

Improvement of Logistics and Supply Chain Management in the Cement Industry: a Literature Review

Piyush Shukla, Lochan Sharma

M.Tech, Department of Industrial Engineering, LPU, Punjab-144411

Assistant Professor, Department of Industrial Engineering, LPU, Punjab-144411

Abstract:-The present research aims to investigate the effects of supply chain management in Indian cement industries using a Qualitative data collection techniques & logistic Management. These data were analysed using SWOT analysis. The outcomes of the analysis are the peculiar features of the practice of Supply Chain Management in Indian cement industry. the optimal supply chain strategy demonstrates the best economic, ecological and social performance in the cement industry. Since 2000, supply chain management has played an operational role within cement and mineral extraction commodity companies. Recently, cost reduction projects have brought supply chain management into the limelight. The level of advancement in cement Supply Chain Management (SCM) can facilitate or constrain indian economic development. Logistics Management also plays important roles and contribute immensely to the economy of a nation. Research was conducted to investigate how logistics and supply chains are implemented in cement factories in India. The cement industries are playing vital role in the economic and social development of the countries. The Indian cement industry chosen for this study is the biggest cement industries in the country.

Keywords:-Cement Industries, Supply Chain Management, SWOT Analysis, Logistic Management.

I. INTRODUCTION

The Research will explore the strengths, weaknesses, opportunities and threats in Indian Cement Company logistics aspect and its logistics process. Supply chain management has been defined as the “design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally”. As defined by Heizer and Render “Supply chain management is the integration of the activities that procure materials and services, transform them into intermediate goods and final products and deliver them to the customers”. Cement is the second most consumed substance in the world after water. It is irreplaceable ingredient in a vast majority of the applications needed in our daily life. For instance, civil infrastructure projects, houses, power generation plants and many more cannot be built without it. In general, cement is a mixture of limestone, sand, shell, clay and iron. Famous example is the Normal Portland cement which is the most common type used World-wide. Different types of cement produced in India:

Ordinary Portland cement (OPC): This is by far the most common cement used in general concrete construction when there is no exposure to sulphates in the soil or in ground water. In consequence, modern cements have higher 28 days strength than the past, but the later gain in strength is smaller.

Portland Pozzolana Cement (PPC): contains up to 35% fly ash. The fly ash is pozzolanic, so that ultimate strength is maintained. Because fly ash addition allows lower concrete water content, early strength can also be maintained.

Portland Slag Cement (PSC): contains up to 70% ground granulated blast furnace slag, with the rest Portland clinker and a little gypsum. All compositions produce high ultimate strength, but as slag content is increased, early strength is reduced, while sulphate resistance increases and heat evolution diminishes.

SWOT analysis is a strategic tool that can help companies analyse their situation and conditions they are faced with, summarize for their past and make a developing strategy and plan for future life and evaluate. “S” stands for strengths, “W” stands for weaknesses, “O” stands for opportunities, “T” stands for threats. Strengths and weaknesses belong to internal factors and opportunities and threats are external factors. Logistics management is the part of supply chain management that plans, implements, and controls the efficient, effective forward, and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements. A professional working in the field of logistics management is called a logistician.



Fig 1. Supply Chain Management-Main Component

II. LITERATURE SURVEY

Deepesh Giri Sharma, G K Sahu(2014) performed a reviewing Study on The Outcomes of the analysis are the peculiar features of the practice of Supply Chain Management in the Indian cement industry. Using SWOT analysis cement manufacturing firm and covered its manufacturing units, sales units, marketing offices, warehousing, logistics, procurement, finance, inventory and environment in order to know the SCM practices. 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.

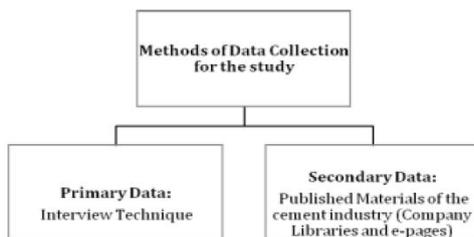


Fig 2. Data Collection Methods

The conclusion drawn from this Study project is as follow:

1. To know what is strengths, weaknesses, opportunities and threats in entire Indian cement firm or company.
2. The key learning of the study suggest that there is a bunch of supply chain management Good practices exists in the Indian cement industry.
3. The Indian cement industry is seeking implementation of green supply chain measures to effectively address these issues.

B. T. D. PRAVEEN VARMA, K.P.SIRISHA (2013)

The purpose of this study project is about the cement manufacturing process, defining the different stages and Equipment used in the process. Mainly cement industries are focusing on Portland type cement and manufacturing in a different type of Portland cement. Indian cement industries are also producing same type of cement and following the different stages.

Generally cement industries are following the seven stages:-

- Stage1:- Opencast lime stone mining
- Stage-2. Lime stone crushing & stacking
- Stage-3.Raw Material Handling & Grinding
- Stage-4. Coal Grinding
- Stage -5. Preheater kiln & cooler
- Stage -6. Clinker grinding (cement mill)
- Stage-7 Packing plant & loading plant

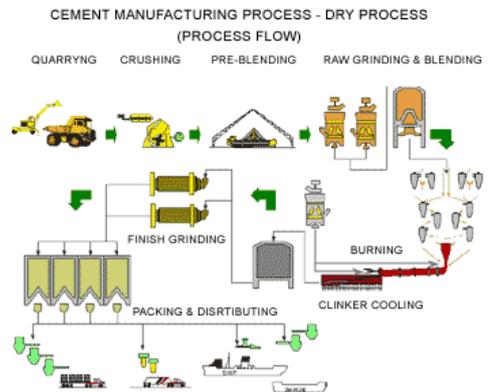


Fig 3. Cemex industries process

Bernd Noche and Tarek Elhasia (2013)

Analysis & model simulation to innovative supply chain strategies in cement industry. Cement is the second most consumed substance in the world after water. It is irreplaceable ingredient in a vast majority of the applications needed in our daily life. To gain better understanding about the nature of SCM in cement industry and its behaviour many tools can be used, for instance, SCOR-Model, ABC Analysis and Operational Performance Triangles.

1. Reseach Background	4. Model simulation
2. Industry analysis	5. Analysis
3. Cement supply chain modelling	6. Conclusion

SCOR-Model *Supply-Chain Operations Reference (SCOR) Model* is another tool. It is used as benchmark tool to analyse the cement supply chain processes. In general, SCOR Model is a cross-functional framework for evaluating and comparing supply chain activities.

ABC (Always Better Control) Analysis This tool is used to help supply chain integration and Push-Pull boundary decision according to seasonal demand and Reorder Points ROP. ABC-Analysis is a range of items which have different levels of significance and should be handled or controlled differently.

Class-A= clinker is a primary product

Class-B= bulk cement

Class-C =Cement in bags

Operational performance triangles Performance triangles could identify the actual position of Company within their Competitors in the target market. Supply chain strategy execution needs to balance the operational performance objectives which are classified in three groups: (Customer Response; Efficiency; Asset Utilization).

Vonderembse et al. (2006) discussed three types of supply chains that are necessary to match three types of products: standard, innovative, and hybrid. They demonstrate that standard products, which tend to be simple products with limited amounts of differentiation, should be produced by a lean supply chain. Lean supply chain employ continuous improvement efforts and focus

on eliminating wastes across the supply chain. On the other hand, innovative products which may employ new and complex technology require an agile supply chain. Agile supply chain responds to rapidly changing global markets by being dynamic and flexible across organizations. Hybrid products, which are complex products, have many components and participating companies in the supply chain; therefore, a variety of supplier relationships may be needed, which they refer to hybrid supply chains. Hybrid supply chains combine the capabilities of lean and agile supply chains to meet the needs of complex products.

Inda Sukatia*, Abu Bakar Hamida, Rohaizat Baharuna, Rosman Md Yusoffa(2012)The purpose of this research is to explore the relationship between supply chain management strategy and chain management practices on supply chain performance. The main tools of data collection instrument used was a questionnaire which was administrated to a total sample of 200 managers are classified by job title and respondents are also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material, and operation from Malaysia manufacturing industry. There are a number of limitations that influence the generalizability of this study. *First*, this study limited only on manufacturing industry. One of the limitations of this single-sector study is that the conclusions may not be generalizable to other sectors.

John Storey and Caroline Emberson(2006)The purpose of this paper is to critically assess current developments in the theory and practice of supply management and through such an assessment to identify barriers, possibilities and key trends.– The paper is based on a three-year detailed study of six supply chains which encompassed 72 companies in Europe. The focal firms in each instance were sophisticated, blue-chip corporations operating on an international scale. Managers across at least four echelons of the supply chain were interviewed and the supply chains were traced and observed. The research presents a number of challenges to existing thinking about supply strategy and supply chain management. It reveals the substantial gaps between theory and practice. A number of trends are identified which it is argued may work in favour of better prospects for SCM in the future and for the future of supply management as a discipline.

Abimbola O Aniki, Charles Mbohwa Esther T. Akinlabi,(2014)discussed the logistic management and supply chain in Nigeria. Logistics is defined as the art and science of management, engineering and technical activities concerned with the requirement, design, supplying and maintaining resources to support the objectives, plans and operations. the logistic and supply chain system in the cement industry in Nigeria being investigated does not only apply to the raw material supply alone; but there is a poor supply of the finished product as well, to transport the finished product from the

cement factories in the Western part of Nigeria to the Northern part. It was strongly agreed that good leadership in coordinating logistics and supply chain management and involvement of supply chain leadership served as a key to achieving target objectives on time. Finally, transparency between the logistics leadership and the partners was not often found in project execution, and 76.7% of the respondents strongly agreed with that. The effective planning and management of a logistics and supply chain infrastructure is a challenge for most countries. However, a nation that is operating under only one kind of logistic system is an under-developed country.

Craig R. Carter, Dale S. Rogers, and Thomas Y. Choi(2015)this journal is mainly focusing Toward the Theory of the Supply Chain. When integrated together, they provide a holistic conceptualization of the supply chain—what it is and how it behaves. By doing so, provide the context in which the existing concepts fit together, and lend precision to key terms and constructs, including the term “supply chain” which forms the basis of the rubric of our discipline. And best way to finding out the application that effect the whole chain to give a better result.

C. Ganesh Kumar and T. Nambirajan(2014)This study examines the impact of supply chain management components on supply chain performance constructs of manufacturing industries. The critical supply chain management components are identified and defined:

- (1) Supply chain concerns
- (2) Supply chain competence and
- (3) Supply chain practices.

The study has collected data from a single executive from each manufacturing enterprise. The executive may be specialized in only a single field such as operations, finance, marketing, etc. the use of a single respondent may lead to generation of inaccurate information.

Just like most empirical studies, the present study is also subject to certain limitations. The study covers only manufacturing enterprises and does not concentrate on the business firms engaged in services sector.

Tarek Elhasia, Bernd Noche, and Lima Zhao(2013)This paper analyses the cement supply chain operations using the Push-Pull supply chain frameworks, the Life Cycle Assessment (LCA) methodology; and proposal integration approach, proposes three supply chain scenarios based on:-

- Make-To-Stock (MTS),
- Pack-To-Order (PTO) and
- Grind- To-Order (GTO) strategies.

Cement, as the most important ingredient of concrete and most mortars, is a fundamental building material for society's infrastructure construction around the world. Cement consumption rate is known as economic growth- and development index of several countries. As cement is usually delivered to local markets, the cement industry spread their production facilities evenly all over the

Federal Republic of Germany and locates near the respective limestone deposits. Cement production is either (wet) or (dry), depending on the water content of the material feedstock. Most of cement plants are operated by Dry-processing worldwide. Simulation has been defined as the imitation of the real world process or system over time. Simulation tools are specifically designed to limit transient effects on measurements, which can be used in estimating a set of efficiency measures in production systems, inventory systems, manufacturing processes, materials handling and logistics operations. The importance of sustainable supply chain management (SSCM) lies in integration and achievement of the environmental, economic and social goals of the cement industry.

Anthony Alexander, Helen Walker and Mohamed Naim(2014)this study aims to aid theory building, the use of decision theory (DT) concepts in sustainable supply chain management (SSCM) research is examined.

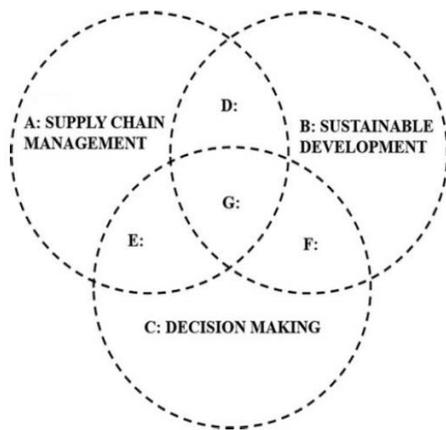


Fig 4. SSCM Stages

Inda Sukati, Abu Bakar Abdul Hamid, Rohaizat Baharun, Mohd Norfian Alifiah, Melati Ahmad Anuar(2012) This research investigates the impact of supply chain integration on competitive advantage. The study also assesses the impact of supply chain responsiveness on firm competitive advantage. And also research findings supported the hypotheses that supply chain integration positively impact supply chain responsiveness and competitive advantage. A supply chain consists of all stages involved, either directly or indirectly, in fulfilling a customer request. A supply chain includes manufacturer, supplier, transporters, warehouses, retailer, third-party logistic provider, and customer. By developing and testing a research framework of supply chain integration, competitive advantage and supply chain responsiveness constructs and conducting an analysis a number of manufacturing firm with valid and reliable instrument, this study represented one of the investigate the relationship between supply chain integration, supply chain responsiveness, and competitive advantage. Overall, this study contributes to the knowledge of the

role of supply chain responsiveness and competitive advantage of the firm in supply chain management field.

Muhammad Imran Qureshi, Mehwish Iftikhar, Mansoor Nazir Bhatti, Tauqeer Shams and Khalid Zaman*(2013)inventory management is continuous challenge for all organizations not only due to heavy cost associated with inventory holding, but also it has a great deal to do with the organizations production process.The proposal of implementing Just in time (JIT) practices upstream with the supply chain is possibly as old as the concept of JIT itself.JIT Implementation is measured through six indicators:-

- (1)Overproduction
- (2)Transportation
- (3)Inappropriate processing
- (4)Unnecessary motion
- (5)Defects
- (6) waiting time.

Sanjay Jharkharia and Ravi Shankar (2004) IT-enablement of supply chains, buyer-supplier relationships, and inventory management are at the core of the supply chain research.

The main objectives of this paper are:

- (1) To formulate some hypotheses which relate the common supply chain issues so that managers could develop strategies for increasing the effectiveness of their supply chain,
- (2) To test the validity of these hypotheses and establish the relative importance of the relevant issues in influencing a supply chain attribute, and
- (3) To discuss the implications of the research for practicing managers.

The research results demonstrate that SCM implementation improves competitive performance by lowering inventory levels. These evidences support the concept of SCM as a comprehensive and vital manufacturing strategy that can build and sustain competitive advantage and ultimately lead to better business performance.

III. CONCLUSION REMARKS

In this literature survey of supply chain management & Logistics Management of cement industries .These data were analysed using SWOT analysis. And Following conclusions are found from the investigation.

1. By developing and testing a research framework of supply chain integration, competitive advantage and supply chain responsiveness constructs and conducting an analysis a number of manufacturing firm with valid and reliable instrument, this survey represented one of the investigate the relationship between supply chain integration, supply chain responsiveness, and competitive advantage. Overall, this survey contributes to the knowledge of the role of supply chain responsiveness and competitive

advantage of the firm in supply chain management field.

2. Customize the logistics network to the service requirements and profitability of customer segments.
3. This survey has faced challenges in regards to limitations of data collection and software capacity along the stages of the simulation modelling. Although most of the input parameters are collected and calculated from reliable sources; there are still limitations such as technical data and storage cost.

IV. FUTURE SCOPE

First, supply chain management can be seen as part of a wider set of trends involving outsourcing, cross-boundary working, new organisational forms characterised by flattened hierarchies, teams, and empowerment and so on rather than rigid command and control (Ruigrok et al., 1999). These trends present an opportunity for the development of SCM. This research across multiple industries and sector would increase the understanding of supply chain performance.

REFERENCES

- [1] Deepesh Giri Sharma, G K Sahu(2014) "Quality in Supply Chain: Case Study of Indian Cement Industry" IPEDR. 2014. V75. 28
- [2] B.T.D.PRAVEENVARMA, K.P.SIRISHA (2013) "Study of Processing and Machinery in Cement Industry" International Journal of Engineering and Innovative Technology (IJEIT) Volume 3, Issue 5, November 2013
- [3] Bernd Noche and Tarek Elhasia(2013) "Approach to innovative supply chain strategies in cement industry; Analysis and Model simulation" 2nd International Conference on Leadership, Technology and Innovation Management 359 – 369
- [4] Vonderembse et al. (2006) "Conceptual Frameworks for Supply Chain Management"
- [5] Inda Sukatia*, Abu Bakar Hamida, Rohaizat Baharuna, Rosman Md Yusoffa(2012) "Competitive Advantage through Supply Chain Responsiveness and Supply Chain Integration" International Journal of Business and Commerce Vol. 1, No. 7: Mar 2012[01-11]
- [6] John Storey and Caroline Emberson(2006) "Supply chain management: theory, practice and future challenges" International Journal of Operations & Production Management Vol. 26 No. 7, 2006 pp. 754-774
- [7] Abimbola O Aniki, Charles Mbohwa Esther T. Akinlabi,(2014) "Improvement of Logistics and Supply Chain Management in the Cement Industry in Nigeria" the World Congress on Engineering 2014 Vol II, WCE 2014, July 2 - 4, 2014, London, U.K.
- [8] Craig R. Carter, Dale S. Rogers, and Thomas Y. Choi(2015) "Toward the Theory of the Supply Chain," Journal of Supply Chain Management, Vol. 51 No. 2.
- [9] C. Ganesh Kumar and T. Nambirajan(2014) "Direct And Indirect Effects: SCM Components" SCMS Journal of Indian Management , January - March,

- [10] Tarek Elhasia, Bernd Noche, and Lima Zhao(2013) "Simulation of a Sustainable Cement Supply Chain; Proposal Model Review "World Academy of Science, Engineering and Technology Vol:7 2013-03-28
- [11] Anthony Alexander, Helen Walker and Mohamed Naim(2014) "Decision theory in sustainable supply chain management: a literature review" Supply Chain Management: An International Journal, Vol. 19 Iss 5/6 pp. 504 – 522
- [12] Inda Sukati, Abu Bakar Abdul Hamid, Rohaizat Baharun, Mohd Norfian Alifiah, Melati Ahmad Anuar(2012) "The Study of Supply Chain Management Strategy and Practices on Supply Chain Performance" The 2012 International Conference on Asia Pacific Business Innovation & Technology Management 225 – 233
- [13] Muhammad Imran Qureshi, Mehwish Iftikhar, Mansoor Nazir Bhatti, Tauqeer Shams and Khalid Zaman*(2013) "Critical elements in implementations of just-in-time management: empirical study of cement industry in Pakistan" Qureshi et al. Springer Plus 2013, 2:645
- [14] Sanjay Jharkharia and Ravi Shankar(2004) "Supply Chain Management: Some Insights From Indian Manufacturing Companies "Asian Academy of Management Journal, Vol. 9, No. 1, 79–98, January 2004

AUTHOR'S PROFILE



Piyush Shukla pursuing M.Tech Mechanical Engineering (Specialization in Industrial Engineering) from Lovely Professional University Punjab India. His research & study interests include production, manufacturing, Supply Chain and Control System.



Lochan Sharma M.Tech working as Assistant Professor in Lovely Professional University Punjab India His research & study interests includes production, manufacturing, and Control System.