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Strategic Governance and Risk Management in The Cement Industry: Insights From Global Perspectives

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Abstract
The cement industry plays a critical role in global infrastructure development but operates within a high-risk, resource-intensive, and environmentally sensitive context. This article explores the intersection of strategic governance and risk management in the global cement sector, highlighting how leading companies are responding to operational, regulatory, environmental, and reputational challenges. Drawing on international practices and frameworks such as ESG standards, COSO ERM, and ISO 31000, the study illustrates how robust governance structures and risk strategies are driving resilience and sustainable value creation. The paper underscores the importance of integrating risk oversight into strategic decision-making. The findings suggest that good governance , stakeholder engagement are becoming essential pillars of modern governance in the cement industry, offering a roadmap for emerging markets to strengthen their sustainability and competitiveness.

INTRODUCTION

The cement industry, a cornerstone of global infrastructure development, faces increasing scrutiny over its environmental footprint, energy-intensive processes, complex supply chains, and regulatory obligations. As a result, strategic governance and robust risk management have become crucial to ensure operational resilience, regulatory compliance, and sustainable growth. In this VUCA world, study of risk management intertwined with governace practices is essential for better sustainability of the sector.

Interdepence of Risk Management and Governance

Cement plays a pivotal role in economic Growth and development of any country.Effective risk management and strong corporate governance are increasingly viewed as interdependent systems, particularly in industries with high environmental, operational, and financial stakes—such as Cement. Global studies have consistently demonstrated that integrated governance frameworks contribute to proactive risk identification and long-term strategic resilience. (Beasley et al. 2005) and (Fraser & Simkins 2010). Risk oversight embedded within board-level governance ensures better risk visibility, enabling swift managerial response to changing market scenario and policy shifts (Mikes and Kaplan 2014). Studies by Zhang & Zhao (2015), and Koseoglu et al. (2019), revealed that a failure to institutionalize governance practices often leads to underreporting of environmental and financial risks, culminating in reputational and operational risks.

The theme intertwined Risk Management and Governance by emphasizing their interdependence in ensuring the sustainability and growth of the cement industry. Given the challenges the sector faces; such as regulatory complexities, financial risks, and environmental implications (World Bank 2016, IFC 2012), effective governance frameworks are essential for aligning stakeholder interests and managing the risks (OECD 2015). This relationship ensures that companies within the cement industry not only comply with regulations but also proactively identify, assess, and mitigate risks (COSO 2017 , ISO 31000 2018), thereby supporting the industry's long-term objectives and its contribution to economic growth (Porter & Kramer 2011). Integrating risk management into governance frameworks creates a holistic approach that enhances decision-making processes and fosters stakeholder trust, ultimately leading to a more resilient and sustainable cement sector (Eccles et.al 2014).

The cement industry plays a pivotal role in the economic architecture of any nation due to its contribution to infrastructure, employment generation, industrial linkages, and national development objectives.The cement industry performance can be directly correlated with GDP growth in most developing economies (UNEP, 2019).

Table I : Per capita Cement consumption vs. GDP

Rank	Country	Cement Consumption per Capita (kg.)	GDP per Capita (USD)
1	China	1700	12,700
2	Vietnam	620	4,100
3	Russia	500	12,600
4	Indonesia	430	4,600
5	Mexico	360	10,500
6	Brazil	350	8,900
7	Germany	330	52,000
8	USA	300	76,000
9	Japan	290	42,000
10	France	290	44,000
11	South Africa	280	6,600
12	UK	250	46,000
13	India	240	2,500
14	Bangladesh	170	2,500
15	Nigeria	120	2,400

****Data Source : Indexbox**

LITERATURE REVIEW

Inter twining the Risk and Governance theme

Literature Review on Risk and Governance is a strategic tool , which anchors decisions with proven knowledge , prevents reinventing the wheel and allows practioners and scholars to build resilent , forward thinking systems that are captured by past insights and emerging trends. The broader risk and governance theme is about how the Organizations identify, assess and mitigate risks for aligning with governance systems by ensuring responsibility, transparency and resilence.Insights derived from literature allow for better understanding , classification, and anticipation of existing (Financial, Regulatory, Operational, Environmental etc.) risks and emerging ones for an effective governance framework , which includes Policies, Accountability Structures, Control Mechanism and Reporting therefor.

Literature Review Process

The literature review paper employs a systematic approach by adopting sequential activities (Snyder 2019; Grilli et al. 2019), (Tranfield et al. 2003) and Prasad et al. (2018) viz. identification of research evidence and selection of studies; description and classification of chosen articles for relevant point , and reporting of results and future research agenda. For effective searching of information from existing literature, PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method is used and to analyse literature (Mengist, Soromessa and Legese, 2020) published since 2008 on "Scopus" platform. The analysed sample is represented by the Risk Management and Governance literature published between 2008 and 2025 and indexed in Scopus database based on selected 'Key Words' (Governance, Risk Management, ERM-Enterprise Risk Management,Value creation, Firm performance, Risk Models, Risk Review and Monitoring, Risk Mitigation, Risk Appetite, Risk Measurement) with use of conjunctive 'and' and 'or'. Post filtration of the identified documents of different types; such as articles, conference reviews, Conference proceedings, books, editorials, book chapters, notes, reviews on keyword based outcomes; only articles published in journals are considered for the purpose with requirement of relevancy. (Dienes et. al , 2016), (Hedin et Al. 2019).

Table II : Literature Selection Criterion

S.No.	Parameters	Description
1	Time period	2008-2025 May
2	Database	Scopus
3	Inclusion Criteria	Peer reviewed, Research papers & review papers
4	Exclusion Criteria	Not related to area of study, Language (other than English)

Present study involves a comprehensive assessment of industry reports, company disclosures, to obtain illustrations on best practices in risk management and governance, offering insights into how leading companies in the sector have successfully navigated complex risks and maintain desired level of governance. Systematic Literature Review provides a unbiased technique and transparent way of reviewing existing literature to get additional knowledge (Webstar and Watson ,2002), Hazaea et. al(2021).
Selection of year 2008 is very significant, because the year is marked for global financial crisis, triggered by collapse of the housing market and a decline in value of subprime mortgages (Anyakwu Ashibudike ,2022) and (Sandeep Rai & Shailesh Dwivedi 2011). The focused events, which triggered the concern and awareness over 'risk' indicates a positive corelation between milestone events and ' number of literature published' during that time span ,can be observed from the Table furnished hereunder.

TABLE – III : Milestones Vs. Publications Numbers (* May 2025)

Year	Milestone/Event	No.
2008	Global Financial Crisis	17
2009	OECD Risk Guidance	20
2010	ISO 31000:2009 gains adoption	26
2014	FRC Risk Guidance (2011-2014)	135
2017	COSO ERM Framework Update: Strategy & Performance (2015-2017)	117
2018	ISO 31000:2018 Update	44
2020	COVID-19: Boost in business continuity and resilience focus (2019-2020)	132
2021–23	Integration of ESG, cyber, and digital risks	254
2024–25*	Focus on resilience, real-time risk, AI governance	275

While searching the source journal, 72 titles (7%) used the word 'Governance', signifying the importance of the word in literature. In total 19 Journals (with 10 or more articles each) published in total 302 articles and rest 748 articles in 388 journals (average of 2) published in 18 year span. Hence, as a subject 'risk' and 'governance' pre-occupied the mind of researchers and editors; in view of the significant number of publications.

TABLE – IV : Journals with Number of Publications

Name of Source Journal	No. of Publications
Corporate Governance (Bingley)	31
Corporate Ownership and Control	31
Corporate Governance: An International Review	27
International Review of Financial Analysis	21
Cogent Business and Management	21
Journal of Risk and Financial Management	15
Managerial Auditing Journal	15
Business Strategy and the Environment	14
Corporate Social Responsibility and Environmental Management	14
International Journal of Disclosure and Governance	14
Journal of Corporate Finance	13
Journal of Cleaner Production	12
Management Science	11
Journal of Banking and Finance	11
Strategic Management Journal	11

International Review of Economics and Finance	11
Finance Research Letters	10
Managerial Finance	10
Investment Management and Financial Innovations	10
19 Journals	**302**
388 Journals	**748**

Thematic Analysis: Risk Management and Corporate Governance

It's important to identify themes that reflect both industry-specific challenges and broader corporate governance and risk frameworks. The key themes studied are:

Enterprise Risk Management

Operational Risk Management

Corporte Governance and ESG

Regulatory and Reporting Standards

Enterprise Risk Management

Enterprise Risk Management in the cement industry involves identification, assessing, and mitigating strategic and other risks and their impact on financial risks across the entire value chain. Literature highlights that ERM frameworks help cement firms achieve resilience in VUCA (Volatile, Uncertain, Complex, Ambiguous) world.

The Enterprise Risk Management (ERM) process has heterogeneously developed across the globe, although it represents a leading paradigm, supporting organizations to identify, evaluate, and manage risks at the enterprise level (Gabriel Anton & Nucu,2020). Even within the sector, risk and impacts are not identical, varies entity-wise. Fraser et. al (2010) survey of Risk Managers found "... virtually all literature is silent on how to deal with the myriad cultural, logistical, historical challenges that exist and are unique to all organizations...." (Philip Bromiley et.al 2015)

Enterprise Risk management refers to the identification, assessment, and prioritization of risks followed by coordinated efforts of (4 Ms) i.e to Measure (impact), Minimize (negativity), Monitor (efforts), and Manage (control)the probability or impact of unfortunate events, if any. Study of Risk Management has grown depending upon the hurdles faced by the industry at different point of time, which may derail the organisational objectives. Risk Management enables a robust, quantitative, and economic understanding of risks whose impact is communicated throughout the organisation's levels (Paula et al., 2018). Such a portfolio approach considers risk interrelations and the significant benefits that can be achieved when they are evaluated and monitored together at a superior Organizational level (Jabbour & Abdel-Kader,2015). Risk management is a continuous process where the sources of uncertainties are systematically identified, their impact assessed and quantified and their effect and likelihood managed to produce an acceptable balance between the risks and opportunities for the concerned industry (Harry FB et. al 2005).

Risk Management helps in informed 'Decision Making' by providing timely and proper insights, which transforms 'hindsight' into 'foresight' by developing 'insight' of the Management. Due to typical nature of the Cement industry, risk and risk management activities differ from other industries. Typical nature of Cement Industry is articulated through-

High-energy consumption: At Kiln to produce Clinker, 1850 Degree to 1900 Degree Centigrade temperature is required. (International Energy Agency, 2019)

Complex supply chain: Supply chain risk management in the Cement industry involves identifying, assessing, and mitigating risks associated with the supply of raw materials, production, and distribution of cement. (Supply Chain Risk Management, 2018)

Geological risks: Cement production requires specific geological formations of limestone for Clinker (mother raw material for Cement). Depletion of natural resources and possible environmental impact for quarrying, making it essential to manage geological risks. (Geological Risk Management in Cement Production 2020).

Environmental and regulatory risks: Cement production process emits pollutants like NOx, and SO2, contributing to air pollution. (WHO 2018) and negative health effects. Since, Cement production is a significant source of greenhouse gas emissions, also contributing to climate change. (Intergovernmental Panel on Climate Change 2019), (Olukanni, D. O., Akinyemi, O. O., and Oyebanji, O. O, 2021)

High capital outlay: Capital cost for a plant differs substantially due to installed capacity of the plant and its location (100 to 200 Dollar per Mt) (Global Cement and Lime Magazine ,2019) ; Appuhami (2008).

Seasonality of demand: Seasonality relates to inventory holding, it was observed that inventory management and return on revenue have a correlation (Khurshid Ali et. al 2022).
Contemporary literature also includes other types of Risks applicable across different Sectors including Cement.

TABLE – V : Other Risks

Types of risk	Authors	Definitions
Credit risk	Greuning and Bratanovic (2009)	-probability that a borrower fail to pay dues
Liquidity risk	Gup and Kolari (2005)	-defined as the hazard to earnings to meet its responsibilities to creditors and the wants of debtors by changing assets into cash swiftly with least loss, being able to borrow moneys when wanted, and having funds accessible to execute gainful securities transaction deeds
Market Risk	Saunders et al. (2006) .	-refers market risk as the chance of change in consumer attitude to product of the company
Foreign exchange risk	Raghavan (2003)	-defines as the risk to honour payment obligations in currency of a different country
Operational risk	Njogo, (2012)	-referred as the hazard of straight or unforeseen loss resulting from insufficient or unsuccessful internal processes, persons and schemes or from outside events
Interest Rate Risk	Gleason (2000)	-refers the possible adverse effect on the net interest revenue and is the exposure of an organizations financial situation to the changes in interest rates.

The everlasting prominence of governance and risk continues to be critical, in dealing with matters like protection of investors and cost rationalization in the journey of sustenance. A proper risk management process can help enterprises to grow by enhancing competitive advantage (Blanco-Mesa, 2020).

Operational Risk Management
Operational Risk Management (ORM) is a component of Enterprise Risk Management, while ERM sets the strategic risk appetite and integrates risk management across all businesses , ORM focuses on day-to-day risks associated with any area of operation. Operational risks identified are consolidated and reported for ERM framework for oversight purposes. Operational risks in cement production stem from plant disruptions, supply chain failures, safety hazards (Sengupta et. al 2016, Gupta 2006) and high energy consumption. Research underscores the need for integrated ORM that minimize downtime, ensure worker safety, and support process optimization.
Corporate Governance and ESG
Corporate governance in the cement sector is evolving to incorporate Environmental, Social, and Governance (ESG) standards as key performance drivers. Globally, and in India, governance reforms are pushing for increased board accountability, sustainability disclosures, and stakeholder engagement. The cement sector is a major contributor to CO_2 emissions and accountable for depletion of natural resources (Limestone, Coal, Fossil Fuel). Studies indicate rising climate-related risks such as carbon taxation, environmental litigation, and community opposition.
Regulatory and Reporting Standards
The cement industry is increasingly governed by evolving national and international regulations—ranging from environmental norms to corporate reporting standards like Global Reporting Initiative (GRI),

Business Responsibility and Sustainability Reporting (BRSR), and Task Force on Climate related Financial Disclosures (TCFD).

Key Frameworks for Risk Management

Enterprise Risk Management (ERM) COSO, 2004 -

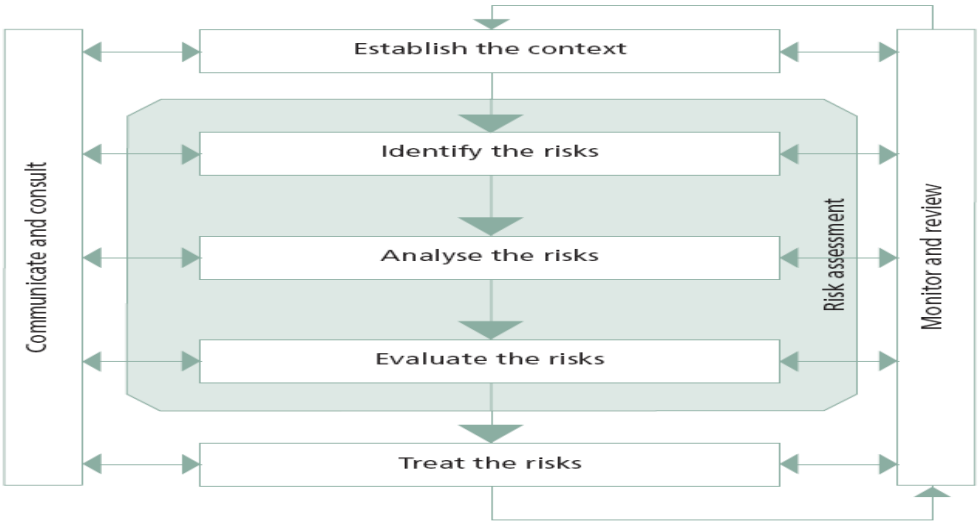
A structured and holistic approach to managing organizational risk. The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004) defines Enterprise Risk Management as follows:

"Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives". COSO is a widely recognized and influential framework for both internal control and enterprise risk management (ERM). It's not just a risk management framework, but it also provides guidance on internal controls, financial reporting, and corporate governance practices.The five elements in the front face of COSO Cube, relates to core Governance and Risk Assessment (Control Environment , Risk Assessment, Control Activities, Information and Communication and Monitoring Activities),which effects the Organisation structure viz. Entity, Division, Operating Unit and Function.

ISO 31000 –

Provides guidelines for designing, implementing, and maintaining risk management framework.

TABLE – VI: Risk Governance Model (ISO 31000 -2018 Framework)



FMEA-

Failure Mode and Effects Analysis is a systematic approach used to identify and analyse the severity, occurrence, and detectability of each failure mode to prioritize mitigation efforts.

Bow-Tie-

An operational risk bow tie analysis helps organizations identify and organize a spectrum of risks, from equipment failures to employee safety.

Governance Models

During 1990s, a number of corporate scandals in the USA (viz., Lehman Brothers, AIG Insurance, Xerox, Arthur Anderson, Enron, WorldCom, Tyco, etc.), and also elsewhere in the world, triggered the gun towards 'governance lapses' in respective entities. To protect stockholder and stakeholder interests, SOx (Sarbanes- Oxley) legislation was promulgated in 2002. Prior to that in 1992 Cadbury Report on financial governance was published. The Cadbury Committee (1992) advocated "a mechanism for accountability, emphasizing the need to raise reporting standards". Moreover, good governance requires the board to constantly monitor the firm to ensure consistent growth in the firm value to add value to the shareholders wealth (Shleifer & Vishny,1997).

Literature provides specific Governance Models (Ungureanu, Mihaela 2012), from a Shareholder to a Stakeholder Perspective (Jacques 2014). The leading Models are –

1. Anglo – Saxon Model (USA, UK) : This model emphasizes entrepreneurship and private ownership with a dominance of independent shareholders. Shareholders exert control primarily through financial means, and regulations encourage transparency and accountability. It features a significant degree of capital dispersion.
2. Continental-European Model (Germany, Italy): This model indicates a high concentration of capital, with major shareholders often involved in strategic decision-making. Managers are accountable to a broader group of stakeholders, including employees and business partners. It has dual governance structure (2-tier Board), which includes both an executive board and a supervisory board.
3. China Model : Shareholder rights on disclosure of Related Party Transactions, protection of Minority Interest and other disclosures like Continental European Model are the hallmarks of Chinese governance model. A 2-tier Board and stress on Corporate Social Responsibility also incorporated in the model.

Overall, these models reflect the different historical, economic, and cultural contexts of their respective regions, each with distinct advantages and challenges in governance efficiency.

4. In developing countries the corporate governance and issues affect economic development (Dr. Muhammad Bagram et.al, 2024) w.r.t four developing countries viz. Pakistan, Mexico, Brazil, and Bangladesh. 'Culture' is the constraint for establishing good corporate governance. The research emphasizes significant associations between governance quality, economic growth, and poverty reduction, including lack of awareness among stakeholders regarding their rights and responsibilities. The authors noticed that family-owned companies and weak enforcement of laws often lead to governance failures.

Theoritical underpinning between RM and CG

All the studies agreed that corporate governance is one key element in improving economic efficiency, which ultimately balances relationships between a company's management, its board, its shareholders and other stakeholders. A risk governance approach provides a sound foundation for an ethical Risk Management system and proffers a robust approach to manage an organisation's risk profile. Mitigation of risk is critical to maximizing shareholder value and corporate governance (CG) requires firms to address various risk issues integrated and simultaneously through enterprise RM processes (Yilmaz & Flouris, 2010). Risk governance is generally defined as "board and management oversight of risk and the attendant configuration of risk management processes of identifying, measuring, managing, and reporting risk" (Ard & Berg, 2010).

TABLE VII : Linkage based on Theoritical underpinning between RM and CG

Theory	Corporate Governance Focus	Risk Management Connection	Interrelationship
Agency Theory	Principal-agent conflict	Controls and monitoring	Governance enforces risk policies; RM supports oversight
Stakeholder Theory	Broad stakeholder accountability	Identifies non-financial risks (reputation, ethics, etc.)	Governance ensures stakeholder inclusion in risk frameworks
Stewardship Theory	Trust and empowerment of managers	Promotes shared responsibility and proactive risk management	Governance enables culture-based RM
Resource Dependency	Board ensures critical resources	Board links help mitigate strategic/external risks	Governance enhances external risk mitigation capability
Institutional Theory	Conformance to norms and regulations	Ensures compliance and legitimacy in risk responses	Governance and RM align with institutional expectations

Transaction Cost Economics	Minimize costs of economic exchanges	Appropriate design reduces risk costs	Governance enables efficient risk-aware organizational structures
Behavioural Theory	Human behaviour affects decision quality	Bias and irrationality increase risk exposure	Governance and RM promote awareness and control of behavioural risks

Methodological Review

The literature reflects a blend of empirical, qualitative, and hybrid research approaches, though the sector-specific focus remains relatively narrow compared to other industries such as Banking, Finance, IT etc. Cement Sector Specific study of Methodology adopted by Researchers across the globe, of which this paper considered 28 selective articles (Global and India specific) for detailed study. It was observed that Case Study , Regression and Content analysis are the methods mostly perused. The below Table indicates the Methodoloy used and the focus area of those studies under risk and governance domain.

TABLE VIII :Methodology Used

Study / Author(s)	Region / Country	Methodology Used	Focus Area
Kumar & Zattoni (2017)	BRICS Countries	Panel Data Regression	Board structure, governance vs performance in emerging markets
Siddiqui (2015)	Bangladesh	Panel Regression + Interviews	Audit committee effectiveness in risk oversight
UNIDO (2020)	Asia & Africa	Mixed Methods (Case, Survey, Interviews)	Governance innovation & sustainability in cement industry
Nekhili & Cherif (2011)	MENA Region	Econometric Modeling (Panel Regression)	Governance structure vs firm risk/performance
Cohen et al. (2011)	USA	Narrative and Textual Analysis	Tone and frequency of risk disclosures in manufacturing sector
De Villiers & Marques (2016)	South Africa	Regression	ESG and financial performance in mining and cement firms
Lopez-Arceiz et al. (2018)	Spain & Latin America	Quantitative (Regression)	CSR disclosure vs firm value in cement firms
Olawale & Garwe (2020)	Nigeria	Case Study + Thematic Interviews	Internal controls, operational risk in cement production
UNCTAD (2021)	Global (Developing Economies)	Interviews	ESG and risk disclosure maturity in extractives and cement industries
Al-Sartawi (2021)	GCC Countries	Regression	Environmental risk reporting and governance scores
McKinsey & Co. (2022)	Global	Executive Interviews	Board oversight of climate and risk in infrastructure sectors
IFC (2020)	MENA, South Asia	Case Studies	Corporate governance practices in infrastructure, incl. cement
Uwuigbe et al. (2016)	Nigeria	Panel Data Regression	Governance attributes and sustainability disclosure in industrial firms
Bouten et al. (2011)	Belgium	Content Analysis	Determinants of environmental disclosure in cement firms
Kılıç & Kuzey (2018)	Turkey	Regression	Corporate boards and environmental disclosure in manufacturing

Research Gaps

Literature review leads to the following major gaps.

1. Absence of Sector-Specific Risk Frameworks

Most global studies apply generic corporate governance or financial risk models, a unique risk environment of the cement industry was not observed. Chatterjee & Brown (2020); Holtec (2023)

2. Underrepresentation of Developing Economies

Empirical research is skewed toward developed regions (EU, US, South Africa), while emerging and underdeveloped economies (e.g., India, Bangladesh, Nigeria) are underexplored—particularly in sector-specific governance and risk area. Since Governance models may not be transferable wholly from developed countries to developing-countries. Al-Sartawi (2021); Uwuigbe et al. (2016)

3. Weak Integration of ESG and Risk Management

Very few studies examine how ESG factors are integrated into Enterprise Risk Management (ERM). However, a longitudinal study on ESG factors improvement with continuous Risk management and monitoring process over a period was not noticed. Lopez et al. (2018); KPMG (2021)

4. Board Dynamics and Behavioural Governance

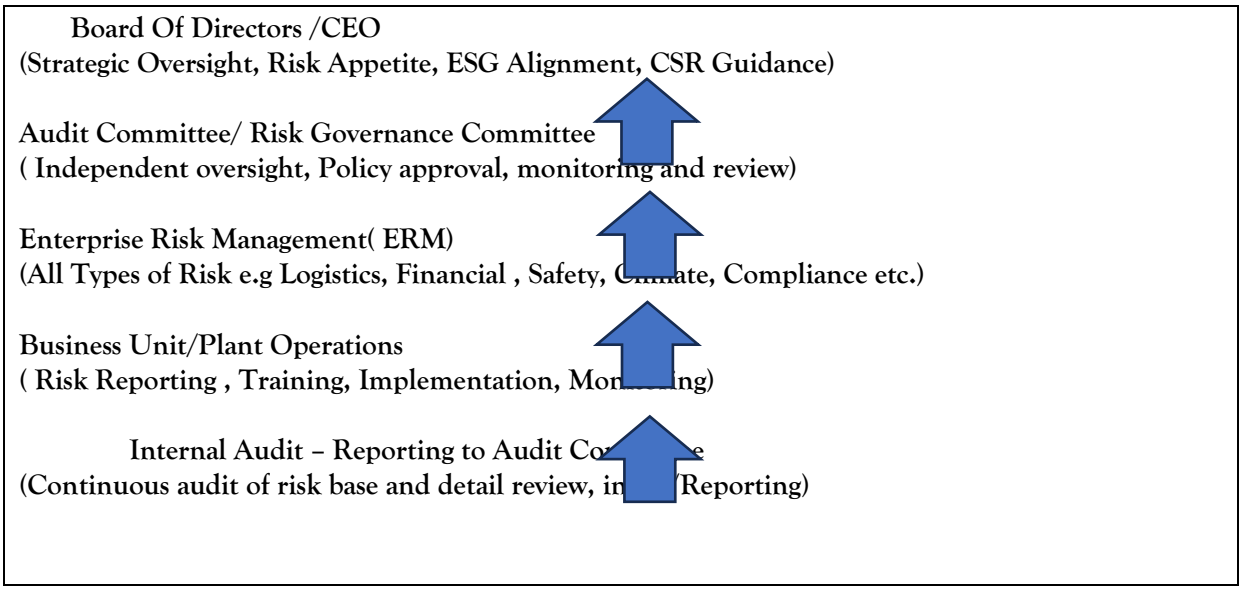
Governance studies focussed on board structure (size, independence), however, relationship between Cement sector, its entity size and behavioural dimensions—such as risk appetite, tone at the top —are not studied. McKinsey (2022); IFC (2020)

Post global literature review, the review tried to see indian Cement Sector through the global lence.

Corporate Governance Framework in India

In the context of ancient Indian philosophy, epics and legal texts like Mahabharata, Ramayana, Bhagavad Gita, Manu Smriti , Yajnavalkya Smiriti, Vishnu Smriti etc. upholds the importance of 'governance', for it ensures the protection of all beings (Mahabharata, Shanti Parva, Chapter 109, Verse 12). Ramayana emphasized on governance as King's primary duty, "The king's duty is to ensure the prosperity of all." (Ayodhya Kanda, Chapter 100, Verse 15). Kings can be interpreted as owners of business , who is supposed to protect interest of all the Stakeholders. "Dharma is the foundation of governance, for it ensures the well-being of all." (Bhagavad Gita Chapter 4, Verse 7). Kautilya's Arthashastra also emphasized on governance, highlighting its role in maintaining social harmony and promoting the common good. (The Kautilya Arthashastra translated by R P Kangle, 2010).

TABLE -IX : Risk Governance Model- India



Various steps are taken by Regulators to benchmark our governance practices against the prevalent global standards. The following Table tries to capture the reforms against global scenario.

TABLE X : Reforms

Dimension	India (Post-2010 Reforms)	Global Practices (EU, USA, OECD, Emerging Markets)	Information Sources
Regulatory Drivers	SEBI (LODR), Companies Act 2013, Kotak Committee (2017), MCA ESG guidance, BRSR mandate	Sarbanes-Oxley (USA), OECD Principles of CG (2004 & 2015), EU Non-Financial	SEBI (2017), MCA (2021), OECD (2015), EC (2022)

		Reporting Directive (2014), CSRD (2023)	
Transparency Focus	Disclosure of CSR, RPTs, risk frameworks, ESG (via BRSR), director evaluations	ESG disclosures (TCFD, SASB), human rights, gender board diversity, emissions targets, audit rotation	SEBI, MCA, TCFD, SASB, EU Taxonomy
Voluntary Frameworks	CII's Voluntary Governance Code, ICAI ESG toolkits, CMA member initiatives	GRI, CDP, UNGC, Integrated Reporting Framework (IIRC), ISO 26000	GRI, UNGC, IIRC, ICAI, CII
Risk Management Integration	Mandated risk management committee for top 1000 firms; limited ERM integration in mid-sized cement firms	ERM embedded into strategic planning (esp. in EU / USA firms); use of digital tools, scenario planning, ESG-linked risk maps	PwC (2021), KPMG (2020), COSO-ERM Framework (2017)
Environmental Risk and Climate Action	Basic compliance with CPCB/ MoEFCC norms; BRSR includes climate disclosures (qualitative)	TCFD mandatory in UK, EU; climate scenario analysis, science-based targets, internal carbon pricing common in large cement firms	IEA (2023), CDP (2022), PwC (2023)
Board Accountability	Reforms mandate independent directors, risk oversight, and director evaluations in listed firms	Board ESG committees, performance-linked remuneration, director rotation & skill disclosure in developed markets	SEBI (2017), Deloitte (2022), McKinsey (2021)
Auditor & Credit-Rating Influence	Governance quality considered in credit assessments (e.g., CRISIL, CARE); audit committee roles strengthened	Global credit rating agencies like Moody's, S&P explicitly assess ESG governance scores in long-term ratings	S&P ESG Evaluation Framework (2022), Moody's ESG Rating Methodology (2023)
ESG Reporting Quality	Improving under BRSR, but often generic, inconsistent, and lacking third-party assurance	EU CSRD mandates third-party assurance; assurance common in USA, EU, and Japan	SEBI (2021), CSRD Directive (2023), KPMG Survey on Sustainability Reporting (2022)

The studies made for Indian Cement Sector and the methodology followed, largely in tandem with methodologies followed by global researchers. Quantitative empirical approaches dominate the current body of literature. These studies largely rely on secondary data derived from publicly available sources such as Annual Reports, Cement Association Notifications, Bombay Stock Exchange (BSE), Company BRSR (Business Responsibility and Sustainability Reports), and Corporate Governance rating databases. Researchers typically employ panel data ,Ordinary Least Squares (OLS) regressions—to analyse the influence of governance mechanisms (e.g., size of Board, Board independence, Audit Committee strength etc.) on key risk indicators like debt-equity ratios, profitability volatility, ESG scores, firm performance etc. (G Malathi, S. Vignesh 2022). Qualitative research in the Indian cement sector is more limited but provides important contextual insights. Case studies have been used to explore how risk governance structures evolve in response to external pressures such as environmental regulations or stakeholder activism (Dr. Amlesh Adhikary 2024). These studies mentions the interviews with board members, risk officers, and sustainability heads, as well as document analysis of board meeting disclosures, internal policies, risk management document etc. Mixed-method studies are emerging with use of survey instruments administered to persons associated with the function or governance officers. This approach enables triangulation of data, offering a more holistic understanding of how risk governance is perceived and operationalized within organizations.(Maria & Kuszenawski,2021)

Shagufta Khan et al. (2014) conducted an exploratory content analysis of sustainability accounting disclosures by the top 10 Indian cement firms. They collected a broad set of "sustainability factors" from the literature (environmental management, social indicators, etc.) and checked whether each company reported on them. The results were striking: "uniform reporting pattern was not found" across firms. Sustainability issues were reported only by a few companies, making cross-firm comparison impossible. Despite the increasing relevance of risk management and corporate governance in the Indian cement

sector, empirical research remains relatively lesser in number. Moreover , sector-specific nuances such as regional regulatory variance with respect to state-level mining and land acquisition policies, emissions risks are inadequately captured in governance disclosures.

Table XI : Snapshot on Methodology used

Study	Year	Methodology	Main Conclusions
N. Nanavati & S. Dave	2024	Content analysis of annual reports/public disclosures (2020–23) for five major cement firms	Substantial variation in voluntary disclosures. Observed overall transparency is moderate and urged companies to enhance voluntary reporting (ESG, governance, managerial policies).
M. Dhuri, et.al	2024	Econometric study of 14 cement companies; used financial ratios and Altman-Z score to assess insolvency risk	Analysed the impact of CSR spending and Sustainable Growth Rate (SGR) on bankruptcy risk. 'The study found no significant effect of these factors on financial distress. It emphasizes the need for "holistic assessment" of financial and non-financial indicators.
Dr. Pankaj Gupta & S B Jain	2022	Mixed Method	Valuable insight into the financial management practices that can enhance the efficiency and profitability of Cement Companies in Rajasthan.
Ankit Kumar	2021	Case Study	Most Firm follow COSO OR ISO 31000 Framework. Climate and legal risks poorly integrated
TERI	2020	Qualitative interviews + disclosure analysis	Carbon risks not embedded in enterprise-level RM
Ghosh & Mondal	2020	Panel regression of Nifty 500 manufacturing firms incl. cement	Board independence positively affects risk disclosure and firm performance
M. Somani & J. Bhatia	2018	Empirical analysis of 10 listed cement companies (2012–2017) ; correlation of Board Size and % Independent Directors with ROCE	Found a significant positive correlation between board size and long-term profitability (ROCE); independent director percentage also showed a positive (though weaker) relation to ROCE .Concluded that stronger governance structures (larger boards, more independent directors) improve cement firms' financial performance and can "restore investor confidence"
IIM Bangalore Working Paper	2018	Case Studies	M&A decisions were poorly governed due to lack of board-level risk strategy
Kumar & Sharma	2015	Panel Data Regression	Board Size, Audit Committee, independence leads to higher profitability
S. Khan et al.	2014	Exploratory content analysis of sustainability/reporting practices (top 10 cement companies)	Absence of uniform reporting for sustainability disclosures. Disclosures varied widely in (energy use, emissions, CSR). As a result,environmental disclosure remains incomplete and incomparable
Dr. Ashok Panigrahi	2013	Longitudinal statistical comparative study	Five leading Cement Companies were studied over a period (2000- 2010) using statistical techniques like Mean , SD, Ratio Analysis and Motaal's Ultimate Rank Test to assess liquidity position.
Balasubramanian et.al	2010	Case Study	Cement sector showed moderate governance practices with poor RM linkage at firm level.

J. Banaji & G. Mody	2001	Qualitative review of Indian corporate governance codes (working paper)	Observed that transparency of ownership was largely absent in Indian corporate disclosures. Indian governance codes (late 1990s) mandated some disclosure but omitted detailed ownership transparency, which remains "endemic" to Indian business. Recommended a sustained push by regulators to elevate disclosure to international standards.

In summary, while quantitative methods have laid a solid foundation in assessing the relationship between governance structures and risk management outcomes in India's cement industry, a deeper and more nuanced understanding will require a greater emphasis on qualitative depth, and longitudinal analysis. The gaps observed through literature studies are -

1. Fragmented Integration of Risk and Strategy: Most developing economies—including India—lack integrated ERM approach that link risk assessment to business strategy. Literature shows that risk identification is often siloed, reactive, or driven by compliance rather than by strategic foresight (Reddy, 2019; KPMG, 2021).
2. Compliance-Driven approach for Governance: Corporate governance in India is still largely perceived as regulatory compliance rather than a value-enhancing framework. Unlike firms in developed countries, Indian companies often fall short of governance best practices such as third-party ESG assurance, or integrated reporting (Chatterjee & Brown, 2020).

TABLE -XII : Discrepancy in Corporate Governance Disclosure and BRS Reporting

No. of Risks (Data collected from Annual Reports of Companies)		
Entity	**CG Disclosure**	**BRSR**
Dalmia Bharat	0	2
RAMCO	0	4
Sagar	11	6
Heidelberg	6	4
ITD	0	14
ACC	16	6
AMBUJA	16	9
BIRLA CORP	0	13
PRISM	20	7

3. Limited ESG-Linked Risk Disclosures: Although ESG reporting is improving under the BRSR mandate, many firms treat it as a checklist activity rather than a strategic communication tool. The absence of robust climate risk scenario analysis, internal carbon pricing, and ESG data assurance highlights a significant literature and practice gap (IEEFA, 2023; PwC, 2022). Despite being a carbon-intensive sector, Indian cement companies show inconsistent reporting on climate risk and decarbonization targets. The literature shows a lack of standardized carbon accounting, scenario analysis, and climate resilience plans—especially when compared to EU or North American firms that follow TCFD or EU Taxonomy norms.
4. Operational Risk Under-covered in literature: Literature on operational risk management—covering plant disruptions, supply chain vulnerabilities, and safety hazards—is limited in India. In comparison to other countries, there is little empirical evidence on how Indian firms use data analytics, automation, or predictive tools to reduce such risks (Holtec, 2023).
5. Inadequate Board-Level Oversight: Although reforms mandate risk management committees, many Indian firms lack board-level risk expertise or structured processes for evaluating governance effectiveness. This gap between form and substance in governance is noted for developing a scoring methodology.(SEBI, 2017; ICAI, 2022).
6. Regulatory Awareness vs Implementation Gap: Indian firms are aware of evolving risk reporting regulations (e.g., BRSR, MCA ESG disclosures), but literature (Academic and Industry) note gaps in quality, consistency, of these disclosures. Unlike global firms that follow GRI, SASB, and TCFD rigorously, Indian cement companies often lack in these aspect.

7. Highly Promoter driven entities, may result in poor Governance: As evident from below mentioned datum, most of the entities having high promoter stake in India. Decision making process and indepence of Boards may lead to governance weakness due to high promoter stake in entities.

TABLE XIII : Shareholding Pattern in Indian Cement Sector

S. No.	Company Name	Shareholding	
		Promoter	Public
1	Prism Johnson Ltd	74.87	25.13
2	Orient Cement Ltd	37.9	62.1
3	JK Lakshmi Cement	46.34	53.66
4	JK Cement	45.68	54.32
5	Ambuja Cements Ltd	67.57	32.43
6	Shree Cement Ltd	62.55	37.45
7	Heidelberg Cement India Ltd	69.39	30.61
8	UltraTech Cement Ltd	59.99	39.84
9	Star Cement Ltd	66.47	33.53
10	Ramco Cements Limited	42.29	57.71
11	ACC	56.69	43.31
12	Sagar	48.31	51.69
13	Nuvoco	72.02	27.98
14	Dalmia Bharat	55.84	44.16
15	ITD Cementation Ltd.	46.64	53.36

8. Financial Disclosure and Market Signalling :Financial transparency has improved due to the adoption of Indian Accounting Standards (Ind-AS), enabling greater comparability and investor understanding. However, selective disclosure practices persist, particularly around pricing strategies, capital expenditures, and merger and acquisition activities. These opaque practices have led to regulatory scrutiny, including investigations and levy of penalty by the Competition Commission of India (CCI) over potential cartelization. This theme underscores a gap between regulatory compliance and strategic transparency.

9. Stakeholder Engagement and Social Accountability: Corporate Social Responsibility (CSR) has become more visible following the Companies Act 2013, which mandates CSR spending and reporting. Cement firms often highlight initiatives in health, education, and water management in their CSR reports. However, these disclosures frequently lack specificity regarding fund utilization and social impact assessment. This indicates a symbolic rather than substantive approach to stakeholder engagement, driven more by compliance than by accountability.

7. Absence of specific RM Model for the Sector: Unlike global counterparts, any Sector specific Model yet to be developed. Disclosure of the RM Model is not mandatory, and hence only a few Cement Companies mentioned the same in Annual Report.

8. The Role of Ratings, Analysts, and ensuring accuracy in disclosure :External accountability mechanisms such as ESG ratings, analyst reports, and investigative journalism are beginning to influence better governance practices in the sector. Large firms are increasingly evaluated by agencies like CRISIL , ICRA, S & P , IIAS and BSE , shaping investor perceptions. Nonetheless, smaller firms often escape such scrutiny, creating an uneven landscape of transparency and governance practices.

Study made by Halder & Rao (Corporate Governance Index for Indian Companies) for developing Corporate Governance Index perused the datum for large listed entities for the period 2008-2011 , used six important governance mechanisms viz. Board of Directors, Audit Committee, Board Committees, disclosure practices. The latest Corporate Governance Index was reported by CRISIL (2019), IIAS - Institutional Investor Advisory Services (2020), Bombay Stock Exchange (2020), ICRA (2020), S & P

(2020). The salient features of those studies w.r.t governance rating include categorization under broad governance issues (1 to 7 as referred below) detailed hereunder.

TABLE XIV- Corporate Governance Index

TABLE – CGI							
Agency	**1**	**2**	**3**	**4**	**5**	**6**	**7**
ICRA			Y	Y	Y	Y	Y
S & P	Y		Y			Y	Y
CRISIL		Y	Y	Y	Y		Y
IIAS	Y		Y			Y	Y
BSE			Y	Y	Y	Y	Y

1 = Accounts Quality
2 = Transparency
3 = Board Composition
4 = Audit Committee
5 = Executive Compensation
6 = Disclosure
7 = Shareholder Rights

Y indicates reported Parameters

Since the above scoring model is not sector specific, the important risk parameters applicable for the Cement industry like ESG performance, Climate change Risk and mitigation, mining restrictions and compliance etc. not being factorized in the Model, indicating the absence of a robust and holistic measurement mechanism.

DISCUSSION & CONCLUSION

The literature review and analysis reveal that risk management and corporate governance are deeply interlinked in ensuring long-term business sustainability. Findings suggest that while major Indian cement firms have formal governance structures aligned with regulatory norms (such as SEBI, Companies Act); Enterprise Risk Management (ERM) practices are often fragmented or reactive in nature. Further, risk practices are predominantly compliance-driven rather than being strategically embedded with decision making process. The COSO framework's application was found to be partial or inconsistent across firms, especially in areas such as operational and reputational risk management. A noticeable gap exists in integrating Operational Risk Management (ORM) with strategic governance decisions. For Indian cement companies, there is a strong need to institutionalize risk governance frameworks, moving beyond 'tick the box' compliance. Board structures, audit committees, and risk oversight roles must align closely with the firm's operational realities. The study underscores the need for risk-based decision-making, especially in areas like environmental risks, supply chain disruptions, and regulatory changes.

The Indian cement sector stands at a critical juncture where operational complexity, environmental accountability, and regulatory scrutiny are intensifying. This study reinforces that effective governance is not just about regulatory compliance, but about embedding a proactive and integrated approach to risk at all organizational levels. Strengthening risk governance practices will not only protect firm value but also support the sector's contribution to national infrastructure development and sustainability goals. However, risk and governance in the Indian cement industry, is largely underrepresented in global governance studies.

Review Results and Future Directions

The literature review starts by identifying the key risks prevalent in the sector, including operational challenges, market volatility, environmental issues, financial uncertainties, and regulatory complexities.

The review explored the risk management practices and assessed their effectiveness in addressing these risks. The study also scrutinized the governance structures in place, analysing the roles of boards, committees, and senior management in overseeing risk management processes.

A central focus of the investigation is the integration of risk management into the strategic decision-making process. By embedding risk management within the governance framework, companies can enhance their ability to anticipate and respond to risks proactively. This integration is seen as crucial for ensuring the long-term viability, enhancement of firm performance of the sector in the face of dynamic market conditions and regulatory challenges. In sum, while India's cement sector has made commendable strides in improving transparency and governance, however, systemic challenges remain. These include inconsistent enforcement, uneven regulatory capacity, and limited stakeholder engagement in smaller firms and /or owner driven entities.

The paper's endeaver is to review the status of Cement Sector Risk Management and Governance practices and benchmark the same for best practices with necessary indication to Regualators and practioners. Since it is evolving , the future researchers also get an opportunity to study implications through conducting longitudinal studies. Assessesing the applicability of global models like COSO ERM and OECD Governance Principles in a localized, developing-economy for such an important sector also an area cut out for future researchers.

Future research should also consider integrating industry-specific governance indicators (Corporate Governance Scoring Index for Cement Firms), such as environmental compliance governance, board-level sustainability engagement, which are particularly relevant to the cement sector's risk landscape

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