

Evaluating Performance of Supply Chain Management System: A Conceptual Analysis in BSNL

Akshaya Kumar Sahoo^{#1}, Dr. Uma Sankar Mishra^{*2}

^{#1} *Research Scholar, Institute of Business and Computer Studies Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India.*
akshaya_sahoo2004@yahoo.com

^{*2} *Associate Professor, Institute of Business and Computer Studies Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India.*
uma_mishra_mba@yahoo.co.in

Abstract: The problems in the telecom service industry are quite visible now a days and the pace of new technology development within this industry is extremely high. The telecom industry is selected for review, analysis and research because it is of fast changing, multiple product variant and high volume business environment with a lot of focus on new technology development and speedy implementation of new ideas and innovations in to new products. Especially, 'BSNL' has taken for focus area because it has a second major market share in Indian market along with its sister concern public sectors like MTNL (Mahanagar Telecom Nigam Limited) and TCIL (Telecom Corporation of India Limited). The scope of this research is to study optimizing availability of both new & existing, and multiple verified technologies. The literature review highlighted in this paper discusses some major issues and challenges in supply chain management system. In this context, this paper aims at relating the theories and principles of supply chain management system that could be used in practice in the telecom service industry especially in BSNL. The paper presents comparisons between the manufacturing and the telecom service industry with special reference to BSNL, a public sector of Govt. of India. The comparison resulted that SCM is well contained in any service sector may be private or public sector.

Keywords: Supply Chain Management System, BSNL, telecom service, technology, telecommunication, strategy.

I. Introduction

"BHARAT SANCHAR NIGAM LIMITED" is abbreviated as BSNL. It is fourth largest department of TeleCommunication Company in Asia and seventh in world today. Which is one of the most earning revenue in

India. Above more than 3 lacs employees, officer and engineers working in BSNL at present. Previously electro mechanically exchanges for use in India namely Stronger type exchange, cross bar exchange were there. These manual telephone exchanges suffered from some disadvantages. To overcome these an automatic exchange was introduced in this system. In 1980's PITHROTHA LTD. Introduced "C-DOT" exchange in India. These exchanges replaced by electro mechanical exchange. These exchange which has wide range of capacity replaced electro mechanical exchange, C-DOT-128, C-DOT-256, C-DOT-512, C-DOT-1024(SBM) exchange, C-DOT-2048(MBM) exchange and so on. Besides C-DOT exchange ILT exchange, E-10B exchange also proved of mild stone in Telecommunication Sector to replace electromechanical exchanges, which were most sophisticated and modern latest techniques electronics exchanges. There after it was OCB-283 exchange which proved very important exchange in this series to replace electro mechanical exchanges. Now it is "WLL" & "GSM" mobiles which is also proved a mild stone in Telecommunication sector. It was 31st march 2002 when BSNL started these GSM mobile and today it has provided almost 35 lacks mobiles in all over country. WLL system which is also a mobile with limited mobility in city & can have Tele communication facility in that area almost. While GSM can cover all cities of the country. BSNL is divided into a number of administrative units termed as telecom circles, metro districts, project circles and specialized units. It has 24 telecom circles, 2 metro districts, 6 project circles, 4 maintenance regions, 5 telecom factories, 3 training institutions and 4 specialized telecom units. The foundation of Telecom Network in India was laid by the British sometime in 19th century. The history of BSNL is linked with the beginning of Telecom in India. In 19th century and for almost entire

20th century, the Telecom in India was operated as a Government of India wing. Earlier it was part of erstwhile Post & Telegraph Department (P&T). In 1975 the Department of Telecom (DoT) was separated from P&T. DoT was responsible for running of Telecom services in entire country until 1985 when Mahanagar Telephone Nigam Limited (MTNL) was carved out of DoT to run the telecom services of Delhi and Mumbai. It is a well known fact that BSNL was carved out of Department of Telecom to provide level playing field to private telecoms. Subsequently in 1990s the telecom sector was opened up by the Government for Private Investment, therefore it became necessary to separate the Government's policy wing from Operations wing. The Government of India corporatized the operations wing of DoT on October 01, 2000 and named it as Bharat Sanchar Nigam Limited (BSNL). BSNL operates as a public sector.

The important factor among the telecommunication companies in Indian scenario is that the company grows who balances or makes a tradeoff between decreasing costs and increasing quality of services rendered. The telecom industry is characterized differently than manufacturing as sales are intangible and depend more on people's education, experience and ethics. The Indian Telecom Service industry is the industry on which to be focused for research because world class communication companies are paying interest as they find worth to invest in a developing country like India.

The use of supply chain management in business, and especially in the service industry is not mature yet. The supply chain is the flow of information and material to and from suppliers and customers (Crom, 1996). This simple form of definition is also applicable to service industry.

Objectives of current conceptual research study are:

- To understand and review practices in the area of demand – supply planning to ensure the availability of components, equipment and tooling in a highly fluctuating market environment of telecom business where new products are being introduced to the market at a constant pace.
- To study the applicability of supply chain management system in service industries.

II. Literature Review

Supply chain management (SCM) is progressively recognized by many organizations as a strategy to attain their business goals today (Altekar, 2005). Corporate

culture and values in terms of extreme trust, commitment and collaboration, organizational capability and top management supports are essential for an effective SCM (Mello and Stank, 2005). Choy, Kenny and Victor (2003) found that the long term success of a firm depends on the reliability of its suppliers and level of satisfaction of its customers. Bartlett Julien and Baines, 2007 also explored that supplier satisfaction and contribution lead to customer satisfaction and SCM performance. Technology is an enabler in SCM for helping supply chain members to establish partnerships for better supply chain system performance. Gunasekaran (2006) explored that information technology is an essential ingredient for business survival and improves the competitiveness of firms. McLaughlin, Motwani Madan and Gunasekaran (2003) found that successful companies around the world are partly dependent on their ability to apply IT to SCM. The operational efficiency and operational flexibility have high relationship with SCM information system. Childerhouse (2006) studied the reengineering construction supply chain by using material flow control approach in nine different companies. Their study found that material flow is playing a key enabler in achieving enhanced supply chain performance. Fawcett, Ogaden (2007) studied the organizational commitment and governance for supply chain success. Kaminsky Simchi-Levi, 2005 advises that the process should be guided by strategic plan that is supported by the overall company structure and culture. Chopra (2007) classified supply chain problems into three levels (1) competitive strategy such as location allocation decisions, demand planning, distribution channel planning, outsourcing, supplier selection, enabling information technology selection , (2) tactical planning such as inventory control, order consolidation, production /distribution coordination, and (3) operation routines such as production shop floor scheduling, fleet scheduling, work force scheduling. The basic objective of supply chain management is to optimize performance of the chain to add as value as possible for the least cost possible.

Supply chain management (SCM) is implemented by integrating corporate functions using business processes within and across companies (Council of Logistics Management, 2003). Supply chain management encompasses more than the activities of any individual corporate function. However, frequently it is seen as a synonym for logistics (Simchi-Levi, Kaminsky and Simchi –Levi 2000), operations management (APICS 2001), procurement (Monczka, Trent 1998) or a combination of the three (Wisner 2004). Many regard the supply chain as being composed of inbound materials, raw materials inventories, manufacturing, finished goods inventories and distribution and view these activities

from point of origin to point of consumption. Supply chain is the network of companies or independent business units, from original suppliers to end customers; management of this network is a broad and challenging task. Choy (2003) found that the long term success of affirm depends on the reliability of its suppliers and level of satisfaction of its customers. Previous research found that collaborative relationship between customer and supplier has positive significant influence to SCM performance improvement. Inventory reduction is one of the main objectives of SCM (Pagel 1999). It is also the most commonly shared data among the supply chain partners. Therefore, several researchers have explored the ways to reduce the inventory in a supply chain. Many researchers have noted that information sharing in the supply chain can play an important role in reducing the inventory level as it allows the companies to quickly respond to market changes thus requiring minimum inventory across the supply chain.

Better planning and coordination within and beyond the boundary of a manufacturing organization can achieve reduction in order fulfillment time (Mohanty and Deshmukh 2001) Technology and human resource related issues also play a role in reducing the order fulfillment time. Compatible and integrated information systems play important roles in integrating a supply chain. These information systems enable the supply chain members to share and use the data for common goals which ultimately lead to greater integration in a supply chain. Raju and Zuhang (2005) develop a channel model in which the deterministic demand is influenced by the price and the service level is fixed by the dominant retailer. Marvel and Peck (1995) claim that the manufacturer's decision to accept returns depends on the nature of the demand uncertainty. This analysis claims that the uncertainty over customer arrivals favors returns while uncertainty over the consumer's valuation of the manufacturer's product leads distributors to set retail prices too high when returns are allowed.

III. Framework of Study

The experts agree that a formal supply chain strategy will be critical to any industry (Thomas 1999) in which it exists in both services and manufacturing (Balsmeier and Volsin 1996). Therefore, we customized the definitions cited above to develop a customized definition for the services industry as follows: The supply chain management for the services industry is the ability of the company to get closer to the customer by improving its supply chain channels. The telecommunications services supply chain will include responsiveness, efficiency and controlling. At this point it is very helpful to compare this

definition along with the definition of communication management. This comparison will uncover the terms of responsiveness, efficiency and controlling.

In BSNL, Telecommunication is a paid service provided by the company to the customers/subscribers. The survival of the company purely depends on the basis of customer satisfaction. The mere advertisement will not fulfill the purpose. For this, the company has to focus on different segmented people with people of different area. Firstly, for landline telephony, the interruption part is to be taken care because now a day's expansion of roads throughout the country is a major issue which causes cable cut and which causes big and prolonged interruptions. If there is a underground cable cut the specified information should reach to the higher level management at an earliest and reciprocally the information and material should come from the higher level management to the base level management (flow of information and material from higher to lower and vice versa) for retaining the customers and in order to provide un-interrupted service to create loyal customers. So, it will be very much effective if and only if the supply chain in the system is effective. Secondly, WLL (Wire Less in Local loop) telephony is a proper substitute of landline telephony with clarity of voice. The working of this system mainly depends on the set at the customer's premises and BTS (Base Terminal Station). It again purely depends on the supply chain. Thirdly, data services, the unique Broad Band Services to the individual and group customers and Lease Line Circuits to the corporate entities are very popular and BSNL can grow by capitalizing this value added service. For this also a strong supply chain is required. Lastly, for mobile telephony, BSNL is facing a stiff competition in this sector of services as other private service providers provide this service as cheap as possible with a very little margin of profit. To retain the customers and to increase the customer base the day to day information with critical analysis should reach the decision making authority through MIS (Managerial Information System) and the information and the required material should reach at the field at an earliest for improvisation.

Table-1 (Comparison of the three processes)

Point of comparison	Service quality	Physically efficient process	Market responsive process
Primary purpose	Supply the required services in a qualitative manner by	Supply predictable demand efficiently at the	Respond quickly to unpredictable demand in order to

	following the programs / procedures with consideration to efficiency and responsiveness.	lowest possible cost	minimize stock outs , forced markdowns and obsolete inventory
Manufacturing focus	Following the rules and assuring that by controlling the partners of the channels	Maintain high average utilization rate	Deeply excess buffer capacity
Inventory strategy	Maintain high Caliber professional with low turnover ratio.	Generate high turns and minimize inventory throughout the chain.	Deploy significant buffer stocks of parts or finished goods.
Lead time focus	Producing the best quality with the lowest possible costs.	Shorten lead time as long as it does not increase cost.	Invest aggressively in ways to reduce lead time.
Approach to choosing suppliers	Select for quality, reputation, flexibility speed and cost with appropriate consideration to its human resources.	Select primary for cost and quality.	
Product design strategy	Maximise performance and minimize cost. Service differentiation is expected	Maximise performance and minimize cost.	Use modular design in order to postpone product differentiat

	during the whole life cycle.		on for as long as possible.
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Source: Fisher (1997): Adapted to the new framework

Table-1 shows how the services company can manage its supply chain. It may be noticed that the common factor for both manufacturing and services processes is the availability of the physical products. It is also quite applicable to BSNL. A major difference of the service made is that the product is intangible; we cannot put it as inventory. In BSNL, if it is a voice service one can quantify it by the duration of speech only including a factor of quality of speech like clarity. Of course, data can be quantified by bytes that the customer used. The telecommunication service industry is unique compared with manufacturing sector. The services industry is matching both the responsive supply chain and the efficient supply chain.

IV. Supply Chain: An Analysis

The basic concept of supply chain management is the ability to get closer to the customer (Weil, 1998). The supply chain is the flow of information and material to and from suppliers and customers (Crom. 1996). Supply chains are sometimes referred as value chains (Stevenson, 2002). The term value or the concept of value is enriched as goods and services progress through the chain. An interpretation of supply chain management for manufacturing describes the integrated process required for managing goods from the initial source of supply to point of consumption .It also includes a broad range of activities that material and service suppliers , manufacturers ,wholesalers and retailers have performed for years .

It is assumed when a relationship exists between different firms or even establishing affiliate the combined outcome will be greater than the outcome of both firms individually.

Table-2 (Objectives and their relation to the benefits outcomes)

Fundamental Objectives	Relationship form	Critical enablers	Benefits and outcomes
Cost reduction	Cooperative partners	i)Problem solving teams	i)Problem elimination ii)Consistency

	hips	ii)Planni ng informati on iii)Consu lting advice	iii)Dependability
Value based benefits/tec hnology advancemen t	Strategi c alliance	i)Recipro cal goodwill trust ii)Proprie tary informati on iii) Technolo gy forecasts iii)Engin eering and technical exchange s	i) New produ cts and proce sses ii) Com petiti ve advan tage

Source: Stuart, 2000, adapted to the service industry

Table-3 (Comparison of the network perspective and resource based view)

<i>Characteristics</i>	<i>Network perspective</i>	<i>Resource based view</i>
Behavioral assumptions	Bounded rationality trust	Bounded rationality trust
Problem Orientation	Dynamic relationship	Internal competence development
Time dimension	Dynamic	Dynamic
Unit of analysis	Relations	Resources and capabilities
Nature of relations	Access to heterogeneous resources	Access to complementary resources

Source: Adapted from Skjoett-Larsen, 1999

Generally supply chain depends on the ability to execute the key business processes that deliver to the customer or the client the value and the quality promised (Bruce, 1996). Since the product is intangible and the quality solely depends on the people who do the work, a controllable process is required to organize the supply chain. Let us consider the case of BSNL, it provides a maximum area of signal coverage and it penetrates to the rural most area of the country. It provides the quality of service as it promises. Mary Lov Fox ,senior vice president of consulting at Manugistics, who suggests that success of supply chain depends on several primary drivers, such as well define processes with well defined guidelines for decision making, removal of organizational and functional barriers, early visibility to change in demand.

Supply Chain management is needed for various reasons: the need to improve operations, increasing levels of outsourcing , increasing costs ,competitive pressures, increasing globalization , increasing importance of e-commerce and the complexity of supply chain (Stevenson 2002). With technology facilitating information flow, a coordinated supply chain can be designed to meet the strategic and operational objectives of the business. It also means establishing effective and workable relationships both inside and outside the organization (Sandelands, 1994).

The strategy to operate supply chain management in the telecommunication services industry is the same as for manufacturing. First, lets consider the three business forces that support the three levels of decisions used in the supply chain management.

The three business forces are as follows as cited by Nixon (2001):

1. E-commerce: E-commerce is a primary factor propelling the forces of increased globalization and increased customer expectations. The Internet and related technologies are dramatically improving the ways in which companies transact all aspects of business with their suppliers.
2. Globalization: Corporation continue to internationalize their production , supplier and customer bases to exploit opportunities for revenue growth and cost reduction .
3. Customer expectations: The internet drives everyone’s expectations of a satisfactory customer service experience. Consumer and corporate buyers demand more choices, accurate and faster fulfillment, and greater value from reliable suppliers.

Based on the above vision of support, the three level approach adopted in this case emphasize the fact that supply chain management is a series of business decisions characterized by distinct business models, which are largely influenced by location topology, product granularity and elapsed cycle time (Sengupta, 1996).

- Level one decisions: These decisions are in the area of business planning and they have a long term effect on the supply chain. Very often, detailed information is not available or reliable. Senior management is frequently the decision maker and user of this information. Quick response is not a requirement at this level.
- Level two decisions: These decisions are in the area of tactical planning and they have a shorter life than level one decision. Detailed information is available and the data probably are very reliable.
- Level three decisions: These decisions are in the area of operational planning and scheduling. The effect of these decisions is short term and affects the next few days and they are constrained by level one and level two decisions.

There are many issues that should be considered when selecting the strategy of operating supply chain management. First the requirements of collaborative design over the Internet will play a very important role in communication. Examples of such requirements are high speed, secure communications and business portals (Youngdahal and Loomba, 2000). Also the issue of sharing information should be considered. Second, the supply chain partners that exchange information on a regular basis are able to work as a single entity. Third, act fast in terms of global competition.

V. Managerial Implication

A detailed intensive literature survey of various research and development works in the area of supply chain management clearly established that it is essential to study, model and integrate the supply chain in the service industry especially in BSNL. The study tests that promotion, service quality and supply chain network of distribution in particular, is the important determinant marketing strategy. To earn a higher level of loyalty in customers, many steps can be taken by telecom service providers. They can introduce some customer-oriented information security model, which allows the customers to control their personal information. The use of the

security programmes or models will help customers to identify the concern for customer security, to check the telecom service providers' reliability and to evaluate the company's trustworthiness. The framework emphasizes one industry in the service sector i.e. telecom industry and more specifically BSNL. So, this research work is confined to a state owned telecom industry. Moreover research is needed to prove its suitability for service industries other than telecommunication. The scope of this research is to study optimizing availability of both new and existing multiple varied technologies within the business.

VI. Conclusion

A part of the paper is based on the literature review of supply chain management in the manufacturing sector. Supply Chain management is needed for various reasons: the need to improve operations, increasing levels of outsourcing, increasing costs, competitive pressures, increasing globalization, increasing importance of e-commerce and the complexity of supply chain (Stevenson 2002). With technology facilitating information flow, a coordinated supply chain can be designed to meet the strategic and operational objectives of the business. It also means establishing effective and workable relationships both inside and outside the organization (Sandelands, 1994). The strategy to operate supply chain management in the telecommunication services industry is the same as for manufacturing. Another part of the paper is based on the framework development as an extension of literature review. The paper presents comparisons between the manufacturing and the telecom service industry with special reference to BSNL, a public sector of Govt. of India. The comparison resulted that SCM is well contained in any service sector may be private or public sector.

References

- [1] Chase, R.B., Aquilano, N.J. and Jacobs, F.R. (2001), operations management for competitive Advantage 9th ed., Mc Graw – Hill / Irwin, New York, NY.
- [2] Cloud, R.J. (2000), "Supply chain management, new role for finance professionals", strategic management, August, PP, 28-32.
- [3] Fabes (2001) "Was that auditor's opinion really independent", Forbes, available at www.forbes.com/global/2001/0319
- [4] German news (2000), "CDU finance scandal", 29 January, available at www.mathematicsuni-uk.de/de.news/2000/01.
- [5] The observer (2002), "big five quake as Andersen faces doom sday scebario", the observer, 20 January, availability at : www.observer.co.uk/business/story

- [6] Vinter, G. (2000), "whistleblowing towards quality", TQM Magazine, vol.12No.3,P166.
- [7] Youngdahl, W.E. and Loomba, A.P.S. (2000), "Service – driven global supply chain", international journal of service industry management, vol.11 No.4, PP.329-47
- [8] Arnold, P.J. and Sikka, P. (n.d.), "Globalization and the state professional relationship:", available at : www.sec.gov/rules/proposed/s71300/sikka1b.htm.
- [9] Sterenson, W.J. (2002), operations management, 7th ed. Mc Graw – Hill/Irwin, New York, NY.
- [10] Yao, Z,Y.Wu and K.K.Lai (2005) Demand uncertainty and manufacturer returns polices for style –good retailing competition production planning & control, 16 (7)
- [11] Wang, Y.L.Ziang and S,J, Shen (2004) channel performance under consignment contract with revenue sharing management science, 50 (1), PP 34-47
- [12] Vereecke, A.and Muylle, S. (2006) performance improvement through supply chain collaboration in Europe International Journal of operations & production management, 26 (11) : 1176-1198.
- [13] Story, Emberson, C., Godsell, J. , Harrison, A. , (2006) supply chain management : theory, practice and future challenges International journal of operations & production management, 26 (7), pp 754-774.
- [14] Sridharan, U.V., Caines, W.R., Patterson, C.C., (2005) Implementation of supply chain management and its impact on the value of firms supply chain management : An International journal, 10 (4), pp 313-318.
- [15] Singh, P.H. Groenevelt and N.Rudi (2005) product variety and supply chain structures (University of Rochestor working paper)
- [16] Simchi – levi D. , P.Kaminsky., and E.Simchi-Levi (2005) designing and managing the supply chain", concept strategies and cases 3rd edition Mc Graw – Hill publisher.
- [17] Shepherd, C. and Guntor, H (2006) Measuring supply chain performance . current research and future directions International journal and productivity and performance management, 55 (3/4) : 242-258.
- [18] Sachan, A. , Datta, S. , (2005) Review of supply chain management and logistics research International journal of physical Distribution and logistics management, 35 (9), pp 664-705
- [19] Raju J. and Z.J. Zhang (2005) channel co-ordination in the presence of dominant retailer marketing science 24 (2), pp. 264-265.
- [20] Mello, J.E. and stank, T.P. (2005), liking firm culture and orientation to supply chain success international journal of physical Distribution and logistics management 35 (8) : 542 – 554.
- [21] Meier, R.L., Williams, M.R. and singley, R.B. (2004) supply chain management : strategic factors from the buyers perspective journal of Industrial Technology, 20 (2).
- [22] Mc Laren, T.S., Head, M.M. and Yuan, Y.F. (2004) supply chain management information systems capabilities : An exploratory study of electronics manufacturers springerlink.com, 2(2) : 207-222.
- [23] Koulamas, C (2006). A news vender problem with revenue sharing and channel co-ordination Decision Sciences, 37 (1) pp 91-100.
- [24] Harrison, A and Hoek, R.V. (2005) Logistics management and strategy 2nd ed.uk : Prentice Hall.
- [25] Gunasekaran, N. Rathesh. S., Arunachalan. , S.Koh, S.C.L. , (2006) optimizing supply chain management using fuzzy approach journal of manufacturing Technology management , 17 (6), pp 737-749.
- [26] Gerchak, Y. and Y. Wang (2004) Revenue sharing vs wholesale price contacts in the assemble systems with random demand Production and Operation Management, 13(1). p 23-33
- [27] Fawcett , S.E.Ellram,L.M.Ogdem,J.A.(2007) Supply chain management : From vision to implementation New Jersey: Pearson Prentice Hall .
- [28] Cousins , P.D., Lawson ,B., Squire B.(2006) Supply chain management theory and practice the emergence of an academic discipline , International Journal of Operation and Production Management ,26(7) p- 697-702
- [29] Chopra S., & Meindl P.(2007) Supply Chain Management : Strategy , planning and operation (3rd ed .), New Jersey : Pearson Prentice Hall .
- [30] Chiu M., Lin G.(2004) Collaborative supply chain planning using the artificial neural network approach Journal of Manufacturing Technology Management , 15(8) pp 787-796.
- [31] Childerhouse P. & Towill D.R(2006) Enabling seamless market oriented supply chains Iernational Journal Logistics systems and Management ,2(4)357-370.
- [32] Cachon G.P.and A G Kok (2006) , category management and coordination in retail assortment planning in the presence of basket shopping consumers (Wharton school Working paper)
- [33] Burnetas A., S.M. Gilbert and C.E.Smith (2007) Quantity discounts in single period supply contracts with asymmetric demand information .IIE Transactions , 39 , p – 465 – 479
- [34] Bartlett P.A.Julien D.M. and Baines ,T.S. (2007) Improving supply chain performance through

improved visibility. International Journal of Logistics Management , 18(2):294-313

- [35] Auramo ,J,,Kaureaa J,and Tanskanes K.(2005) Benefits of IT in supply chain management : An explorative study of progressive companies . International Journal of Physical Distribution and Logistics Management 35(2):82-100