

A Study of Supply Chain Management in some Selected Cement Companies of North-East India

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Abstract—Effective management of cement supply chains enables the cement companies to maintain a continuous flow in cement manufacturing processes. Therefore, to understand the existing supply chain management within the North East Cement Industry of India, an analysis of the industry has been carried out using Michael Porter's five forces and a comparative analysis of supply chain strategies of the selected cement companies has been analyzed and presented according to Larry Lapidé's supply chain excellence framework (2006). This study has been done to understand the prevailing scenario of the Cement Industry and its Supply Chain Management in the Northeastern region of India. The study concludes that there is high rivalry between the cement companies of the region, whereas the bargaining power of buyers is low in the industry. The Larry Lapidé's supply chain excellence framework found customer response and efficiency as the major supply chain strategies among the selected cement companies. A purposive sampling has been used for selecting the cement companies from the region. Questionnaire were prepared for collecting the primary data and various Industry reports were used as secondary data sources for analysis in the present study.

1. INTRODUCTION

One of the world's largest and fastest growing cement industries, the Indian cement industry has been expanding significantly on back of rising infrastructure activities, increasing demand from housing sector, and construction recovery. Some of the recent major government initiatives such as development of 100 smart cities are expected to provide a major boost to the sector as a whole. With 366 million tonnes (MT) of cement production capacity in FY15 (December 2014), India is the second largest cement producer in the world after China. Of the total capacity, 98 per cent lies with the private sector and the rest with the public sector. A total of 188 large cement plants together account for 97 per cent of the total installed capacity in the country, while 365 small plants make up the rest. Of the total 188 large cement plants in India, 77 are located in the states of Andhra Pradesh, Rajasthan and Tamil Nadu ^[1].

1.1 Overview of the North East Cement Industry

The North Eastern Region of India stretches from the foothills of the Himalayas in the eastern range and is surrounded by Bangladesh, Bhutan, China, Nepal and Myanmar. The region is rich in natural resources, covered with dense forests, has the highest rainfall in the country, with large and small river systems nesting the land. However, NER so rich with natural resources has not been able to catch up with the pace of development which has taken place in rest of India.

North-East has around a dozen large cement companies operating and looking for new market outside region. The cement industry of North-East is one of the fastest growing markets in India. Cement companies operating in North-East India enjoy concession and tax reliefs under North-East Industrial Investment Promotion Policy 2007 (NEIIPP). To make their operation viable Cement Industries are armed with transport subsidy. The cement market of North-East is now approximately 5.2 Million Ton per annum and expected to grow at a very fast pace due to huge infrastructure development, increasing housing projects etc. This facilitates the cement demand to grow in the near future and will also raise opportunity in the region. Following the increasing demand and growth opportunities in the region, various cement companies from rest of the India are eyeing to enter North-East. In addition to this the cement companies of North-East India are now eyeing the growing market of North Bengal and Bihar too for expansion. With entry into these new territories the cement companies show it is gradually growing in the NER.

2. LITERATURE REVIEW

It has become a trend of discussion on supply chain in recent years. In order to maintain the competitive advantage in today's changing economic environment, companies are thriving to explore new ways in their business operations. Increasing consumerism and thrust for quality and availability of the products is becoming a nightmare for the manufacturing

units today. The companies now are looking for answers in making their supply chains a focused area for improvements by various cost reduction technologies. This majorly includes managing the supply and demand, sourcing raw materials and parts, manufacturing and assembly, distribution across all channels, and delivery to the customer ^[2].

According to the Council of Supply Chain Management Professionals (CSCMP), Supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the crucial components of coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. Many firms nowadays are using their supply chains as competitive weapons and a central element of the strategic management process ^[3].

The focus of supply chain management (SCM) has shifted from production efficiency to customer-driven and partnership synchronization approaches. In order to implement this strategic shift companies requires high-level collaboration between supply chain partners. A supply chain is a dynamic process and involves the constant flow of information, materials, and funds across multiple functional areas both within and between chain members ^[4].

As customers demands are always uncertain, manufacturers tend to manage their suppliers in different ways leading to a supplier–supplier development, supplier evaluation, supplier selection, supplier association, supplier coordination, etc. ^{[5][6]}.

The supply chain management has put on huge momentum and has eventually become a crucial instrument for the success of any business in today's competitive business environment. Industries today cannot be imagined without a planned and structured supply chain. The competition has mandated companies to explore everywhere and in any area which in the past were considered less important. One of the similar areas is supply chain management which has become the turning stone for competitors.

2.1 Industry Analysis Model

In his book Competitive Strategy, Michael Porter (1980) defines a model of structural analysis for industries. Porter (1980) suggests that a company must understand its environment to formulate a successful strategy. The term environment includes social and economic forces; some are generated within the industry and some are external to the industry. The level of competition in an industry is determined by five competitive forces: threat of entry, rivalry among competitors, pressure from substitute products, bargaining power of buyers and bargaining power of suppliers. The level of influence of these forces controls the profit in the industry and therefore the return on capital invested by a company within the industry ^{[7][8]}.

2.2 Supply Chain Strategy Framework

One framework was considered to analyze the supply chain strategy of companies within the cement industry. The framework was presented by Larry Lapede in 2006 in his article "The essence of excellence" based on the information of the MIT Center for Transportation and Logistics Supply Chain 2020 project. The article presents the results of the first phase of research proposing a definition about excellent supply chains. Lapede (2006) argues that an excellent supply chain is a competitively principled supply chain where there is an alignment between supply chain strategies, operating models and metrics within the strategic framework of the company. In addition to the information in this article, Lapede (2008) expands this framework in a new article called "The operational performance triangles". In this article, Lapede (2008) introduces the concept of absolute or relative triangles. The absolute triangle refers to the objectives that all companies within the industry must have, to be able to play in the industry. The relative triangle refers to the objectives where companies should focus to achieve significant differentiation from its competitors ^{[9][10]}.

3. RESEARCH METHODOLOGY

3.1 Data Collection

Data Type- The study has used both Primary as well as Secondary data for the research and analysis. Secondary data has been used to understand the past developments in the area of supply chain management and cement industry as a whole while Primary data has been useful in analyzing and preparing the competitive positions of the cement companies of north east in the region.

3.2 Data Source

Primary Data – Primary data source were the authorities from various departments i.e. supply chain management, marketing, logistics, finance, of the cement companies of north east region.

Secondary Data – Secondary data sources were books, reports, articles published time to time, internet sources, vision documents of North Eastern Region, Govt. of India publications, NEIPP 2007 policy document etc.

3.3 Data collection method and Research instrument

Primary data has been collected through descriptive questionnaires from designated officials and through personal interactions.

3.4 Sampling Technique

Sample Size – A sample size of eight large cement companies has been taken for the research.

Sampling Type – Purposive Sampling

3.5 Data Analysis

A qualitative analysis of the data collected has been done and the findings are shown with the help of appropriate tables, figures and models.

4. FINDINGS AND ANALYSIS

4.1 Analysis of the Cement Industry of North East using Michael Porter’s five forces

The Industry analysis has been done by using the five competition forces given by Michael Porter (1980) as threat of entry, rivalry among competitors, pressure from substitute products, bargaining power of buyers and bargaining power of suppliers.

Table 1 Represents the analysis of the barrier of entry to the NE Cement Industry.

Table 1

Barriers	Barriers of entry in the cement industry
Economies of scale (EoS)	In general cement plants are built to get economies of scale and are owned by large companies with big and highly automated quality standards. This makes the barrier of entry medium to high for small as well as large capacity plants.
Capital requirements	With a huge setup cost and need of integrated transportation and logistics infrastructure the capital requirement as a barrier of entry becomes high .
Differentiation	Product differentiation in cement industry is low making the rivalry among the companies High .
Government policy	In North East, flexible government policies attracts new companies to enter for setting up cement plants which makes this barriers of entry very low .

In North east region, cement has no direct substitute. Since cement is the major components of a concrete, the substitutes of concrete are also a threat to cement. In this case, other building materials are substitutes of concrete e.g. wood, clay bricks, etc. but since they don’t represent a major challenge especially for large buildings and infrastructure projects the pressure of substitute product becomes **low in the industry**.

Table 2, represents the analysis of the drivers for rivalry in the cement industry.

Table 2

Drivers for rivalry	Rivalry in the cement industry
Numerous or equally balanced competitors	In cement industry, there are small number of equally balanced competitors which makes the rivalry in the industry high .
Differentiation	Cement differentiation is low; hence rivalry is high .
Strategic Stakes	Cement firms normally have high stakes in the market making the rivalry high . The stakes are mostly related to capital investment required to open a new plant and capacity increments.
Switching cost	Cement is a commodity. The switching cost from one manufacturer to other manufacturer is low. This barrier of entry is high .
Exit Barriers	Cement firms normally have specialized assets, long term government licenses and huge capital investments; hence rivalry is high .

In cement industry, there is a difference between the bargaining power of buyers of large construction companies and government, and the bargaining power of buyers of builders and small contractors. The relative importance of each type of buyer depends on the level of development of the region.

It has been found that the bargaining power of builders and small contractors is low whereas the large construction projects and government have high bargaining power. But as a matter of fact, the emerging market like north east is still dominated by small contractors and builders. The developed markets in rest of the India are dominated by large construction companies and government agencies. The north east market has been experiencing a trend of outsourcing the construction of houses to petty contractors since a long time. These petty contractors are also named as D-I-Y builders and small contractors. Since, north east lacks big housing projects and infrastructural development projects as of now, so the industry lacks big construction companies and is still dependent on the small contractors called petty contractors.

Table 3, represents the analysis of the bargaining power of buyers in the cement industry of North East as below.

The basic raw materials used in the cement manufacturing process are limestone, sand, shale, clay and iron ore. The main material, limestone, is usually mined on site while the other minor materials may or may not be mined there. Since all the raw materials are natural resources, they are under the Government’s control. Companies have to buy rights from the government to set up the cement plant.

Table 3

Bargaining Power of Buyers (BPB) Drivers	Builders and small contractors bargaining power.	Large construction companies/Government bargaining power
Buyers purchases large volumes relative to seller sales	Market is dominated by a group of dispersed buyers; hence BPB is low.	One buyer or one group of buyer makes the purchasing decision; therefore BPB is high
Seller's product importance on buyer's costs or purchase	Cement price is significant but the quantity that the final customer buys is small; hence BPB is medium.	Cement unit price is low but the quantity that the buyer needs is high; hence BPB is high.
Buyer's switching cost	Cement buyer's switching cost is low; hence the BPB is high.	Cement buyer's switching cost is low; hence the BPB is high.
Seller's product importance to the quality of buyer's product	Because of the fractioned market and builders and small contractors building, quality is not a significant issue. This market is more price sensitive than quality sensitive; hence BPB is low.	In this market the quality is very is very important. Buyer's prestige and future contracts are in stake; hence BPB is high.

Table 4 shows the analysis of the drivers for bargaining power of suppliers as below.

Table 4

Bargaining power of suppliers drivers	Bargaining power of suppliers in the cement industry
There are substitute products for sale to the industry	There is no clear evidence about substitute products for cement raw materials; hence BPS is high .
Importance of the Industry as a customer of the supplier group	Cement industry is a major buyer of raw materials and energy sources. Hence, BPS is high .
Supplier's products are differentiated or it has built up switching costs.	Other raw materials and energy are commodities and switching cost is low. BPS is low .
Supplier groups possess a credible threat of forward integration	There is no clear evidence about forward integration in the cement industry. BPS is high .

In India, the government controls the access to raw materials through medium to long-term licensing.

Hence, we can conclude that the Bargaining Power of Suppliers in the North-East Cement Industry is **high**.

A cement plant is generally located near limestone deposits and cement produced in a particular region is mainly consumed in that region. At present Assam and Meghalaya are

the only two states who are the major manufactures of cement in North-East and most of the cement plants located in these two states have locally available inputs and some of the plants produce their own inputs such as- limestone. The raw materials reserve (excluding limestone) is not available in all places. Most of these plants of North-East get the coal from the local markets, and the plants which use Fly-ash import from West-Bengal and Bihar. Gypsum is imported from Bhutan. As we know that there is no clear evidence about substitute products for cement raw materials. So the Bargaining Power of Suppliers becomes **high**.

A summary of the results of Porter's five forces analysis for the north east cement industry is presented in Fig. 1 as below.

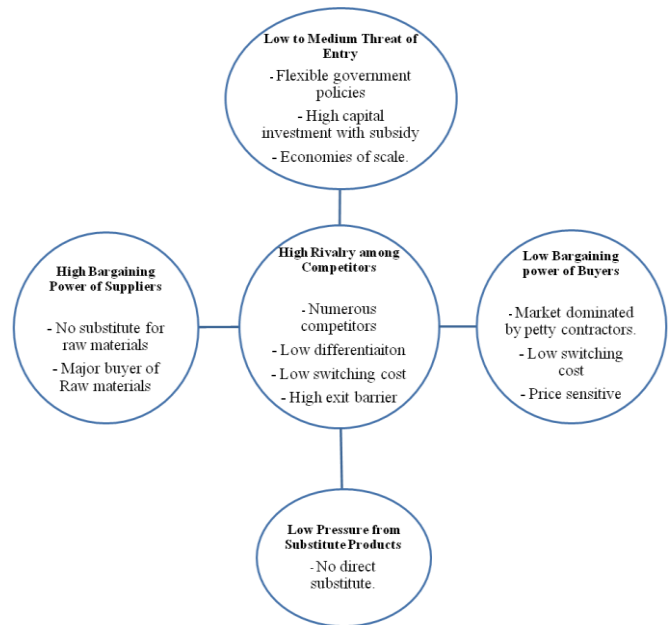


Fig. 1

4.2 Analysis of the Cement Industry of North East using Supply Chain Excellence Framework created by Larry Lapide (2006)

In his article, **Lapide (2006)** introduces the concept of absolute and relative performance triangles. The relative triangle refers to the objectives which companies should focus on, in order to achieve significant differentiation from their competitors in the subsequent industry and market.

The relative triangle requires a more detailed analysis. The first step is to review the strategy of the selected eight large cement companies according to the primary and secondary information collected from the designated officials of the companies and their annual reports. The overall business strategy of the major cement companies of the North Eastern Region of India has been summarized and analyzed.

Star Cement (CMCL) predominantly is placed in customer response because it believes in innovation and protecting environment by continuous upgradation. Recently the company started extending its sales towards West Bengal, Bihar and Nepal too. Its customer focused schemes are relatively more attractive and effective in the market. Its channel partner and consumer loyalty programmers are dominating among the competitors in the North-East region. The company also provides utmost satisfaction to the consumer through best quality and customer care. The company also utilizes the surpluses for the welfare of employee and the society at large extent.

Dalmia Cement (DBCL) is positioned in the block of efficiency and customer response (little inclined towards efficiency) because it concentrates on innovation and continuously evaluates the strategy to gain significant presence in the emerging market. The company is continuously trying to upgrade the product packaging and product quality level that could live up to high standards. The company also ensures the safety of the employee and target to zero accident policies.

Max Cement (GVIL) is positioned in the block of efficiency and customer response (little inclined towards the assets utilization) because the company increases its capacity of utilization. The company focuses on environmental safety and utilizing natural resources at optimal level. The company also concentrates on implementing different strategies and methods to prevent any fatal accident.

Valley Strong Cement (BVCL) is positioned in the block of customer response and efficiency (little inclined towards efficiency) because the company provides most efficient and comprehensive building materials. The company makes the customer confident and comfortable with them and their brand. They establish a long-term relationship with the customers and stakeholders. They ensure that Products, ideas, Services are delivered before or on schedule at all times.

Topcem Cement (MCL) is positioned in the block of customer response and assets utilization (little inclined towards customer response) because the company provides a meaningful service to the customer by continuously improving the product and process. The company uses latest tools and techniques to improve the performance. The company also focuses on innovation and customer satisfaction.

Surya Gold Cement (PCL) is positioned in the block of customer response and asset utilization (little inclined towards asset utilization) because they achieve cost effectiveness through optimum capacity utilization, total productivity management and superior human resource. They provide fresh cement to the customers for stronger and more enduring construction, therefore contributing to building a stronger Assam. The company also ensures the safety of the employee and target to zero accident policies.

Taj Cement (HCCL) is positioned in the block of customer response and asset utilization (little inclined towards asset utilization) because they achieve cost effectiveness through optimum capacity utilization, total productivity management.

Best Cement (JUDL) is positioned in the block of customer response and asset utilization (little inclined towards asset utilization) because their growth in size will be through continuous review of potentials of the existing manufacturing resources, strategic acquisitions and massive expansions. They continuously strive to enhance its value to its customer, shareholder, vendors, suppliers and employees. They are very sensitive to the welfare and development needs of the society.

After the above analysis the second step taken is to build a relative triangle for the cement industry of north east and based on the strategy we allocate the corresponding position to the selected eight companies on the relative triangle, as shown in the Fig. 2 below.

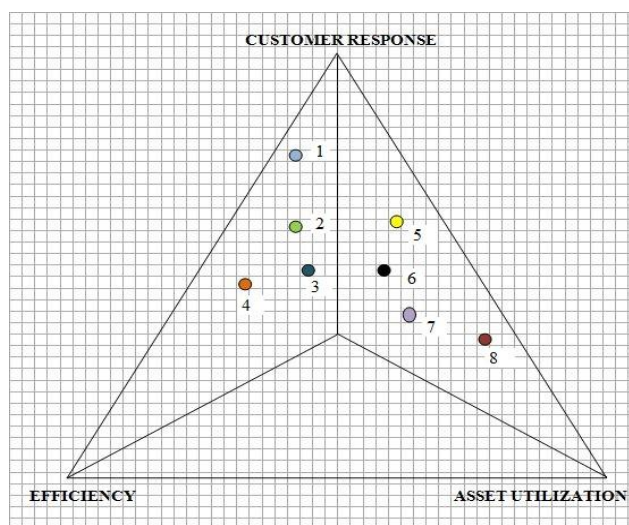


Fig. 2

Table 5

Name of the Cement Cmpny	Number Allocated
Cement Manufacturing Company Limited (Brand name: Star Cement)	1
Dalmia Bharat Cements Limited (Brand name: Dalmia Cement)	2
Green Valliey Industries Limited (Brand name: Max Cement)	3
Barak Valley Cements Limited (Brand name: Valley Strong Cement)	4
Meghalaya Cements Limited (Brand name: Topcem Cement)	5
Purbanchal Cements Limited (Brand name: Surya Gold Cement)	6
Hills Cement Company Limited (Brand name: Taj Cement)	7
JUD Cements Limited (Brand name: Best Cement)	8

Table 5 shows the list of selected eight companies (with their product brand) under study. The number allocated to the corresponding company is depicted in Fig. 2 in the relative triangle.

5. CONCLUSION

It is to conclude that the North East Cement Industry still hold good position to attract new ventures to enter the market. It can be an opportunity for new plants and startups to enter this market. Although the rivalry among competitors and bargaining power of suppliers tends to be higher but the lucrative NEIPP policy 2007 facilitates companies to sustain in the competition of the industry.

The supply chain excellence framework for the selected eight companies concludes that all the eight companies are inclined toward customer response. Only the degree of inclination differs from company to company. Star cement and Dalmia cement are highly inclined toward customer response whereas Surya Gold, Taj and Best cement are inclined more toward asset utilization with little focus on customer response. This shows that the cement companies of the region are now becoming customer centric and customer friendly. Since inventory, transportation and logistics plays a vital role in supply chain management of cement industry across the country, the companies in north east region are focusing on new cost effective technologies to improve the supply chain and to optimize the supply chain processes for improved customer services and value chain. Cement is a commodity which has less shelf life and hence the delivery and the consumption need to be fast and on time. This is to infer from the current study that cement industry of north east needs an improved supply chain management for escalating their profits and brand value in the consumer market.

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