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A COMPREHENSIVE OF INDIA CEMENTS AND ITS INTERNATIONAL LOGISTICS OPERATIONS

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Abstract: International logistics operations in the cement industry involve a well-coordinated supply chain that ensures the efficient movement of goods from production units to global destinations. These operations typically include inland transportation, port handling, storage, and maritime shipping. Cement and clinker, the primary export products, are transported from factories to ports using road and rail networks, followed by loading onto vessels for international shipping. The use of both owned and chartered vessels allows for flexibility and cost-efficiency in global distribution. Efficient logistics planning is essential to meet delivery timelines, maintain product quality, and minimize costs. Coordination with international logistics partners, freight forwarders, and port authorities is critical to ensure smooth operations. Digital tracking systems and logistics management software enhance transparency and allow real-time monitoring of shipments. Sustainable practices such as optimized routing, bulk packaging, and fuel-efficient vessels are increasingly being adopted to reduce the environmental footprint. These operations are vital in supporting export activities, expanding market reach, and enhancing competitiveness in the global cement trade. International logistics serves as a backbone for cross-border trade in cement, and its strategic management directly influences market presence, customer satisfaction, and overall business performance in global markets.

Keywords: Cement Export, International Logistics, Maritime Shipping, Supply Chain, Clinker Transport, Port Handling, Vessel Operations, Sustainable Logistics, Freight Management, Global Trade

I. INTRODUCTION

International logistics operations refer to the planning, implementation, and control of the movement of goods, services, and information across international borders to meet global supply chain demands. This is the most important aspect of global trade, ensuring efficiency and complying with safe and international rules, allowing companies to transport their products.

Transparent implementation of these functions allows businesses to minimize costs, optimize delivery times and maintain a competitive advantage in international markets. The basis of international logistics, and companies must choose the most appropriate regime based on costs, time of transportation and the nature of the freight. Ocean freight is the most used method for international trade, with more than 80% of world expeditions.

II. NEED OF THE STUDY

This study is essential to understand the multifaceted aspects of India's international logistics operations, particularly in the cement industry. It focuses on analyzing how logistics contribute to enhancing competitiveness, helping Indian cement manufacturers maintain an edge in global markets. The study also identifies key issues and opportunities in international transportation and trade regulations, which are crucial for ensuring smooth cross-border movement of goods. Furthermore, it evaluates the strategies adopted by Indian cement companies to optimize logistics costs and improve the efficiency of their global operations.

III. REVIEW OF LITERATURE

1. Li-Hsing (1998) Accepted on 6 August 1998 Due to limestone mining bans in western Taiwan, cement production shifted to the east. This created a geographical supply-demand gap, necessitating optimized transportation networks. The



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study applies fuzzy linear programming models to determine the optimal cement and limestone transportation amounts and facility capacities, integrating constraints like port capacity, trans-shipment operations, and traffic congestion.

2. Alberto Behar, Philip Manners, Benjamin D. Nelson (2012) Published: 8 August 2012 Using a gravity model, the study finds that better international logistics significantly increase exports, especially for medium-sized developing countries. One standard improvement in logistics reduces perceived distance by 14%. The effect of logistics on exports is moderated by country size and multilateral trade resistance.

3. Martí Selva, M.L.; Puertas Medina, R.M.; Leandro Garcia (2014) The paper uses components of the Logistics Performance Index (LPI) to understand logistics differences among countries. It applies the gravity model to emerging economies, highlighting how customs efficiency, infrastructure, and logistics costs affect maritime trade and international trade performance.

4. Effnu Subiyanto, Djoko Mursinto, Rudi Purwono (2016)Published 15, 2016 Analyzed logistic costs of four stateowned cement projects in Indonesia. Found that while sea freight contributed 6.464% and domestic transport 1.363% to total investment cost, infrastructure limitations caused a massive 27.129% cost impact on the domestic supply chain, highlighting the need for infrastructure development.

5. Azmat Gani (2017) December 2017The paper examines logistics indicators' effects on international trade. It concludes that strong logistics performance is positively and significantly correlated with both exports and imports. Investment in logistics infrastructure and services can enhance a country's trade competitiveness.

6. Yugang He, Ranong Wu, Yong-Jae Choi (2022) 6 February 20 Using panel data (2000–2018), the study finds a positive long-term relationship between international logistics and cross-border e-commerce trade, while the short-term effect is negative. Empirical techniques like panel cointegration and causality tests validate the dynamic interaction over time.

7. Anonymous Authors – Academic Editor: Miaochao Chen (2022) 10February 2022 This research discusses the rising demand for transnational logistics due to cross-border e-commerce. Despite growth, logistics costs remain high. The authors propose optimizing export logistics modes using case analysis and filtration methods to overcome current inefficiencies in intermediary logistics.

IV. OBJECTIVES OF STUDIES

- To analyze the procurement strategies for raw materials used in cement production and assess their impact on the overall supply chain efficiency.
- To study the production and distribution processes within organization and evaluate how they align with market demands.
- To evaluate the logistics and transportation network, focusing on the integration of road, rail, and shipping in the movement of cement across regions.
- To understand the role of ports and shipping operations in cement exports, including vessel handling, loading procedures, and turnaround times.

V. RESEARCH METHODOLOGY

- Existing studies analyze cement logistics in Taiwan and Indonesia, but there is little research on India Cements' international logistics operations, including cost optimization, port usage, and supply chain challenges.
- Studies have explored logistics costs in Indonesia and the impact of infrastructure limitations. However, there is a gap in understanding the logistics strategies adopted by Indian cement manufacturers, particularly in global markets.
- Previous research has not deeply analyzed the role of digitalization, automation, and tracking systems in optimizing international cement logistics.
- While some studies discuss logistics performance in global trade, there is limited research on how international regulations and policies impact the cement export Ssector, especially for India.
- Most studies focus on individual country cases (Taiwan, Indonesia, OECD nations) but do not compare India Cements' logistics efficiency with other global cement players.
- Research on cement transportation rarely considers sustainability, carbon emissions, and environmental concerns related to international cement.

DATA COLLECTION:

Data collection methods are essential for systematically gathering information to understand the logistics and supply chain strategies of India Cements in its international operations. This study will use both primary and secondary data collection methods to gather comprehensive insights into the company's international logistics processes.



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SAMPLING TECHNIQUE

In the context of international logistics operations for cement transportation, purposive sampling allows for a focused, targeted approach to data collection. This method involves intentionally selecting cases that are considered particularly relevant to the research objectives. For example, you might choose to study shipments to high-volume export destinations such as the UAE, Sri Lanka, or the Maldives, as these routes are likely to provide valuable insights into the efficiency of logistics operations. You may also focus on specific transport routes, like those passing through busy international ports, or select shipments that encountered challenges such as delays or customs clearance issues. By deliberately choosing cases that offer meaningful data, purposive sampling helps ensure that the findings are directly applicable to key aspects of cement transportation, such as cost-effectiveness, time efficiency, or problem-solving in logistics.

DATA ANALYSIS TOOLS

This study used tools like SPSS and Excel for analyzing both descriptive and inferential data. SPSS was essential for running Anova, Chi square, regression and correlation analyses to explore variable relationships. Microsoft Excel assisted with data organization, summaries, and graphical presentation.

VI. SIGNIFICANCE OF THE STUDY

The study holds significant importance as it provides a comprehensive understanding of the international logistics operations of India Cements, one of the leading cement manufacturers in the country. With globalization driving increased demand for construction materials, efficient logistics management has become a key factor for maintaining a competitive edge in the global market. This study focuses on how India Cements manages the transportation of its products from domestic manufacturing units to international destinations, highlighting the strategies adopted for optimizing supply chain operations. It examines critical elements such as route planning, export procedures, port handling, freight cost management, and adherence to international trade regulations. By doing so, the study reveals the operational strengths and challenges faced by the company in the global logistics landscape. The insights gained from this analysis contribute to more informed decision-making in areas like plant location strategy, shipping partnerships, and distribution network planning.

PERCENTAGE ANALYSIS

- The 65% of respondents had 5–10 years of experience in logistics and exports.
- The 87% stated that plant location is mainly influenced by the availability of raw materials and logistics access.
- The 78% agreed that proximity to ports is very important for export efficiency.
- The 83% confirmed that multimodal transport is optimized through digital integration of road, rail, and port schedules.
- The 74% identified continuous-flow supply chain as the best fit for India Cements' operations.
- 69% indicated that ocean freight is the largest logistics cost component in cement exports.
- 81% mentioned that flexible production planning and inventory buffering manage demand fluctuations effectively.
- The 76% selected truck turnaround time at ports as the key logistics efficiency metric.
- The 85% preferred real-time cargo tracking and port digitization to reduce lead times.
- The 91% agreed that freight forwarders handle shipping arrangements and export documentation.
- 65% chose EXW (Ex Works) as the Incoterm with minimum seller responsibility.
- The 88% favored containers over bulk carriers due to better protection and easier handling.
- The 79% identified real-time cargo visibility as an important value-added service.
- The 70% agreed that Inland Container Depots (ICDs) help by facilitating customs clearance outside ports.
- The 82% recommended blockchain and IoT technologies for improving logistics visibility.
- 78% suggested that digital route optimization and use of alternate fuels can reduce the logistics carbon footprint.
- Majority suggested improving real-time tracking systems, faster port coordination, and increasing investment in sustainable logistics practices.



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CORRELATIONS

TABLE 1 CORRELATION Correlations

		13. What is the main reason India Cements would prefer Tuticorin port for exports?	17. Which strategy would help India Cements lower its carbon footprint in logistics?
13. What is the main reason India Cements would prefer Tuticorin port for exports?	Pearson Correlation	1	341
	Sig. (2-tailed)		.111
	N	23	23
17. Which strategy would help India Cements lower its carbon footprint in logistics?	Pearson Correlation	341	1
	Sig. (2-tailed)	.111	
	N	23	23

INTERPRETATION

A moderate negative correlation exists (-0.341). However, since p = 0.111 > 0.05, it is not statistically significant. There is no strong evidence of a linear relationship between the preference for Tuticorin port and strategies for carbon footprint reduction.

DESCRIPTIVE STATISTICS

Descriptive Statistics						
	N	Mean	Std. Deviation			
1. What strategic factor most influences the location of India Cements' manufacturing plants?	23	2.174	.6503			
5. How does India Cements most likely manage fluctuations in export demand?	23	2.391	.8913			
6. What key metric should India Cements monitor for export logistics efficiency?	23	2.435	.8958			
8. What is the role of a freight forwarder in India Cements' export logistics?	23	2.348	.9346			
Valid N (listwise)	23					

TABLE 2 DESCRIPTIVE STATISTICS

Descriptive Statistics

	Ν	Mean	Std. Deviation
19. What might be the reason for choosing containerized export over bulk loading?	23	2.348	.8847
10. Why is bagged cement usually exported in containers rather than bulk carriers?	23	2.435	.9451
Valid N (listwise)	23		

INTERPRETATION

The survey of 23 participants shows that most agreed on the importance of strategic plant location, with the lowest average score (2.174). Views on export logistics efficiency, container use, and the role of freight forwarders were



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moderately aligned. The widest range of opinions was on using bagged cement in containers, showing less agreement on that practice.

Chi- Square:

TABLE III CHI- SQUARE TEST

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.428 ^a	9	.042
Likelihood Ratio	14.414	9	.108
Linear-by-Linear Association	1.397	1	.237
N of Valid Cases	23		

a. 16 cells (100.0%) have expected count less than 5. The minimum expected count is .09.

INTERPRETATION

Since p = 0.042 < 0.05, there is a statistically significant relationship between the two categorical variables being tested. However, 16 cells have expected counts less than 5, which can affect the reliability of the Chi-square result (Chi-square assumes larger expected counts). There is evidence of an association between the variables, but the small expected counts caution us to interpret carefully.

FINFINGS

The study revealed several key insights into the logistics and supply chain operations within the cement industry. It was found that efficient transportation planning and the strategic location of production plants significantly reduce overall distribution costs and enhance delivery timelines. The integration of multimodal transport options, especially the use of shipping for international logistics, plays a critical role in expanding market reach and improving competitiveness. Furthermore, digital tools and real-time tracking systems are increasingly being adopted to optimize inventory management and monitor shipment movements effectively. Challenges such as high fuel costs, infrastructure limitations, and regulatory barriers were also identified as factors impacting operational efficiency.

VII. CONCLUSION

The study concludes that international logistics plays a crucial role in enhancing the global competitiveness and operational efficiency of cement producers. An integrated logistics system that combines road, rail, and sea transport ensures the smooth movement of cement from manufacturing units to international markets. Strategic port selection, along with the use of bulk shipping methods, helps in reducing transit time and optimizing freight costs. The study also highlights the importance of regulatory compliance, proper documentation, and streamlined export procedures in avoiding delays and ensuring successful cross-border operations. With the growing need for efficiency and transparency, digital tools such as GPS tracking and inventory management systems are increasingly being adopted to improve logistics performance. Sustainability has also emerged as a key focus area, with efforts directed toward adopting cleaner fuels and energy-efficient transportation modes.

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