen and developed and efficient public infrastructure.

In recent past policy decisions have been taken by Ministry of Railways for expanding and improving the conditions of railway infrastructure, amenities on trains and the railway stations and other railway premises for passengers and other railway users. As a result of these policy initiatives phenomenal growth has taken place in all the activities of Railway working which includes the Stores department. Since economic liberalization started in early 1990's the pace of growth has increased substantially and Railways has set ambitious targets for the Eleventh Five-Year Plan. Scientific Materials and supply Chain Management (SCM) has emerged in recent years as an important managerial function in its own right. A systematic application of the tools and techniques of materials management can achieve considerable saving in costs and increase in productivity. No management today can afford to ignore these concepts and techniques in an environment marked by liberalization, globalization, enhanced competition and rapid progress in technology, particularly in the areas of automation and computerization.

The objective is to increasingly apply the modern concepts related to integrated materials management, strategic and operational aspects of outsourcing and procurement, the interface of materials management and supply chain management. The objective is also to adopt the latest techniques of cost control and optimization by leveraging information technology tools for development and implementation of an efficient materials management system in the organization. It is needless to say that all is to be done in public procurement platforms in most economic manner. The technical, industrial and commercial scenario of the country has also changed significantly. There are now more number of standards, specifications, accrediting bodies and also more central, state and local laws.

The market in India has also undergone tremendous change ever since the liberalization process was initiated in early 1990's. The boundaries between the domestic and global market have become very thin and transparent. Number of global players, multi-nationals have been entered the Indian market and are keen to join hands with Indian Railways. In order to avail advantage of improved market condition Indian Railways would have to make major changes in the rule/procedure/methodology of procurement and also methodology of procurement and also methodology of disposal of non-performing assets and unserviceable materials. To mention a few concepts like green procurement, E-procurement, E-payments, Reverse auction, eco-friendly disposal systems would have to be not only introduced early but implemented with speed and on a sustainable basis. Recently (since year 2009) Stores

Department achieved the distinction of going 100% digital on tendering and procurement through web based online process using public key and Digital Signatures completing all 26 Railway Units (Both Zonal Railway & Production Units). This is the biggest web based procurement portal in entire Asia using single window function for all Procurements by Indian Railways crossing over 5 Lakh Online tenders through Fully Secured website www.ireps.gov.in. E-Auction: The department successfully achieved and adopted online E-Auction process since May 2013, crossing E-Auction Revenue over 3000 crores using fully secured single window E-Auction Process Providing Online Net Banking and Payment Gateway Facility enabling Purchasers across India to participate Online.

Railway Material Management System is now 100% computerized. All the activities from estimation of needs to procurement, receipt, issue & final disposal on a software called Material Management Information System (MMIS). It is seen that while implementing Material Management Information System (MMIS) the existing historical processes are replicated on I.T. There is a need to do comprehensive Business Process Reengineering (BPR) to take advantage of Information Technology introduction. Material Management function has to move from lower order clerical function to most competent strategic function. It contributes 60-75% of the total working expenses. Lot of research has been done in the area of procurement and supply chain management of various categories of professionally managed corporate business houses.

Indian Railway is a Government of India organization and Material Management practices are standardized under strict law of public procurement environment. Public procurement is one area of emerging importance. In emerging economies like India public procurement contribute 25% of total GDP. Not much research work has been done in the area of public procurement. There are more complex set of rules and procedure in carrying out the business processes under public procurement. These processes may add to lead time and challenge efficiency and effectiveness.

This research work is undertaken to reduce the gap in efficiency and effectiveness of public versus private procurement. Even a 5% saving in expenditure will be huge amount. Moreover efficiently well spent money shall provide better success prospect of the project.

1.12 Scope of the Study

The study investigates the procurement related issues in upstream supply chain of the Indian Railways. In this study role of public procedures, tendency of strict compliance of rules and procedure, implementation of Information Technology (I.T), supplier relation management, budget management and vendor managed inventory issues are addressed. The best practices of successful private organizations are studied and attempt is made to adapt and customize these practices to suit public procurement environment. Figure 1.2 depicts the scope of study where in customer means internal customer or consuming department. Partner includes finance department, Railway Design and Standards Organization (RDSO), material management department and third party inspecting agency. Suppliers are upstream suppliers. The study does not investigate the out bound supply chain management, production planning, risk management etc.

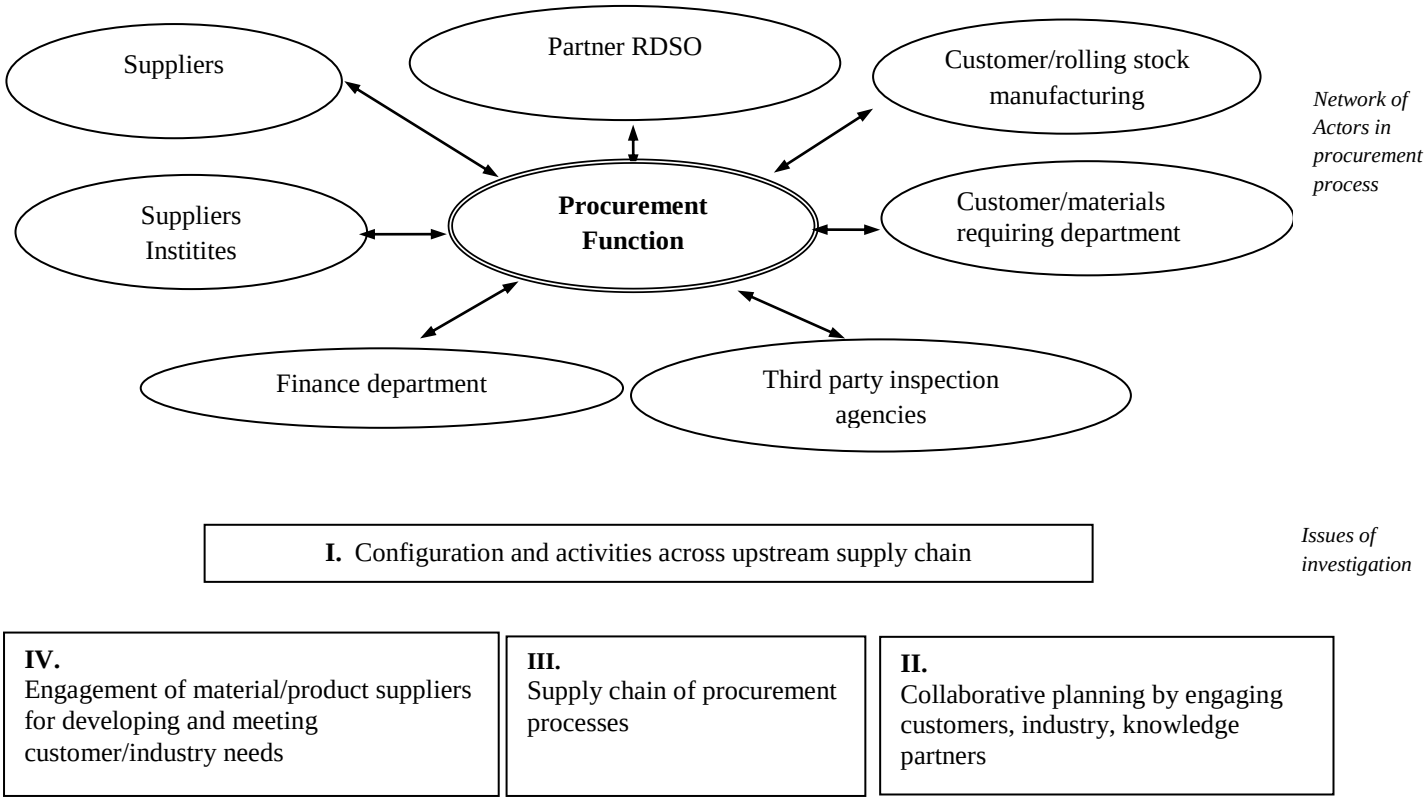
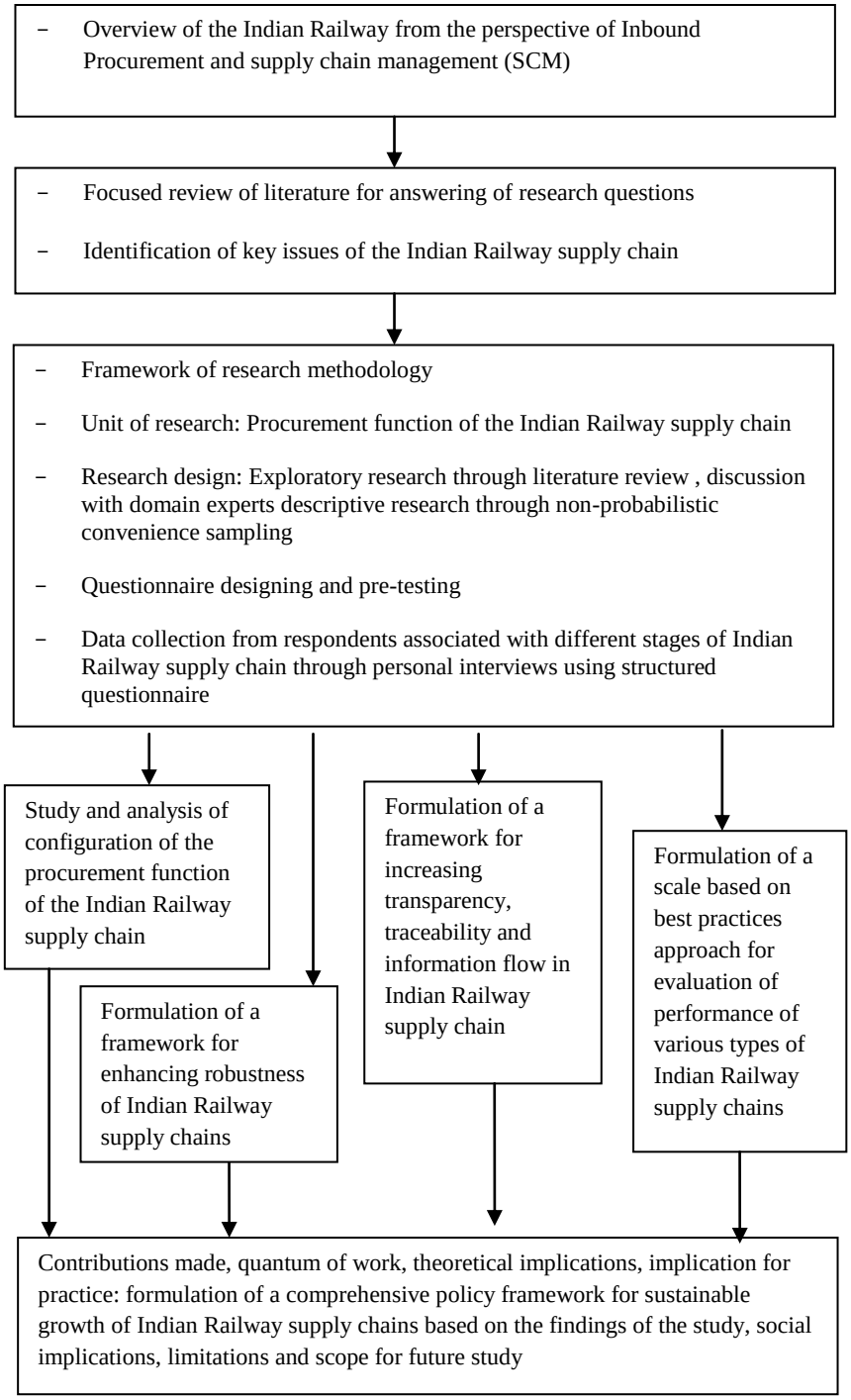


Figure 1.2: Scope of the Study (Procurement Issues across Network of Linkages)
Source: Conceptualized by researcher

1.13 Structure of the Thesis

The scheme of thesis is depicted in figure 1.3. The thesis is organized in seven chapters.



Chapter 1 sets the context and brings out the overview of public procurement system on the Indian Railway. It covers introduction to materials management functions of the Indian

Railway, rationale of study, organization structure of the Indian railway and structure of thesis.

Chapter two presents the review of literature establishing the foundation of this work. It covers the characteristics and importance of public procurement, its processes, contract management, important factors in public procurement, supplier relation management and performance measurement system.

Chapter three presents methodology through case study approach. It deals with research design through literature and exploratory interview. It also details on measurement tools and value chain mapping.

Chapter four presents assessment of procurement process, salient features, similarity and difference between private and public procurement, evolution of supply chain function. It describe the theoretical frame work of the supply chain function of the Indian railways and compare it with best practices of supply chain of efficient private organization so as to flag the relevant issues. It also describes the procurement of electricity and High Speed Diesel (HSD) oil of the Indian Railway.

Chapter five presents Vendor Managed Inventory (VMI) related critical issues which require to be addressed for Vendor Managed Inventory (VMI) and key performance indicators. It carry out the value stream mapping of existing procurement process and business process reengineering of existing process so as to implement Vendor Managed Inventory (VMI) of the Indian Railway in public procurement environment. It also describes the 3rdParty Logistics (3PL) system of the Indian Railway.

Chapter six is about making procurement as driver of the supply chain. It deals with deciding on the performance measurement system evaluation of performance of supplier for supplier relation management. It deals with purchase portfolio and business process reengineering to make purchase as driver of the supply chain. This leads to level four of maturity of supply chain for global optimization instead of local optimization.

Chapter seven presents summary and conclusion. The study is all about making public procurement system as effective and efficient as private procurement system. The issues covered in the thesis are value for money, inventory management, budget management, cartel formation and supplier relation management. This makes the procurement as the diver of supply chain. The study will benefit the professional in making public procurement process

effective and efficient. It is original work of study and will help the academician to carry out further research in integration of inbound and outbound supply chain.

1.14 References

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