

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter presents an overview of the field of knowledge management and its relevance to the industry in the 21<sup>st</sup> century from the point of view of deriving competitive advantage. It presents discussion on knowledge, knowledge management, its relationship with competitiveness, components of knowledge management, progress and future research areas in the field of KM.

The next section provides a brief overview of the cement industry in India with a view to identify future challenges and opportunities; so as to identify relevance of knowledge management as a strategic tool for responding to emerging challenges. It highlights history of India's cement sector, trend of capacity and production, capacity of large, mid and small size companies, cement consumption forecast, per capita consumption comparison with developed and emerging economies, segment wise consumption, customer mix, cement price trend, five forces analysis and business strategies around which cement industry and the players would grow and develop to derive competitive advantage in the 21<sup>st</sup> century.

The subsequent section deals with need and relevance of knowledge management in cement sector with specific focus on marketing and sales function of cement industry. The concluding section presents the outline of the thesis with a brief description of each chapter.

### 1.2 What is Knowledge?

To understand and appreciate knowledge, literature suggests to understand the difference between data, information and knowledge. The data is raw numbers and facts, information is processed data, and knowledge is authenticated information (Alavi & Leidner, 2001; Dretske, 1981; Machlup, 1980; Vance, 1997). Rather knowledge is information possessed in the mind of individuals: it is personalized information (which

may or may not be new, unique, useful, or accurate) related facts, procedures, concepts, interpretations, ideas, observations, and judgments (Alavi & Leidner, 2001).

From the organizations perspective knowledge is a combination of two components - one that is the collective information and experiences possessed by each individual and second the data that is stored in formats such as – paper and digital. It is this knowledge that organizations need to utilize for deriving benefits and create a competitive edge against its competitors.

### **1.3 What is Knowledge Management (KM)?**

The sacred Vedic literature of India describes unique feature of knowledge in just three words *Nahi Jnanena Sadrusham*, it means knowledge is supreme and has no comparison (Mruthyunjaya, 2011). It is widely observed that the society we live in has been gradually turning into a “knowledge society” (Al, 1990; Bell, 1973; P Drucker, 1968; Nonaka, 1994). The knowledge society refers to formation of society developed on the knowledge acquired over the years (Mruthyunjaya, 2011). The foundation of industrialized economies has shifted from natural resources to intellectual assets, executives have been compelled to examine the knowledge underlying their businesses and how that knowledge is used (Hansen, Nohria, & Tierney, 1999). The view that knowledge is the source of corporate competitiveness is widely shared in our society, and companies are focusing their efforts on how to accumulate and utilize knowledge as an internal resource (Takahashi & Vandenbrink, 2004). That is why organizations need to look for more structured approaches to knowledge management, in a way to make their members aware about the importance of organizing resources in order to obtain the value of knowledge (Ferrari & Toledo, 2004).

Knowledge management is increasingly becoming an integral business function for many organizations as they realize that competitiveness hinges on effective management of intellectual resources (Grover & Davenport, 2001; Randeree, 2006).

KM is about interventions in the organizations’ knowledge base, which by definition includes individual and collective intellectual assets that help an organization to perform its tasks (Jafari, Akhavan, Nour, & Fesharaki, 2007; Probst, Romhardt, & Raub, 2000). Knowledge management is not a simple question of capturing, storing

and transferring information, rather it requires interpretation and organization of information from multiple perspectives (Bhatt, 2001).

Thus, it can be inferred that organizations have been realizing the criticality of knowledge as a resource compared to natural resources. Therefore, knowledge management is becoming an important focus area within organizations to manage both individual and collective knowledge to derive competitive advantage.

#### **1.4 Components of Knowledge Management**

The two important dimensions of knowledge management discussed in literature pertain to – **process** and **practice**. The process typically is the series of actions performed whereas practice is the expected framework and guideline for the identified outcome/s. These two dimensions need to be effectively used within organization so that they continuously renew the knowledge in order to achieve desired performance. The knowledge management processes have various kinds – knowledge acquisition, retention and exploitation (Beckett, Wainwright, & Bance, 2000), internal and external knowledge base (Danskin, Englis, Solomon, Goldsmith, & Davey, 2005), knowledge acquisition, conversion, application and protection (Gold, Malhotra, & Segars, 2001), knowledge acquisition, knowledge dissemination and responsiveness to knowledge (Darroch & McNaughton, 2003), creation and sharing of knowledge (Civi, 2000), and discovery of new knowledge, creation of new knowledge and sharing knowledge (Chuang, 2004). The knowledge management practices are typically classified into two parts – Human Resources (HR) and Information Technology (IT). These are rewards for knowledge sharing, treating it as a part of performance evaluation, Information and Communication Technology (ICT) infrastructure to share data and information, and support day to day work (Andreeva & Kianto, 2012), IT focus on quality, productivity and technological advancements and HR focuses on organization learning, knowledge management, product and process innovation (Gloet & Terziovski, 2004), use of collaborative technologies for rapid information access (Civi, 2000), task shaped knowledge of human resource and technical contribution to daily operations, abilities to retrieve and use knowledge (Chuang, 2004).

Thus, it can be inferred that knowledge managements process dimension is classified into four stages – acquire, share, use and apply and practice dimension of two types –

HR and IT. A combination of these two is used to derive competitive advantage by an organization.

### **1.5 Knowledge Management and Competitiveness**

The key benefits of KM identified are – improved decision making, increased responsiveness to customers, improved efficiency of people and operations, improved innovation, improved product/services (Chase, 1997). The market place is increasingly becoming more and more competitive and the rate of innovation is rising, so that knowledge must evolve and be assimilated at an ever faster rate (Civi, 2000). Knowledge embedded in the interactions of people, tools, and tasks provides a basis for competitive advantage in firms (Argote & Ingram, 2000). There is a clear link between the emerging body of knowledge referred to as knowledge management and that of innovation. The four areas of knowledge which lead to innovation, namely, are – *construction, embodiment, dissemination and use* (McAdam, 2000). Implementation of a KM strategy can be used as a means to generate a flow of strategic innovations, so giving a source of competitive advantage (Forcadell & Guadamillas, 2002). The link between knowledge-management orientation and superior financial performance suggests that firms with well developed knowledge management practices develop knowledge embedded products that better target the needs of consumers and are more difficult for competitors to imitate (Darroch & McNaughton, 2003).

The critical factors affecting competitiveness and organization's performance derived from KM that have been studied were - success, market share, rate of growth, profitability and innovativeness (Andreeva & Kianto, 2012; Lee & Choi, 2003), innovativeness, market position, mass customization and difficulty to duplicate (Byrd & Turner, 2001), differentiate products from low cost substitutes (Danskin et al., 2005), quality improvement and anticipate rivals development plan (Berawi, 2004), innovativeness, customization, create entry barriers for competitors that are difficult and expensive to duplicate (Chuang, 2004).

Thus, the key critical factors around which KM contributions for deriving competitive advantage are – market share, rate of growth, profitability, innovativeness and responsiveness to market demand.

## **1.6 Progress of Knowledge Management – Perspective**

The KM discipline is at the pre-science stage, but it has been progressing towards normal science and academic maturity (Serenko & Dumay, 2015). In fact, KM has emerged naturally due to the growing pressure on organizations to increase their effectiveness and efficiency because of economic, technological and societal changes (Grover & Davenport, 2001; Prusak, 2001; Serenko & Dumay, 2015; Wiig, 1997). In the second half of the twentieth century, industry professionals recognized KM value and developed first KM concepts, principles and frameworks. Subsequently, these practitioners documented their ideas in relatively short, yet ground-breaking, peer-reviewed journal articles that boosted academic KM research and subsequently became citation classics (Serenko & Dumay, 2015). The KM studies according to level of analysis has been over 74% combined at the organization, system and industry level; the balance includes various other levels namely – subject, users, country, Small and Medium Enterprises (SMEs), group/team, society, stakeholders (Dwivedi, Venkitachalam, M.Sharif, Al-Karaghoul, & Weerakkody, 2011).

The sectors covered as a part of KM research have been mixed such as – textile (Danskin et al., 2005), manufacturing and industrial services companies in Malaysia (Wong & Wong, 2011), firms from biotechnology and telecommunications from Spain (Marqués & Simón, 2006), automotive (Forcadell & Guadamillas, 2002), steel (Gupta & Govindarajan, 2000), biotechnology (Clarke & Turner, 2004), aeronautics and space (Sabherwal & Becerra-Fernandez, 2003), biotechnology and pharmaceutical (Salazar, Hackney, & Howells, 2003), manufacturing, insurance, health services, retail, utilities, diversified financial, banks, transportation (Byrd & Turner, 2001), Indian banks (Goswami, 2008), Indian manufacturing, IT and IT enabled services, power generation and distribution companies (Chawla & Joshi, 2010), pharmaceutical (Sharma & Goswami, 2009).

The researchers from North America and Europe in the field of knowledge management have contributed over 75% to the overall research output in this field (Dwivedi et al., 2011; Serenko & Dumay, 2015) whereas less than 15% from Asia-Pacific and even less than 1.5% from India (Dwivedi et al., 2011).

Thus, over the years greater reliance of KM is emerging across countries and continents. However, major work happened in the field of KM in developed countries across service and manufacturing industries.

## **1.7 Indian Cement Industry**

To understand the dynamics of Indian cement industry, historical perspective in two phases namely – full control till 1988 and complete decontrol from 1989 onwards need to be analyzed to understand their implications on emerging scenario in the industry.

### **1.7.1 History of Indian cement industry**

The Indian cement industry is over 100 years old and has contributed significantly to the growth and development of India. It had two distinct phases based on government control namely<sup>1</sup>:

- **Full control since 1914** – In this phase the cement industry witnessed shortfall in infrastructure support such as power, coal and railway wagons. There was control in respect of price and distribution of cement. This adversely affected the growth of industry and the industry witnessed black marketing of cement, adulteration, lack of supply of cement to projects, housing and small repairs. It was known as an era of permit raj. The production of cement during complete control phase increased from 2.2 MTPA in 1950 to 43 MTPA in 1990 i.e. an average growth rate of 7.7 per cent per annum spread over 40 years.
  
- **Complete decontrol in the year 1989** – In 1982 partial decontrol started with full decontrol in 1989. During this phase government started loosening its control over the cement industry. The major steps that evolved were – modernization of cement plants that involved conversion of wet and semi dry process kilns to energy efficient dry processes, setting up of captive power plants to overcome the problem of erratic supply of power and scrapping outdated kilns. These steps gave boost to cement

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<sup>1</sup> (<http://www.cmaindia.org/industry/history.html>, website accessed on March 3, 2018)

industry and it turned out to be a buyers' market from 1990 onwards. The production of cement increased from 43 MTPA in 1990 to 284 MTPA in 2016; resulting in an average growth of 7.5 percent during a phase of decontrol spread over 26 years. Although the average annual growth in the decontrol period is marginally less than the average annual growth during control period but it has been on far higher base of 43 MTPA in 1990.

The major events in cement industry in last two and a half decades (post decontrol) in India are - Increase in installed capacity, change in variety of cement produced, entry of MNC's, increase in Merger and Acquisition (M&A) activity, growth of Ready Mix Concrete and Pre-fab structures, increased focus of companies on value addition, customer service and use of alternate fuels in cement production.

## **1.7.2 Indian Cement Industry emerging scenario**

### ***1.7.2.1 Cement capacity, production and capacity utilization***

The Indian cement industry is quite large and in terms of installed capacity it is second compared to China. The growth rate over the last two decades has been phenomenal as is evident from capacity increase from 102.3 MTPA in 1996-97 to 464.6 MTPA in 2016-17, that is an increase in capacity by 362 MTPA in a period of two decades. However, the additional production during the previous corresponding period was just 197.1 MTPA (Table 1.1). It may be mentioned that the production in this industry gets almost fully absorbed in the market and thus can be construed as demand. It may be observed from the Table 1.1 that the capacity utilization hovered between 75% to 86% between 1997-98 and 2008-09 which had a sharp fall to 70.8% in 2009-10 and thereafter hovered between 60-65% between 2010-11 and 2015-16 and again had a major dip to 58% in 2016-17. This indicates excessive capacity creation vis-à-vis demand over years during last two decades. The reason that can be attributed to such a situation wherein capacity is way ahead of demand is that it takes around 3-4 years to commission a cement plant which happens to be usually ahead of demand creation. Therefore, companies invest in building cement capacities based on projected demand that is five years ahead of the actual consumption period. The surplus capacity is also a resultant of function of actual demand not realized as it is projected. Therefore, the gap

between the capacity and production seems much higher than it is in reality. The excessive capacity creation causes further pressure on prices which results in increasing the rivalry among cement players in the market.

**Table 1.1 Cement Capacity, Production and Capacity Utilization**

Year	Cement		
	Capacity (MTPA)	Production (MTPA)	Capacity Utilization
1996-97	102.3	73.3	71.6%
1997-98	107.9	82.9	76.8%
1998-99	115.5	87.6	75.9%
1999-00	116.6	100.2	86.0%
2000-01	127.9	99.2	77.6%
2001-02	140.9	106.5	75.6%
2002-03	146.1	111.8	76.5%
2003-04	152.4	117.0	76.8%
2004-05	158.1	125.3	79.3%
2005-06	166.2	140.5	84.5%
2006-07	172.7	154.7	89.6%
2007-08	204.3	167.6	82.0%
2008-09	226.5	181.4	80.1%
2009-10	283.2	200.7	70.8%
2010-11	325.3	209.7	64.5%
2011-12	341.5	223.2	65.4%
2012-13	371.4	240.6	64.8%
2013-14	388.9	249.9	64.3%
2014-15	410.8	261.3	63.6%
2015-16	450.3	273.9	60.8%
2016-17	464.6	270.4	58.2%

Source: Capacity from Cement Manufacturers Association Apr 2012 issue; Global Cement Review 11th edition and Cement production from Central Statistics Office, India

### ***1.7.2.2 Cement capacity share of large, mid and small size players***

There are a total of 83 cement groups across India including small regional players with a total installed capacity of 439.74 MTPA for the year 2014-15 (Appendix I). The 12 large size players having a capacity of more than 10 MTPA account for 60% of installed capacity (Table 1.2). The large size players consist of companies namely - UltraTech, ACC, Ambuja, Shree, Jaiprakash Associates, Ramco, India Cements, Chettinad, Dalmia, Century, Kesoram and Lafarge. Out of these 12, Ambuja and ACC are controlled by Holcim group which is a Swiss cement major based in Switzerland and another is Lafarge based in France. The remaining 71 companies that includes 14 mid size and 57 small size, account for 41% of the total installed capacity. The large size companies are national players with multiple plants spread across different states whereas mid and small size groups are regional players. The large size players focus on



creating value through focused efforts in developing their brand, being innovative at market place in terms of sales promotion, responsiveness to customer demands, invest in best supply chain and human resource practices thereby earning high margins to improve their profitability. Therefore, there is an intense competition among the large players. On the other hand, mid and small size players focus on cement sales only at the best price possible to cater to the local demand without much bothering about creating customer value. This forces the large players to continuously keep themselves updated about the market dynamics to develop their own strategies. The 12 large players have intense rivalry amongst each other to cater to the incremental demand across different geographic regions. On the other hand, the small size regional players create price disruptions in the market by basically cutting prices against the large companies. The mid size players take a in between path by creating value as well as competing on price front. These companies are likely to face challenge for their existence by the leading players and therefore are expected to create opportunities of M&A to the large companies.

**Table 1.2 Capacity - Share of Large, Mid and Small Size Players**

Players	Number of Groups	Capacity range	2014-15 Capacity(MTPA)	Share of capacity
Large Size	12	Greater than 10 MTPA	262.35	60%
Mid Size	14	Greater than 5 MTPA and less than 10 MTPA	85.81	20%
Small Size	57	Less than 5 MTPA	91.58	21%
Total	83		439.74	100%

Source: Capacity range developed using capacity of groups from Indian Minerals Year Book 2015 (Published in 2017)

### ***1.7.2.3 Forecast of cement consumption***

The cement consumption is forecasted based on 7.5% growth rate during the period of decontrol. The consumption based on the forecast is expected to touch a level of 518 MTPA in 2025-26 i.e. addition of 248 MTPA to the production level of 2016-17 (Table 1.3). As per the Crisil forecast the production of cement is expected to touch a level of 355 MTPA in the year 2021-22 (this is likely to touch a figure of 388 MTPA assuming an average growth of 7.5% per annum) and forecast as per AT Kearney and CII is 550-590 MTPA in 2025-26. Thus, demand projections indicate that the cement production is likely to be in the range between 518 MTPA to 590 MTPA in 2025-26. The forecast

of cement consumption indicates that the cement sector will be attractive in the next decade; providing a good opportunity to cement manufacturers.

**Table 1.3 Cement Consumption Forecast from 2017-18 to 2025-26**

2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
290.7	312.5	335.9	361.1	388.2	417.3	448.6	482.2	518.4

#### ***1.7.2.4 Per capita cement consumption (PCC) in Kg***

The per capita consumption of cement is accepted as an important indicator of the country's economic growth<sup>2</sup>. The per capita consumption of cement in India has increased by 2.45 times from 83 Kg in 1997-98 to 204 in 2016-17 (Table 1.3). Still PCC of India is lower compared to PCC level in 2012 of emerging and developed economies (Kearney, 2014):

- Emerging economies – Indonesia (225 Kg), Brazil (346 Kg), China (1555 Kg)
- Developed economies – Italy (402 Kg) and United States (250 Kg)

The per capita consumption of cement in India is just around 12.2 per cent of China and 54.9 per cent of Brazil; indicating a future scope of growth for cement industry in India. This indicates that there is enormous scope of increase in cement consumption in all types of construction namely – residential, commercial and industrial. With the improved technology and change in customer expectation, industry would witness new expertise and approaches both in the manufacturing and marketing of cement.

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<sup>2</sup> Indian Minerals Year Book 2015 (Published in 2017)

**Table 1.3 Per Capita Cement Consumption from 1997-98 to 2016-17**

Year	Cement Production (MTPA)	India's Population (Million)	Per Capita Cement Consumption (Kg)
1997-98	82.9	997.4	83
1998-99	87.6	1016.0	86
1999-00	100.2	1034.5	97
2000-01	99.2	1053.1	94
2001-02	106.5	1071.5	99
2002-03	111.8	1089.8	103
2003-04	117.0	1108.0	106
2004-05	125.3	1126.1	111
2005-06	140.5	1144.1	123
2006-07	154.7	1162.0	133
2007-08	167.6	1179.7	142
2008-09	181.4	1197.1	152
2009-10	200.7	1214.3	165
2010-11	209.7	1231.0	170
2011-12	223.2	1247.2	179
2012-13	240.6	1263.1	190
2013-14	249.9	1278.6	195
2014-15	261.3	1293.9	202
2015-16	273.9	1309.1	209
2016-17	270.4	1324.2	204

Source: Cement production from Central Statistics Office, India and India's population from world bank

#### **1.7.2.5 Share of cement demand from segments**

The cement demand would continue to be from three segments – housing, infrastructure and industrial/commercial. It may be observed from (Table 1.4) that the share of cement demand is likely to shift in favor of infrastructure sector, as against housing. The share of demand from housing is likely to reduce from 63% in 2012 to 42-45% in 2025 that is a fall in the share between 18-21% which would mainly shift in favor of infrastructure sector, demand from industrial/commercial sector is likely to marginally increase by 1% from 16% in 2012 to 17% in 2025. (Table 1.4).

**Table 1.4 Share of Cement Demand from Three Segments**

Segment	Year			
	2012	2016	2020e	2025e
Housing	63%	60-65%	50-51%	42-45%
Infrastructure	21%	15-20%	32-34%	37-41%
Industrial / Commercial	16%	15-20%	16-17%	17%

Source: For 2012, 2020e & 2025e Cement Vision 2025: Scaling New Heights, AT Kearney CII report 2014 and for 2016-17 Crisil cement sector report, September 17

The cement demand in absolute terms for each segment would increase in each of the segment from the level in 2012 to the level in 2015, in MTPA. The highest increase would be witnessed in infrastructure segment:

- Housing from 151.6 to 233.3 up by 81.7
- Infrastructure from 50.5 to 197.0 up by 146.5
- Industrial / commercial from 38.5 to 88.1 up by 49.6

The rationale<sup>3</sup> for increase in each segment is mentioned below:

Housing:

- Government of India's housing for all initiative is expected to bring US\$ 1.3 trillion investments in the housing sector by 2025
- The number of Indians living in urban areas will increase from 434 million in 2015 to about 600 million by 2031

Infrastructure:

- In the Union Budget 2018-19, the Government of India has given a massive push to the infrastructure sector by allocating Rs.5.97 lakh crore (US\$ 92.22 billion) for the sector
- The infrastructure sector in India witnessed 33 deals in FY2016-17 involving US\$ 3.49 billion as against US\$ 2.98 billion raised across 31 deals in FY2015-16, with the majority of deals led by power, roads and renewable sectors
- In Union Budget 2018-19, Rs. 71,000 crores (US\$ 10.97 billion) was allocated for national highways while Rs. 19,000 crores (US\$ 2.94 billion) was allocated to Pradhan Mantri Gram Sadak Yojana for development of roads in rural and backward areas of the country
- India's energy sector is expected to offer investment opportunities worth US\$ 300 billion over the next 10 years

Industrial / commercial:

- India's population below 30 years of age having exposure to global retail are expected to drive demand for organized retail
- Total 213 malls are operational in India and 34 new malls are expected to become operational in top 8 cities by 2020

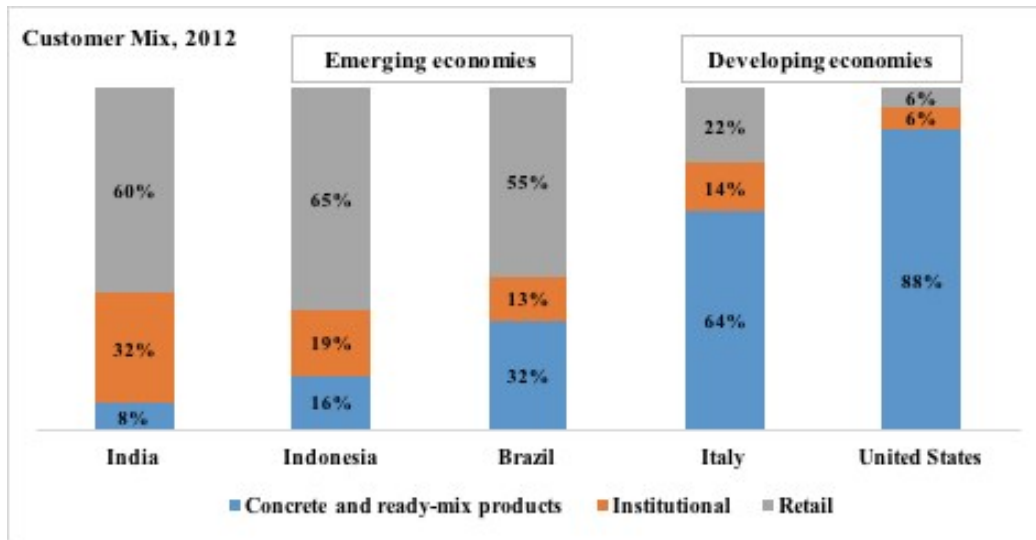
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<sup>3</sup> Report published in February 2018 by Indian Brand Equity Foundation (IBEF) a trust established by the Department of Commerce, Ministry of Commerce and Industry, Government of India

- Government initiatives to promote tourism in Tier 2 and Tier 3 cities is generating significant demand for hotels in such cities, especially for budget hotels
- Medical tourism sector in India is gaining momentum, with a target of attracting 8 million medical tourists into the country by 2020
- The market size of real estate in India is expected to increase at a CAGR of 15.2% during FY2008-FY2028E and is estimated to be worth US\$ 853 billion by 2028
- Rapid growth in services sectors: IT (Information Technology) / ITeS (Information Technology enabled Services), BFSI (Banking Financial Services and Insurance) and Telecom

#### ***1.7.2.6 Customer Mix***

There are three types of buyers for cement - retail, institutional and converters, that is the producers of RMC and concrete products. The retail buyers are the largest that account for 60% of total cement purchased which is sold through intermediaries such as – traders, wholesalers and retailers. The institutional buyers consist of builders and contractors engaged in real estate construction, and commercial projects such as shopping malls, industrial projects etc. This segment accounts for 32% of total cement demand. The last and the growing segment is buyers from RMC and producers of concrete products that accounts for 8% of cement demand. Both institutional and RMC segment buyers prefer to purchase cement directly from the cement manufacturers; whereas, the cement sales through retail channel would continue to dominate the buyer segment that is consistent with emerging economies (Fig 1.1).



Source: Fredonia Group, British Cement Association; A.T. Kearney analysis

**Fig 1.1 Customer Mix – Retail, Institutional, Concrete and Ready-Mix Products**

The retail segment provides high margins compared to the other two segments – institutional and convertors. The retail customer needs advice on the choice of cement either from contractor or mason or a satisfied home builder. The customer of this segment who is financially weak rely upon retailers’ recommendation to make a brand choice. On the other hand, the key success factors for sales to other two segments depends on namely – reputation for quality and delivery, seek support from companies to reduce the cost of construction, look for timely inputs on technical, supply chain and commercial matters. As the retail segment is served by the large network of dealers and retailers, it results in continuous initiatives and challenges for this segment to keep coming out with strategies for sales promotion, advertising, discounts offered, response time etc. This would require continuous efforts to update knowledge about this segment.

#### **1.7.2.7 Cement Prices**

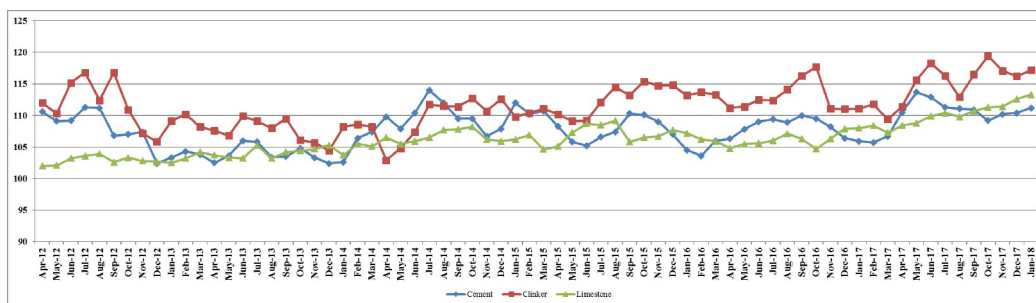
The cement price in India is driven largely by the demand and supply situation of a geographical location and follows a seasonal variation. The regional companies located near the market have logistics advantage which gives them greater flexibility to set prices and in turn derive competitive advantage; as against national players, who compete on creating value for the customer through sales promotion, discounts and response with speed to the customer demand. The price trend month wise for the cement

as well as two key inputs namely limestone and clinker for the period Apr'12 to Jan'18 is given in (Appendix II) and also shown in (Fig 1.2). Some of the key observations which emanates from the data are as under:

- The limestone is an input raw material its prices have continuously increased between Apr'12 and Jan'18 with minor fluctuations month to month. The price index ranged between 100 – 105 from Apr'12 to Mar'14; 105 – 110 between from Apr'14 and Sep'17 and finally crossed level of 110 mark after Oct'17. Thus input prices have steadily increased between Apr'12 and Jan'18.
- The price index of clinker which is the intermediate product fluctuates similar to the price index of cement and has been most of the times above the price index level of cement. The price index of clinker for 47 months in last 70 months has been in the range of 110 – 115. In general, there has been a marginally greater rise in the price of a clinker as against price of cement.
- The cement price index witnesses frequent fluctuations within each year in a block of 6 years from Apr'12 to Jan'18. Also, the escalation in price index has not been consistent during this period. The significant shift in the range is observed in period Apr'16 to Mar'17 to period Apr'17 to Jan'18, that is range shift from 105-110 to 110-115 (Table 1.5). It may be observed from the data given in Table 1.5 that cement prices has started escalating from 2016 onwards with lesser fluctuations.

**Table 1.5 Monthly Price Fluctuations of Cement Prices – 2012-13 to 2017-18 (Jan)**

Range		Number of months vis-a-vis price range					
From	To	Apr'12 to Mar'13	Apr'13 to Mar'14	Apr'14 to Mar'15	Apr'15 to Mar'16	Apr'16 to Mar'17	Apr'17 to Jan'18
100	105	4	8	0	2	0	0
105	110	5	4	6	8	12	1
110	115	3	0	6	2	0	9
	Total	12	12	12	12	12	10



**Fig 1.2 Price Index Trend of Limestone, Clinker and Cement**

The above analysis reveals that cement prices are continuously under pressure and the increase is not commensurate with the increase in price of inputs and intermediate material.

A further analysis of the price index for the similar period (Appendix II), suggests that coefficient of variation within the year for price index of lime stone is in the range of 0.7% to 1.4%, for intermediate product clinker is between 2.0% and 3.2%, and for the final product that is cement is between 1.2% and 3.0%. It is observed that the difference between variation in price index of cement has been 1.8% that is maximum compared that of limestone and clinker (Table 1.6).

**Table 1.6 Coefficient of Variation in Price Index of Limestone, Clinker and Cement**

Year	Limestone	Clinker	Cement
2012-13	0.7%	3.2%	3.0%
2013-14	0.8%	1.5%	1.6%
2014-15	1.0%	2.8%	1.8%
2015-16	1.2%	1.9%	2.0%
2016-17	1.2%	2.1%	1.4%
2017-18 (10 months)	1.4%	2.0%	1.2%

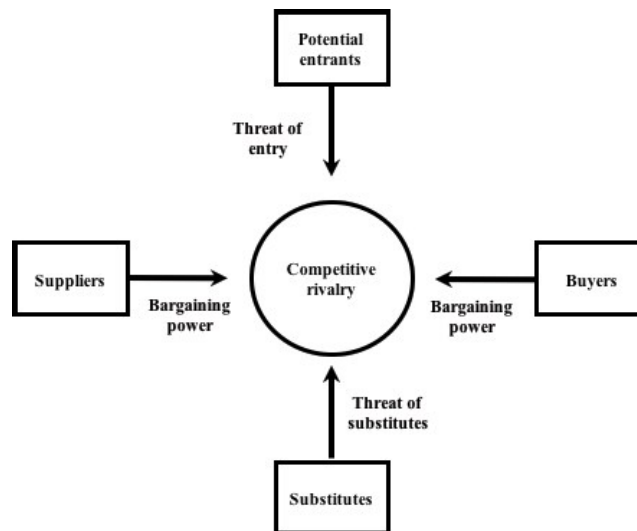
The coefficient of variation in price index for lime stone and clinker is responsible for fluctuation in production cost whereas variation in price index for final product cement affects the revenue of the companies. These three variations on cost and revenue side put together do not move up and down in linear fashion, that causes pressure to improve the net revenue, especially under fluctuations of prices and by controlling the cost. It may be mentioned that major capacity escalations in a cement industry had taken place during the last one decade by installation of modern plants. It takes sometimes to stabilize production under the new set up to derive cost advantage. As such companies



had to continuously develop intelligence systems to know the product wise, competitor wise cement prices in the market to decide about their pricing strategy. This knowledge of the cement prices and associated discount and sales promotion policies on a continuous basis helps companies to develop their pricing strategies and implement them timely.

#### 1.7.2.8 The five forces framework for Indian cement industry

This framework helps identify the sources of competition in an industry or sector. The five key elements of this framework (Fig 1.3) namely are – threat of entry of new player in the sector, bargaining power of supplier to the sector, bargaining power of buyer from the sector, threat of substitutes to the sector and competitive rivalry among organizations producing similar products and services (Johnson, Scholes, & Whittington, 2008).



Source: IBEF (Indian Brand Equity Foundation) February 2018

**Fig 1.3 Five Forces Analysis India's Cement Sector**

**Competitive rivalry** – High due to oligopolistic nature of the Indian cement market that is characterized by tacit collusion, where large players control major supply

**Threat of New entrants** - High entry barrier due to huge capital investments required present substantial barriers to entry & achieving economies of scale for large players

**Threat of Substitutes** - Low threat from substitutes although there are partial substitutes such as asphalt, glass, steel, wood, etc; practically cement has no direct substitutes

**Bargaining power of suppliers** - Moderate to high as cement players have to depend on the railways for carriage outward & local coal companies for fuel, although diversification of freight options & fuel sources is diminishing the suppliers' power

**Bargaining power of buyers** – High mainly because of demand supply gap and large number of fragmented players.

The above five forces analysis suggests that the industry is undergoing major competitive rivalry, although has attractive opportunities to grow. In the backdrop of emerging competitive rivalry amongst the major players in the cement industry; some of the key challenges to compete that are emerging would revolve around the following: While large players control supplies to bring in price discipline however recent norms of Competition Commission of India forces cement companies to compete on others parameters mentioned below:

#### ***1.7.2.9 Challenges for Indian Cement Industry***

The cement industry challenges faced by Indian cement industry in the emerging competitive scenario can be classified under two broad categories namely marketing related challenges and manufacturing related challenges. The details of the same are discussed below:

- Marketing challenges
  - Market share: The industry is facing an intense rivalry amongst the leading players and some of the mid size players who have also been aspiring for entering into the arena of major players, which keeps posing a great threat to the existing players for retaining and increasing their market share.
  - Cement price: There is a variation in cement prices across periods, geography and product categories. To track the price movements on daily basis is an enormous task but this is imperative to take informed decisions about price change that finally needs to be communicated swiftly across levels in the marketing hierarchy for implementation in the market.

- Shift in business interest of cement dealers: There are number of dealers associated with cement companies for the past more than 2-3 decades having multiple expectations from the companies. The next generation of these dealers happens to be educated and having technical and management degrees, have much more knowledge about other profitable business opportunities which poses a threat to retain the existing dealer network for the companies. To ensure that the business interest of such dealers in cement business remains intact it is important for companies to keep coming out with attractive business policies related to discounts, sales promotion and credit terms.
- Human resource: The marketing professionals available in the market are inclined to take-up jobs in service, FMCG, banking, consulting etc. This creates a shortage of availability of professionals for cement marketing. The marketing manpower available with the cement companies require continuously HR interventions that supports people with training, reward and recognition.
- IT and Data analytics: The major challenge is to continuously update the IT infrastructure and apply data analytics techniques to arrive at informed decisions for improving overall competitiveness.
- Inter-regional movement of cement: The cement plants are located near clusters of limestone deposits. The consumption centers which are the function of population, industrial development and income availability are quite far away from clusters of limestone deposit. This poses challenge to the mobility of cement from plant to actual consumption center, leading to complex logistics problem. That requires high end software solutions to plan the logistics movement and manpower to manage the execution.
- Demand supply: The oversupply situation puts constant pressure on marketing and sales team to register a year on year growth for increasing the market share amidst fluctuating prices, which have not consistently increased along with increase in the input cost as also carrying and insurance cost. The large players would significantly invest in customer service to command price premium compared to mid size and small size players. This

high supply situation would also be responsible for increase in cost in terms of carrying and insurance cost.

- Logistics management: Logistics management plays a very critical role in meeting the expectations of the customer which involve mainly two sides of the coin that is timely availability of outsourced raw materials and ensuring timely delivery of consignments at the door step of dealer/customer. This requires transportation planning and management related to rails, roads and coastal transport.
  - Railways: The long distance transport of cement is a must because the cement production units are located near the mines whereas distribution centers are near the market. The major challenges in using this mode are – less availability of rakes, improper infrastructure at rail yards and loss of time in loading and unloading of cement. This affects the delayed supply of cement to the customer.
  - Road transportation: The organized players in this market are less therefore high customer service level expectations are not fulfilled. The road transportation cost has increased due to manual loading, high turnaround time and increasing diesel prices which pose great challenge to the cement manufacturers.
  - Coastal transport: India has a very large coastal belt and less than 2% cement is transported through this route. To improve cement dispatch through coastal route requires up-gradation in port facilities, for which manufacturers have to mainly lobby their efforts with government or may have to invest in creating facilities for coastal transportation which would work out to be beneficial from cost benefit point of view.
- Manufacturing function
- Coal availability: Coal is a critical input used in production of cement and also to generate captive power for running the cement plant. There had been inadequate supply of coal due to non-preference status to cement sector as compared to priority given to sectors such as power, steel and fertilizers. This has forced cement companies to import coal that puts cost pressure.

- Captive power plant (CPP): The power requirement of more than 60% of the cement plants is fulfilled through grid power. While these CPPs help in insulating against the erratic and unreliable power supply, they are less process efficient compared to grid power that leads to increase in cost. Since cement plants have invested substantially in CPPs they now refrain from making capital investment in other energy such as renewable sources.
- Gypsum availability: The gypsum is one of the key inputs in cement production which companies are forced to import because of lack of gypsum availability in India and thus adds to the uncertainty of timely availability and also results in increased cost of production.
- Long lead time to commission a cement plant: Shortage of labor to construct a cement plant and delay in obtaining clearances from government for land and environment results in long lead time to commission a cement plant.
- Technical Manpower: The cement plants in India are mostly at a distance from cities. The availability of technical manpower for plant operations is difficult as engineering diploma holders and graduates do not enjoy plant life and prefer a city location. Thus, attracting right talent poses challenge to cement manufacturers.

#### ***1.7.2.10 Opportunities for Indian Cement Industry***

The Indian cement industry has immense potential and is attractive even though it faces multiple challenges presented in the previous section. The demand for cement would come from three segments – housing, infrastructure and industrial/commercial while the share of housing would decline in coming years. Still there would be substantial volume growth. The customer expectations of the three segments would be different that provides opportunities to cement companies to draw in best practices and processes from other sectors such as paints, pharma, large scale construction projects etc. While this provides cement sector growth opportunities in terms of volumes it also provides opportunities to design innovative sales solutions and work towards meeting increasing customer expectations.

### ***1.7.2.11 Need for KM in Indian cement industry***

The critical resource apart from land, labor, natural resources and machines to have an edge over competitors in the 21<sup>st</sup> century business environment would be knowledge, knowledge management and strategic thrust with knowledge management inputs. It has been established through empirical and non-empirical studies that there is positive impact of knowledge management on the performance of an organization. Therefore, management of knowledge as a subject is gaining popularity within organizations across sectors and conscious efforts are being made to institutionalize it.

For the Indian cement sector, it is critical to embrace application of concepts of knowledge management in this sector. The Indian cement industry has evolved post decontrol of cement from government in terms of change in technology to produce cement, production of variety of cement, emerging prominence of consumption segments, related customer mix, surplus demand supply situation, entry of foreign players, expectations of customers and pressure on prices. To manage these changes has posed a distinct strategic need that would require greater thrust on knowledge management.

On the production front the type of technology used by most of the plants has shifted from wet to dry. The large cement manufacturers that have plants at multi-locations have become imperative to share the best practices on cement manufacturing for continuously improving the plant efficiencies which would require distinct thrust on knowledge and knowledge management practices. Within the marketing & sales function, the approach of cement companies towards customer post-decontrol has changed from being mere dispatch centric to more of customer centric. This has largely changed due to change in expectation of the customer such as - timely delivery of cement, competitive price, discount and sales promotion schemes, commercial terms coupled with the overall business environment. To meet such expectation of customers it is important for marketing and sales professionals of the cement companies to constantly obtain customer and market knowledge share and develop marketing strategies along with superiors, peers and subordinates, and finally apply it back in the market to be ahead of the competition in terms of market share, growth, innovation, customer response and finally the profitability.

In the above backdrop of emerging relevance of KM to derive competitiveness and the lack of studies with overall perspective in this regard, especially in context to developing countries, an attempt has been made in this section to understand the emerging opportunities and challenges in the cement industry in India. The purpose was to come out with competitive scenario in cement industry and how KM inputs from process and practice point of view can help in deriving competitiveness.

### **1.8 Outline of Chapters**

#### Chapter 1 Introduction

This chapter draws a comprehensive sketch of the study undertaken with three broad sections namely; knowledge, knowledge management, its impact on the organization, and rationale for applicability of knowledge management specifically in the marketing and sales domain of the cement company for deriving competitive advantage.

#### Chapter 2 Literature review

A detailed review of literature pertaining to knowledge, knowledge management, knowledge management and its impact on organization was carried out and presented in this chapter to identify the research gaps to develop scope for the study with specific research questions and the objectives.

#### Chapter 3 Proposed model and hypotheses

This chapter presents the proposed knowledge management model from marketing and sales perspectives for driving competitive advantage in cement industry. The insights for the proposed model have been developed based on porters' value chain model with specific reference to cement industry. This chapter also presents the research questions for the study, objectives of the study and the related hypothesis framed for testing.

#### Chapter 4 Research design and Methodology

This chapter discusses the rationale for selection of research design, survey method and research unit. The chapter presents the process to develop the questionnaire for each of the construct based on literature review. This chapter also discusses the tools and techniques used for data analysis and their relevance and ends with the discussion on the approach to administer the questionnaire.

## Chapter 5 Data analysis

This chapter presents the profile of the respondents and the results of statistical analysis performed on the data collected in this study – importance index, normality assessment of data by obtaining values of Skewness and kurtosis a pre-requisite to be conducted before steps of SEM are initiated. These analyses were carried out using AMOS software. This was followed by exploratory factor analysis using principal component analysis on seven constructs to extract components and finally confirmatory factor analysis to develop measurement and structural model. The statistical computing package named as SPSS is used for this analysis.

## Chapter 6 Conclusion

The final chapter presents the findings of the study along with the managerial implications for cement industry pertaining to marketing and sales. This highlights hypothesis that were supported or rejected based on data analysis. The chapter concludes with the limitations of the study and the future scope for research.

### **1.9 Conclusion**

This chapter lays the foundation of all the chapters of this study through a comprehensive sketch of the study being undertaken. The chapter initially covers topic related to knowledge and their importance in deriving competitive advantage, followed by history, challenges, opportunities, and need and relevance of knowledge management in Indian cement industry.

The next chapter presents the literature review pertaining to knowledge, knowledge management, components of knowledge management and linkage of knowledge management with organizational performance, with a view to identify specific research gaps for posing research questions for the study.





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