Embracing Risk as a Core Competence: The Case of CEMEX[1]

Donald R. Lessard and Rafel Lucea

MIT Sloan School and George Washington University

[1] The research for this paper was conducted in the summer of 2005. First complete version February 2006. Revised May 2008.

I. Introduction and Overview.

"[L]a concepción del riesgo como un aspecto fundamental de la empresa la hemos venido manejando desde hace un buen tiempo."
Hector Medina, EVP Finance & Planning, CEMEX

"[T]he concept of risk as a fundamental aspect of our company is something we have been managing for a long time."
Hector Medina, EVP Finance & Planning, CEMEX

Even more remarkable than its emergence as a global leader in the cement industry from its humble origins in northern Mexico in 1906 is how CEMEX achieved this transformation. Viewed through the lens of risk, CEMEX's trajectory appears as a confluence of formal processes, metrics, and tools orchestrated to deliver a breakthrough in operational excellence and a masterful exercise in managing strategically in the face of uncertainty.

From a risk management perspective, two themes run through the CEMEX story. First, having "grown up" in one of the world's tougher market and institutional environments in the world, CEMEX developed the ability to thrive in markets where more powerful competitors dared not go. Embracing rather than avoiding specific kinds of risks has become a trademark of CEMEX, a valued core competence. For example, the company has developed a set of capabilities and processes that has transformed the risks of demand volatility it faces in emerging markets into a source of competitive advantage. The second pervasive theme is managing risk not as something independent of, but *as*, the day-to-day business of the company. Risk management is so embedded in the company's cultural and organizational fabric that it is barely noticeable as a distinct management function at either the strategic or tactical level.

Strategically, CEMEX integrates market and demand risks in its overall planning for capacity and sourcing. Operationally, it mitigates these risks by actively trading cement across markets. CEMEX matches or beats global industry standards in managing the physical hazards inherent in cement and concrete production and distribution, despite its considerable exposure in emerging markets in which safety practices are perceived to be less rigorous. Its emphasis on achieving operational efficiency by systematically applying management practices and metrics and on promoting company-wide visibility through intelligence and information systems is central to the CEMEX Way.

The greatest strategic risk CEMEX has faced and successfully managed to date is the threat to its economic viability and independence posed by the opening of the Mexican economy and the globalization of the cement industry. It responded to this threat by aggressively pursuing greater global scale while simultaneously narrowing its product focus to cement and concrete. Because growth was achieved largely through acquisition at a pace well beyond what internal cash flows could support, the need for substantial external financing exposed CEMEX to new risks that demanded the development of new capabilities.

The ability to conduct business in tough institutional environments and the capacity to integrate risk considerations into its strategic and operational decision making processes have paid handsome dividends to CEMEX, helping it to navigate the consolidation of its national market in the 1960s and 1970s, survive Latin America's "lost decade" of the 1980s, ride the first wave of sectoral internationalization in the late 1990s, and become one of largest building materials companies in the world at the beginning of the 21st century. Now CEMEX must marshal its capabilities to meet a new set of challenges that face the cement industry, and CEMEX as an increasingly visible player within the industry, as it enters the next millennium. Among these are the increasing concern on the part of citizens and governments with the potential impact of cement production and use on the environment and human health, the emergence of more stringent global standards for transparency and business practices, , and the emergence of new technologies that could potentially alter the economics of the cement business.

With CEMEX's move into the first ranks of the global building products industry with the acquisitions of RMC, this is an ideal vantage point to review and reflect upon the company's emergence from a challenging competitive landscape as a truly global firm with operations in both mature and developing economies. Analyzing its past successes will help inform the company if the capabilities that have served CEMEX so well in the past are likely to continue to be a source of competitive advantage for at least another hundred years.

In this article, we take a comprehensive view of risk management. We consider not only the management of property, casualty, and liability risks and hedging of financial risks, usually defined as avoidance of loss, but also the full range of proactive and reactive interventions invoked to *create and preserve value* in face of volatile demand, exchange rates, and factor costs. We also emphasize the context specificity of managing risk. To maintain an effective presence in four main regions and 50 countries, CEMEX must be able to respond to simultaneously to the often conflicting demands imposed concurrently by the competitive, institutional, and operational contexts in which it conducts business.

Risk management is a useful lens through which to view a firm's management more generally. Being an exceedingly complex activity—ranging from the strategic to the operational and from the general to the specific, and as likely to be centralized as to be distributed across geographies and organizational levels and, quite often, to operate from both extremes concurrently—risk management provides a potent focus for inquiring into organizational practices and performance and a basis for making meaningful comparisons across firms.

In the following section we examine how CEMEX manages risk at operational and strategic levels. We then review the organizational infrastructure (culture, responsibilities, and processes) that supports risk management and explore its relationship to "The CEMEX Way." In the concluding section, we offer some observations about the "fit" of its strategies and capabilities with CEMEX's new role as a leader in a truly global industry.

II. Risk Management at CEMEX: Operational Excellence and Strategic Integration.

Operational Excellence

When we expressed interest in reviewing CEMEX's risk management practices, we were immediately directed to risk management director Rene Martinez who, with justifiable pride, acquainted us with CEMEX's system for managing property and casualty risks. This multi-step process involves the following: tracking and offering advice on risk at the plant or business unit level, allocating sufficient "first loss"[2] to assure the unit's focus on risk management, pooling the remaining risk through a captive insurance subsidiary, and reinsuring the excess in international markets to calibrate prices and manage potential losses that might otherwise strain CEMEX's capacity to respond. In our judgment and by all indications this system is world-class.

We were shown how CEMEX's application of this rigorous approach quickly reduced property and casualty losses in newly acquired units by standardizing the way operational risks were treated across the organization. CEMEX identified three elements to be crucial to successfully integrating new firms:

1) A formal process, mapped out in engineering detail,
2) Clear assignment of responsibilities,
3) Measurement of outcomes.

These elements are the core of The CEMEX Way as it applies to risk management.

The transformation of newly acquired firms' operational practices, management processes, and cultural principles is illustrated in the integration of RMC into CEMEX (see Box 1). Research in the field of international business suggests that to compete effectively at the global level firms need to develop the ability to transfer knowledge across borders. The experience of CEMEX, however, suggests that the traditional view that knowledge or best practices are transferred from the developed countries in which they are presumed to be most likely to originate to less sophisticated markets does not always hold.

Integrating RMC: The Elements of Risk Management

The March 2005 acquisition of RMC was unquestionably the single greatest integration challenge faced by CEMEX in its 100 years of existence. Beyond the sheer size of the operation—$7.9B in revenue generated by 26,000 employees operating 51 cement factories, mills and terminals, over 400 quarries, and close to1,500 ready-mix plants distributed across more than 20 countries— there was the matter of differing management philosophies -- whereas RMC's operations were managed in a decentralized manner, CEMEX is the poster child of standardization CEMEX approached this enormously complex task with a focus on (1) value capture, (2) time pressure, and (3) systematic

[2] CEMEX's business units pay directly the first 10% of any property or casualty loss, as well as all insurance premiums.

opportunity identification, prioritization, and execution. The table details the main phases, associated objectives, and nature of desired changes.

Phases	**Objective**	**Nature of Desired Change**	**Implications for Risk Management**
1. Pre-acquisition analysis 2. Take control of new operations 3. Identify sources of synergy 4. Redefine organizational structure 5. Implement rationalization initiatives	Rapid capture of value resulting from operational synergies	Structural	Adoption of general best practices, principles Emphasis on operational risks
Processes and Systems	Standardization of operational and managerial processes; information flows throughout the firm	Behavioral	Generation of risk management support systems Operational/strategic risks
Culture	Full commitment to The CEMEX Way	Cognitive-emotional	Promote an integrated, proactive risk management mindset

Early in the first phase of the integration process it became evident that opportunities for initial value capture where highly concentrated, both geographically and functionally. Integrating RMC's operations in the United States, United Kingdom, France, and Germany became the highest priority and rationalizing materials operations, optimizing cement plants and procurement, and consolidating staff functions became the main areas of attention.

Chief among initiatives deemed to have considerable public relevance was the turnaround of the Rugby cement plant in the United Kingdom. The largest of its kind in the country, this plant had a long history of conflict and underperformance. During 2004, the plant had operated at barely 70% of capacity, and materials, energy, and maintenance costs were much higher than for similar plants operated by CEMEX. Two months after the acquisition the control systems had been streamlined to the point that instead of 3000 potentially-plant stopping alarms there were only a handful –and plant utilization shot up to 94%. As part of the PMI turnaround program, an energy efficiency and cost-savings plan based on burning of tire chips as an alternative fuel was implemented. Plant personnel levels were also reduced as part of the efficiency program. But the turnaround came neither easily nor cheaply. Besides the impact of the loss of jobs on the community, the announced reduction in the number of plant alarms and planned burning of tire chips generated strong community reactions. A number of encounters with community leaders and citizen groups led CEMEX to release detailed information about the nature of proposed process changes and to invest in a state-of-the-art filter system that would further minimize the emissions of particles over and above what was required by the planning process.

During the first phase of RMC's integration, CEMEX identified US$360M in recurrent savings, 70% to be realized in Europe, 25% in the United States, and the balance elsewhere. Remarkably, these savings were to be realized within three years of the date of acquisition, with US$40M being saved within the first three months.

Though crucial, the first phase of the integration process was the tip of the iceberg with respect to standardizing the treatment of operational risks. After capturing the value generated by synergies induced by the first phase of integration, CEMEX is presently diffusing its standard management systems and processes throughout the new operations, via experts deployed to provide training to former RMC country, plant, and technical personnel. This second phase of integration will see the adoption of CEMEX's reporting and accountability practices. These are intended to make volumes, prices, and production levels system-wide visible to management and the use of the highly disciplined Capex model, which responds to the principle, pervasive within CEMEX, that internal competition significantly improves the way capital is employed.

The example of RMC attests to CEMEX's extraordinary ability to integrate and turn around acquired firms. This ability is all the more remarkable given that it takes place largely through common processes rather than the replacement of managers of the acquired firms. From the perspective of risk management, the swiftness of the process helps to ensure that risk-related information and practices are spread evenly across the organization and are aligned with the objectives of the firm.

Even as they extol the benefits that are derived from standardizing risk management practices at the operational level, CEMEX managers are aware that there are limits to the application of this principle. As CEMEX increases its geographic footprint, the variety of institutional, legal, and cultural environments that it must navigate limits the extent to which it can standardize the treatment of risks that stem from operations across countries. Whereas operations related risk, particularly those associated with physical injury or death dominates in the U.S., product liability concerns are deemed of much greater concern in Europe.

In sum, CEMEX has developed a sophisticated and efficient system for managing property and casualty risks that arise from its operations. This system was designed at and is monitored from the company's headquarters in Mexico and has been implemented across its 77 plants worldwide. Its effectiveness lies fundamentally in a set of meticulously designed processes, tools, and metrics that make the system highly transferable across geographies. It is also important to realize, however, that as Cemex expands the complexity of its operations grows exponentially, challenging the "one size fits all" principle that it has sponsored in the last few decades. Whether this model will continue to work as CEMEX consolidates its leadership in the construction materials industry is explored in the concluding section of this chapter.

Strategic Integration

It was clear from our initial interviews that CEMEX has an excellent handle on operational risk management. But speaking with others in the firm including its EVP of Finance & Planning, the CFO, and head of trading revealed that risk management was deeply embedded in the company's strategic processes as well. Strategic risk management can be defined in at least four complementary ways:

> 1) As addressing (identifying, assessing, responding to, monitoring) risks of sufficient importance to have firm-wide (strategic) impact,
> 2) In terms of strategic responses to these risks (e.g., choices about market entry, selection of business model, and so forth),
> 3) As extending beyond mitigating specific risks to maximizing the economic value and viability of the firm doing business in the face of risk,
> 4) In terms of its integration into a firm's overall strategic management.

Strategic risk management differs from the typical operational definition of risk management in that its objective at the most basic level is to secure the firm's viability and maximize its economic value rather than simply to limit or reduce its risk. A strong operational focus on risk management can be an important strategic capability. This is certainly the case with CEMEX, which faces a variety of risks that, because they cut across the business have the potential to affect value but are amenable to strategic response. Before examining CEMEX's specific strategic responses to such corporate risks, we review the entire spectrum of risks—from "inside" risks largely under the control of management to "outside" risks that are out of their control—and consider potential responses to each (see Figure 1).

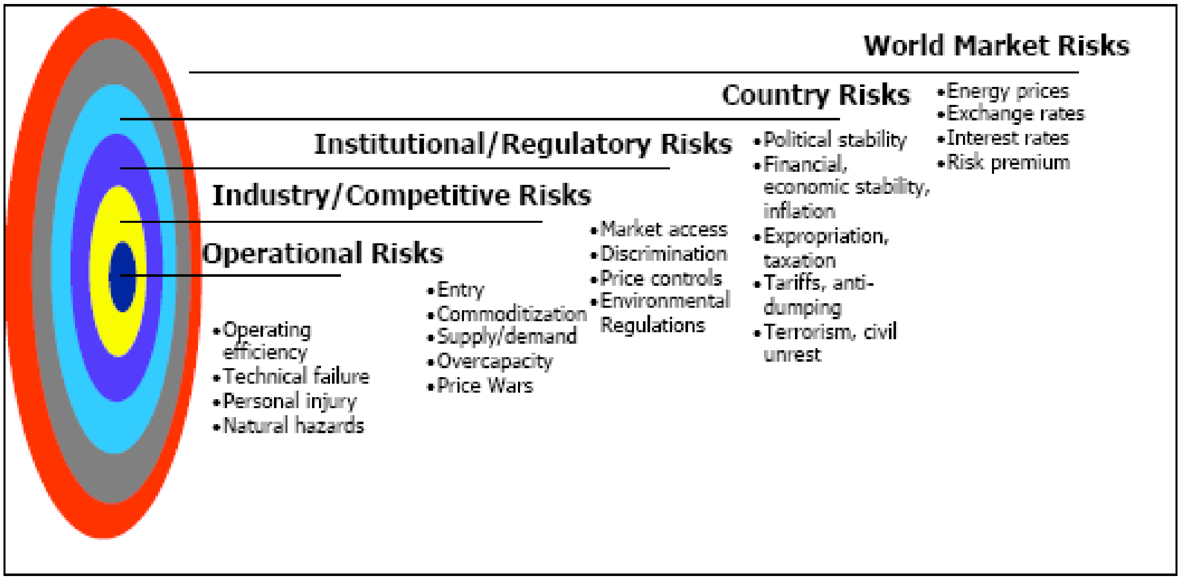

Figure 1: Layers of Risk

We consider elements of three of these layers for CEMEX: industry and competitive risks, including commoditization and demand risks; institutional and regulatory risks, including market access, price control, and environmental regulation risks; and world market risks, including exchange rate and energy price risks. We also explore how these aggregate into overall enterprise risk. This treatment is intended to be illustrative rather than exhaustive.

Industry/Competitive Risks. The core risk incurred by the cement business is the necessary and irreversible commitment of fixed assets (cement plants, terminals, and distribution facilities) with significant fixed operating costs and specific capital in the face of uncertain demand. This risk is exacerbated by the commoditization (or near commoditization) of its products and services, which make prices fall to marginal cost levels during periods of oversupply (so-called ruinous competition). In the long run, these risks play out in the entry and expansion decisions of firms seeking to dominate particular markets through investments in production scale and scope. In the short run, attempts to dominate through preemptive investments in capacity increase the likelihood of a mismatch between supply and demand, resulting in excess productive capacity and forced price reductions.

Such risk exposure is a fact of life for any firm that produces durables with relatively inflexible (lumpy) capacity. CEMEX's main product, cement, and its focus on emerging markets made this risk particularly salient to CEMEX during its adolescence as a global firm. CEMEX is clearly aware of this risk and pays careful attention to improving the quality of its estimates of cement supply and demand in the various markets it serves. In addition, CEMEX also tries to limit the commoditization of its products through branding and using innovative distribution models.

In sum, CEMEX manages demand risk not only by strategically adjusting its product mix and carefully selecting where to locate its plants, but also by operating in multiple countries and by brokering market unbalances through logistics and trading. This multi-pronged strategy is only open to firms with global scope and sophisticated operational capabilities.[6]

Diversification across markets reduces the overall volatility of sales and revenues to well below the average volatility within each national market. In fact, CEMEX calculated in 2004 that if it had had today's geographic distribution of sales ten years ago, it would not have experienced a single quarter of negative growth! Figure 2 depicts the degree of risk reduction that CEMEX has achieved through geographic diversification using GDP data for the countries in which it operates. In fact, the benefits to CEMEX have been even greater, as cement demand is highly sensitive to fluctuations in GDP, often moving by a multiple of 2 to 3 times the percentage GDP change.

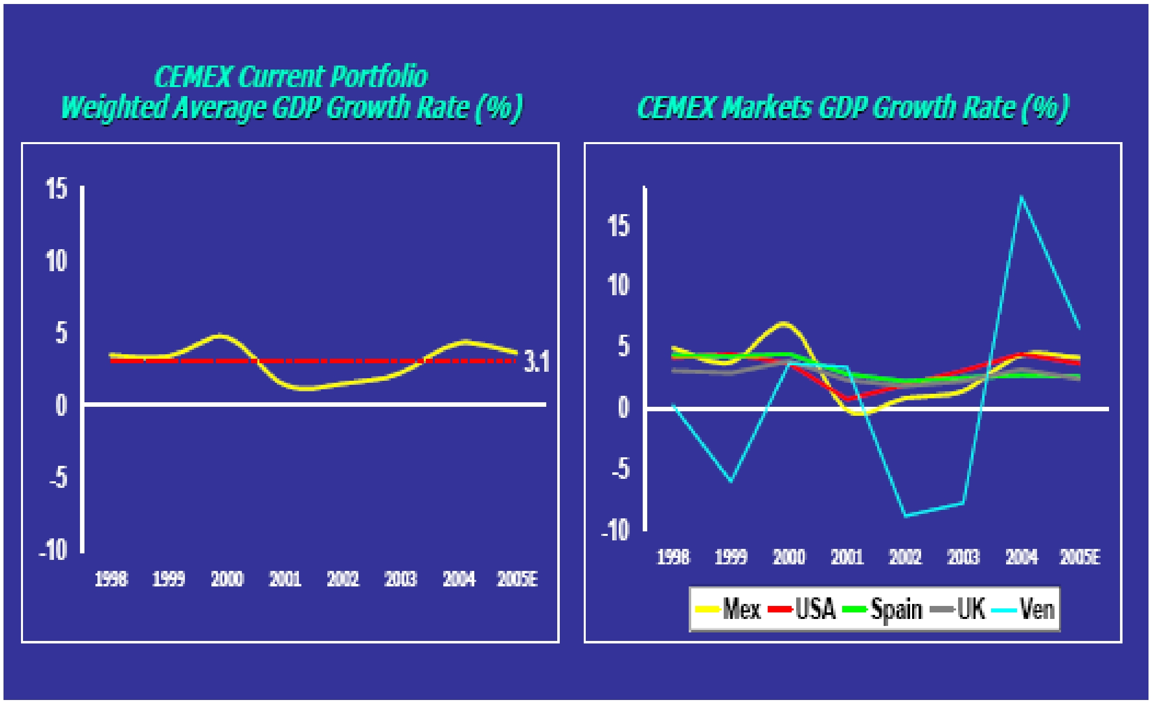

Figure 2. CEMEX's weighted average GDP growth vs. GDP growth in Individual Countries

CFO Rodrigo Trevino explains the links between growth, diversification and competitive behavior: "What's driving the geographic diversification in our business is to be able to achieve high growth, to achieve it in a way that is more stable over time"

CEMEX *pools capacity* through international trading both to reduce risk and to add value. Jorge Guajardo, head of trading, observed that trading and logistics "play a key role in the corporate risk agenda because you have a mechanism for dealing with shifts in demand around the world and for balancing them in a way that is probably much more effective than the portfolio." While diversifying sales across countries can reduce overall variation in cash flows, revenues, and profits, substantial variation in capacity utilization might still be experienced on a market-bymarket basis, resulting in either excess capacity (and capital investments) or lost sales (if capacity is exceeded). The constraint of matching supply and demand within markets is relaxed for products that can be moved across markets, enabling producers to reduce both within and *overall* variability in cash flows, increase average capacity utilization or, equivalently, reduce the total investment required to support a given sales level.

The ability to exploit strategically its standing as third largest producer of cement, one of the largest traders of cement and operators of terminals and fleet vessels is deeply rooted in CEMEX's operational excellence. Trading decisions, for example, are made regionally as close to markets as possible, but shipping decisions are cleared and aggregated globally through CEMEX's IT system. This clever combination of localization and global integration enables the company to respond quickly and coherently.

Institutional Risks. Among the most important of the institutional risks CEMEX faces are the uncertainty of environmental regulations and the application of rules and limits on market access and pricing within and across countries. These risks emanate from three different but related spheres—markets, governments, and society—the interaction of which can affect not only firm performance but also chances of survival. Because changes in rules (or their application) can be exogenous to a firm's actions, a response to a firm's actions, or something in between, institutional risks tend to lie at the mid point between "inside" and "outside" as depicted in Figure 1. Examples of each of type of institutional risk are provided in Table 1.

	Response to focal firm activities	Exogenous to firm activities
Competitive	Competitive responses from other cement companies	Disruptive technical change
Regulatory	Anti-dumping actions	Cross country regulatory bodies–WTO, EU, NAFTA–might have broader regulatory agendas that directly affect the cement industry or specific companies
Social values Mainly health and environment	Corporate citizenship issues: example, Rugby "in plume-community" protest of tire burning at cement plant [7]	Changes in social values, e.g., increasing sensitivity to health and environmental issues in developed countries

[3] http://www.rugbyinplume.org/RIP/

Table 1: Examples of Sources of Institutional Uncertainty for CEMEX

CEMEX copes with these risks by trying to anticipate changes in regulations or social attitudes, acting in compliance with regulations, and responding to social views regarding acceptable behavior. In some cases, this also includes actively participating in shaping the public's expectations of industry.

During CEMEX's early years of international expansion, when it was seen as the newcomer or perhaps even the intruder, the company found itself on the losing side of a number of decisions in the regulatory arena. It has mitigated risk in this domain through centralized control of shipping and thoroughgoing internal legal oversight of operations both within and across borders. Although the acquisition of RMC affords CEMEX a much stronger insider position in Western Europe and the United States, how this status will influence the dynamics of institutional risk is a consideration we take up in the concluding section of this chapter.

While strict attention to casualty risks mitigates one important dimension of environmental and regulatory risk, CEMEX is still at risk from reactions to environmental damage that might be caused by its operations and tighter regulation of emissions and other environmental impacts. While plant technology and siting are often determined before acquisition by CEMEX, the firm does impose a common, global environmental standard and has, on occasion, closed plants that cannot be upgraded to comply at a reasonable cost. Perhaps more importantly, strict attention to operations on a variety of dimensions minimizes variation from the environmental standards implicit in the design of plant and equipment. Beyond this, CEMEX has dealt with institutional risk through its membership in the Portland Cement Producers Association.

World Market Risks. A key world market risk that CEMEX faces is the cost of energy, which fluctuates enormously over time. It mitigates the impact of this risk in three ways. First, through continuous innovation at the process level, CEMEX has converted to a variety of locally attractive alternatives to internationally traded oil, including Pet-coke and tire chips. This conversion has not only reduced energy costs on average, but it has also effectively decoupled them from international energy prices, thereby substantially reducing the volatility of energy costs over time. CEMEX also actively contracts for and hedges energy prices over the medium run, further reducing volatility. The net effect of the two actions is shown in Figure 3,

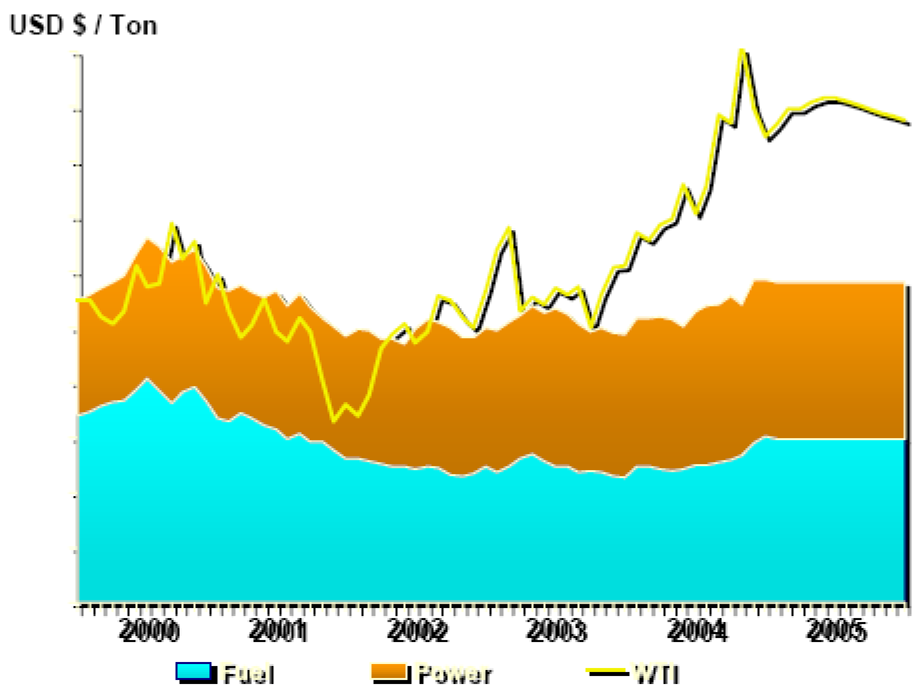

Figure 3: Evolution of CEMEX Energy Costs versus International Energy Prices[4]

compares the price of oil in the international markets –West Texas Intermediate- with the fuel and power costs experienced by CEMEX between 1999 and 2005. Over this period CEMEX has clearly outperformed international energy markets, with a lower rate of increase in costs and much lower variability.

CEMEX also appears to face substantial currency risk, as it operates in many countries with different currencies but accesses capital in only one or two currencies. However, the company has determined that this risk is limited and that up until the acquisition of RMC, at least, borrowing in U.S. dollars is a reasonable match to its overall free cash flows.

[4] Source: Cemex Strategic Planning Corporate Presentation, November 2005

There are several reasons for this. First, although cement has relatively high energy content and energy costs usually are internationally determined, the extensive use of Pet Coke and other non-tradable sources tend to limit this exposure and the remaining impact to a considerable extent be passed through to customers. The remainder of costs and revenues are largely matched in local currency terms, so that cash flows measured in U.S. dollars thus move much less than one to one with local real exchange rates. This, together with CEMEX's substantial diversification across countries, results in an overall dollar free cash flow that is substantially immune to exchange rate fluctuations. No hedging of exchange rate movements, therefore, is required beyond the matching of financing costs through dollar borrowing.

The incorporation of RMC, with its Pound Sterling and Euro cash flows will alter the currency basket of CEMEX's operations, but this can easily be offset by adjusting the overall currency mix of borrowing.

Summary: None of the actions we have described are aimed only at reducing risk; all address risk as part of the overall business puzzle. It is in this sense that CEMEX can be said to truly manage risk strategically.

III. Organizational Features of Risk Management and "The CEMEX Way."

Having illuminated the basic elements of strategic risk management (SRM) and their application to CEMEX, we turn to the organizational implications of The CEMEX Way as manifested in the company's approach to SRM. In other words, having elaborated in the previous section what SRM involves, we now consider the timing and manner of its execution.

In 2001, CEMEX institutionalized the set of principles and practices that enabled the phenomenal growth it has experienced in recent years. These precepts are known as The CEMEX Way, which involves five guidelines: efficiently manage the global knowledge base; identify and disseminate best practices; standardize business processes; implement key information and Internet-based technologies; and foster innovation. Adherence to these precepts was expected to reduce the company's cost base significantly, render integration of new acquisitions more efficient, foster a stronger common culture that facilitates innovation and implementation of new technologies, and facilitate the transfer of managers globally. Further, and perhaps most important, the application of these principles allows CEMEX to integrate acquisitions and bring their operations to a global standard without massive replacement of local management.[5]

Academic and practitioner studies of the individual elements of The CEMEX Way have yielded considerable insight into the contribution each makes to the firm's competitive advantage. Seeking a more holistic perspective, we view The CEMEX Way through the

[5] See, for example, "The Cemex Way: The Right Balance between Local Business Flexibility and Global Standardization," (IMD case study) for a discussion of the contrast with earlier periods when takeovers were accompanied by large-scale management changes

lens of risk management and discover how its elements complement one another to deliver an aggregate advantage that far exceeds the sum of the advantages yielded by the individual elements.

We identified three overarching contributions of The CEMEX Way to the management of corporate risks.

1. It fosters a culture that treats uncertainty as an inherent element of business.
2. It clearly delineates responsibilities with respect to risk management and their distribution across organization levels, functional departments, and geographic regions.
3. It establishes and deploys an array of processes and informational tools that align risk management initiatives throughout the organization and across different dimensions of risk.

A Culture that Treats Uncertainty as an Inherent Element of Business. Two elements of its culture set CEMEX apart with respect to how risk is treated. The first is that risk is generally not addressed explicitly as such, but rather tightly integrated into the way the company is organized and decisions are made. The other is that risk is viewed by CEMEX not just as a threat, but also as an opportunity to grow and create value.

What one finds at CEMEX is a pervasive sensitivity to the inherent uncertainty associated with commercial endeavors. This is most visible in the “risk agendas” that are defined and monitored by executives at all levels of the firm. Acknowledging uncertainty to be a fact of life seems to have the effect of improving decision making at the company level rather than simply optimizing operations at the sub-system level.

Integrating risk management in its strategic choices and taking into account the dimensions of risk help CEMEX create value as well as preserve its viability. At the operational level, worker and public safety are front-line management responsibilities on which CEMEX ensures managers deliver by disseminating best practices, providing central office support, and measuring staff explicitly on risk related criteria. Making the dissemination of best practice and rotation of talent an integral part of its culture has enabled CEMEX to thrive in the face of seemingly insurmountable threats.

The importance accorded the treatment of uncertainty and careful analysis of the implications of every line of action is implicit in CEMEX’s emphasis on a common, firm-wide approach to operational practices. Strategic decisions related, for example, to international expansion require the deepest level of engagement by all departments ranging from planning to finance, and legal.

CEMEX’s broader conceptualization of risk as an opportunity as much as a threat is in large part responsible for a long history of turning challenging circumstances into sources of competitive advantage. Among the elements of The CEMEX Way that have contributed to this capability is the emphasis on global knowledge management and diffusion of information throughout the firm Even before it expanded internationally, CEMEX had established an intelligence system and assigned a senior officer to closely follow each of Mexico's states. On the basis of the information obtained by this officer regarding economic, social, and political developments, states were colored green, yellow, or red. As Hector Medina explained: "If colored green, that's good; if yellow I must understand what is happening, and it's something I can ask; but if it's red, as soon as I see it I must engage fully to solve the problem."11

That many instances of CEMEX turning risk to advantage predate the formal definition of The CEMEX Way underscores the fact that it was the institutionalization of long held beliefs rather than a sharp departure in business philosophy. For example, CEMEX recognized that risks can pose opportunities as well as threats in the events that triggered the company's international expansion in the early 1990s. Instead of retrenching in its home market and diversifying into other sectors as the Mexican economy opened up over the 80's and early 90's,[6] CEMEX maintained its focus on cement and expanded internationally into the markets of its principal competitors. Buying cement plants in Spain afforded CEMEX access to the financial markets as a Spanish firm, which, in turn, enabled it to further expand internationally. This strategy also decreased CEMEX's dependence on its home market and allowed it to compete with the European multinational firms that were trying to enter the Mexican market in their own national markets.

The determination with which it pledged its commitment to be responsive to the environment and its primary stakeholders, employees, and communities is another instance of CEMEX perceiving opportunity in an uncertain environment. Recognizing that cement production is an energy intensive activity increasingly likely to draw the attention of regulators and environmental activists, CEMEX preemptively adapted most of its plants to utilize alternative energy sources, such as Pet-coke, a by-product of refining. In addition to reducing CEMEX's energy bill, this move has also made CEMEX less of a target for this attention.

However, it has also found that with it increased presence in Europe and the United States, it has had to address environmental concerns and other aspects of corporate social responsibility in a more structured way than it had previously.

Clear Distribution of Responsibilities. For risk to be properly managed the problem being addressed must be clearly bounded in scope and the organization must have access to relevant information and be able to effect change. These crucial prerequisites were acknowledged in the formulation of The CEMEX Way.

[6] The Mexican economy started to open in late 80's with a marked increase with is accession to GATT in 1986. Its entry into NAFTA in 1994 was another major step.

The multiple dimensions of risk were explored in the previous section, which also considered characteristics of the risk sources such as whether it is imposed by externalities or inherent in the way the firm is run and whether it is associated with firm strategy or with specific operations. By cross-tabulating these dimensions and sources of risk, we can begin to tease out the information and levers needed to manage each type of risk and where in the organization these elements are most properly combined (see Table 2).

	Internal Dimensions of Risk	External Dimensions of Risk
Strategic (company-wide)	. Set broad direction of the Firm	. Macro institutional conditions . Global competition (strategic chess)
Operational (functional/local)	. Day-to-day firm operations	. Local institutional conditions . Local competitive landscape

Table 2: Taxonomy of Risks and Responses

Strategy formulation and implementation is perhaps one of the most illustrative risk-related activities internal to the firm and pervasive with respect to its implications. Those charged with such responsibility must have access to highly aggregated information on firm operations and contextual conditions in all markets in which the firm operates. The natural locus for executing this task and addressing associated risks is the top of the organization. By "the top of the organization," we do not mean the exclusive purview of the CEO but rather the collective formed by higher ranking managers in all functional departments and geographic regions. At CEMEX this collective, termed "*Executive Committee*," includes the CEO, EVPs, and Regional Presidents.

These individuals are not artificially segregated into planners, strategists or implementers, but jointly set the strategic direction and monitor progress towards defined objectives. Risks that are pervasive in their effects on, but originate outside of, the firm are classified above as external, strategic risks. Although these are risks over which any given company has little or no control, their nature and salience can be monitored for the purpose of influencing their impact and evolution. During periods of institutional transformation, it can contribute to the new rules that govern the activities of these organizations. Management of this type of risk tends to be more distributed across functions, levels, and regions. CEMEX's Executive Committee, for example, is directly involved in the monitoring of industrial policies in various global or regional forums, but it relies on the legal department to track and manage compliance with present and future legal regimes on issues ranging from corporate taxation to anti-competitive practices and to the trading department to deal day-to-day with global demand risk.

Responsibility for dealing with risk associated with the daily operation of plants, docks and logistics resides at lower levels of the organization. This does not imply that the risks are low impact, but rather that they are best managed at this level in the company. It might be the case, for example, that the effects of selecting a less than ideal site for a new plant are in the long term less deleterious than polluting a drinking water source for a medium-sized U.S. city which might occur from the improper management of a cement plant. Managing the latter risk is primarily the responsibility of plant managers, while the plant siting decision is the responsibility of the Executive Committee. Articulation of The CEMEX Way has greatly facilitated the management of internal operational risks, the standardization of processes, the diffusion of best practices, and the emphasis on sharing knowledge globally by clearly establishing the locus for dealing with different levels of risk. The same is true of CEMEX's success in addressing energy price risk –it was due to the flexibility each CEMEX's plant manager has in employing the most cost effective energy source in each country at any given point in time coupled with company-wide sharing of best practice.

Risks that originate outside the firm but are contained within a fairly limited geographic, competitive, or institutional domain include regulatory changes within a specific country, price wars with specific competitors for particular projects, and community objections such as the location of a cement plant or the amount of heavy vehicle traffic generated by such a plant. At CEMEX, addressing such risks is the responsibility of country managers who are presumed to have better knowledge of local conditions and thus be better positioned to forestall potential threats and identify and exploit opportunities that might be teased out of specific risks.

Formal Processes and Organization-wide Alignment of Risk Management Initiatives. The CEMEX Way defines formal processes and systems to support the coordination of work among CEMEX's thousands of employees worldwide. As noted in the previous section, risk management relies in part on relevant information being captured and made available to those most appropriately positioned to interpret and react to it. It is equally crucial that the myriad risk management initiatives being developed and implemented at any given time be coordinated. CEMEX has developed a number of mechanisms that facilitate the requisite information gathering and initiative alignment. These mechanisms, which effectively constitute a central nervous system for the company, variously take the form of information systems, managerial processes, and elements of organizational structure.

Although it utilizes geography and functions as organizing principles, at the time of the RMC acquisition CEMEX was in no way a matrix organization in which managers have multiple reporting responsibilities. While the additional complexity resulting from this acquisition is leading to further organizational change, it is still correct to state that CEMEX is primarily structured along geographic lines, but it has a strong emphasis on functional coordination within each of its four regions. This organizational structure is complemented by knowledge sharing processes, central to The CEMEX Way, that promote coherence among the various initiatives undertaken to manage risk associated both with both its long-term objectives and day-to-day operations.

Cement trading perhaps best exemplifies how CEMEX manages structure and processes to achieve responsiveness and coherence. Unlike key competitors, CEMEX manages trading regionally in order to exploit local information and to speed decision making. Coherence is assured by requiring that shipping be booked centrally, which has the effect of making trades visible and enabling intervention when local decisions are suboptimal when, for example, they ignore opportunities that cut across regions or have undesirable effects on markets outside of the region.

CEMEX has demonstrated a remarkable ability to devise mechanisms that foster, through coordination and incentives, coherent behavior across geographies, uncertainty, and sources of risk. CEMEX also has sought to more closely align managers' interests with the company's goal of maximizing long term value creation by replacing its stock option program with a restricted stock program.

Managerial processes and practices implemented to preserve alignment among the different facets of the company include periodic meetings of *the Executive Committee* at which the overall state of affairs of the company and its industry is reviewed in scrupulous detail. Accorded quasi-sacred relevance by CEMEX top management, these monthly meetings provide rapid feedback on proposed changes to the organization and are a forum for soliciting additional information needed to assess particular situations. CEO Lorenzo Zambrano's telephone calls from the meeting room seeking clarification from plant and country managers are legendary.

Last but certainly not least is CEMEX's second to none information system; it is probably the single most important device CEMEX uses to capture, process, and disseminate relevant information throughout the organization. Given that many studies link this sophisticated element of The CEMEX Way to the firm's success, we emphasize here its complementarity with the other alignment mechanisms the company employs.

Putting the Pieces Together: Risk Management, Culture, Organization and Systems

We have emphasized that at CEMEX consideration of risk is integrated into the firm's daily management and addressed as second nature. But for some types of risk, there is a strong overlay of formal processes to ensure compliance with company-wide standards. To put CEMEX's risk management practices in context, we map out four approaches along these two dimensions (see Table 3).

Formality / Integration	Informal	Formal
Differentiated	**I: Unaware, unfocused**	**II. Compliant**
Integrated	**III. Organic**	**IV: Mindful, strategic**

Table 3: Integration and Formality in Risk Management

Firms that fall in the upper left quadrant (I) by and large either are unaware of risk or are unfocused in their treatment of it.. Firms that occupy the upper right quadrant (II) exhibit little integration of risk into their decision making but do establish formal mechanisms for addressing risk-related concerns. This “compliant” approach, which has become more prevalent in the wake of Sarbanes-Oxley, is wasteful in that resources are diverted to assessing and documenting sources of risk but insights gained therefrom do not inform subsequent decision making. Firms that reside in the lower left quadrant (III) have typically developed organizational processes and tools that implicitly take risk into account but with little formalization of the concept or of associated processes. Quite frequently, managers in these firms will not even admit to “doing risk management,” maintaining that what they are engaged in “is everyday work.” The lower right quadrant (IV) is home to firms that are exceedingly mindful of the way they deal with the risks associated with their operations. These firms explicitly define the way they think about and measure risk and integrate it into their planning and implementation processes.

Overall, our judgment is that CEMEX’s approach to risk lies somewhere between quadrants III and IV as depicted in Figure 4. Like many firms, it addresses different types of risk in different ways. CEMEX’s formal centralized processes for managing property and liability risks, which it makes a central concern of frontline managers through charge backs and first-loss provisions, position it squarely in the lower right quadrant (IV). Its treatment of market risks, on the other hand, which are considered explicitly in strategic planning and mitigated through diversification and trading but with monitoring and control carried out in a significantly less formal way, straddles the lower quadrants (III and IV). With respect to institutional risks, which are dealt with centrally and implicitly but do not seem to be incorporated into local decision-making and are certainly not managed in a formal way, CEMEX finds itself in the upper left quadrant (I).

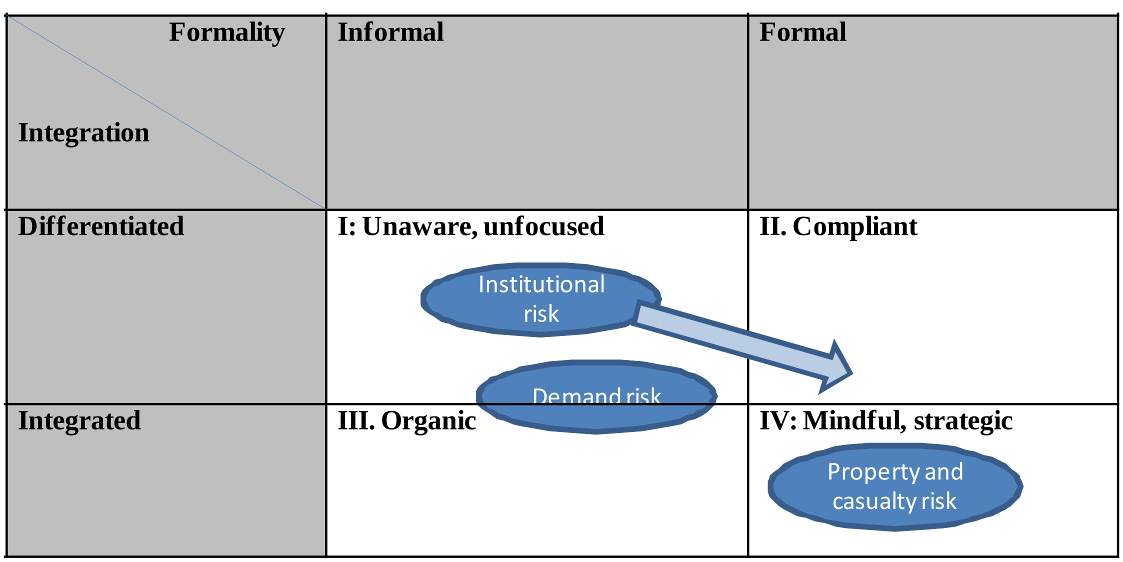

Figure 4. Integration and Formality in Risk Management at CEMEX

Examining the organizational mechanisms by which CEMEX manages the risk associated with its activities reveals the company's culture to encourage managers not only to consider that every decision involves some level of uncertainty, but also to look constantly for instances of risk that might mask opportunities. Having determined that access to relevant information and the ability to mount an effective response are crucial to risk management and given that neither is uniformly distributed across an organization, it must be concluded that different types of risk are best dealt with at different levels. Managerial processes and systems have also been shown to be indispensable tools for managing risk. In helping to shape the organizational culture, define boundaries of responsibility, and standardize managerial processes and systems, The CEMEX Way has contributed fundamentally to CEMEX's successful management of risk. This after- the fact analysis is undertaken not so much to identify specific factors to which to attribute CEMEX's enviable growth and profitability, but rather to afford a vantage point from which to reflect on whether its present approach to risk management will support CEMEX's consolidation of its position in the twenty-first century.

IV: Looking Forward.

To say that the world in which CEMEX was incorporated has changed dramatically would be an understatement. The competitive, institutional, social, and technological forces that impinge on the company today would have not been imaginable just a few decades ago, let alone in 1906 when the company first began. Taking the perspective of strategic risk management, we consider below just how radically different today's world is from that into which CEMEX was born, and reflect on the challenges to its continued growth.

As they grow in size and economic relevance, firms set in motion a number of forces that threaten their stability and their survival. Organizational complexity grows exponentially with numbers of employees, products, and markets and geographic reach. Such rapid growth can render obsolete organizational structure, culture, processes, and tools, all of which exhibit a high degree of resistance to change. The imaginative organizational structure and carefully developed suite of processes and tools that have enabled century-old CEMEX to transform itself from a small local business into a global firm that employs in excess of 50,000 people in more than 50 countries have proven remarkably robust, but there are signs that the model might be reaching its limits.

The power that affords large organizations opportunities to influence, not just follow or even break the "rules of the game", is an advantage only to firms that are aware of their relative importance in a given context and that consciously cultivate the capacity to exert that power appropriately. Exploited inappropriately or without regard for deeply rooted institutional values and norms, such opportunities can beget adverse effects that can put a firm under tremendous strain. CEMEX has, by many accounts, been a rule breaker in the cement industry. But as it solidifies its leadership in the industry, CEMEX is quickly becoming a rule maker in spite of itself. In countries in which it has a dominant position, for example, competitors need to take CEMEX's commercial policies as the primary benchmark for their own operations. Owing to the importance of these products as basic inputs to the construction industry, one of the basic growth engines in all countries, CEMEX's relevance vis-à-vis national governments and international markets is noticeably elevated. Wielded wisely, this power can be a source of formidable competitive advantage, but it also puts the company under a spotlight that will showcase any abuse of its privileged position.

Finally, there is today a fundamental tension that besets all global companies: the need to be simultaneously highly integrated at the strategic and operational levels and extremely responsive to the local cultures, norms, and needs of the countries in which they operate. Whereas efficiency continues to drive profitability in this industry, the main risk factors associated with operations vary markedly with geography. For example, the design of work practices and commercial policies respond in the United States to an overriding preoccupation with avoiding personal damage and in the EU to environmental and product liability concerns. Delivering locally products and services produced at a level of global efficiency will undoubtedly be one of the challenges CEMEX faces in the coming decades.

How will CEMEX's highly integrated, informal, distributed risk management system respond to these challenges? Will today's mechanisms serve it well in the future? Or would a more formal approach to risk management improve CEMEX's odds of maintaining its competitive position?

Although we cannot answer these questions, we have identified specific conditions under which the type of formal, integrated risk management approaches CEMEX has devised do make a difference. Namely, this occurs when:

- the level of uncertainty is high;
- a strategic rather than reactive response is possible;
- the level of experience in a given institutional setting supports the identification of "risky" situations.

Further, a final comment from Hector Medina shows that CEMEX understands that this is the case: "the factors that affect the performance of our business, our markets, and our competitors are much more complex, and it is precisely because of this that we must be systematic in our observation, and this for me is the risk agenda, everyday, at all levels of the firm."

In our judgment, CEMEX is better positioned than at any other time in its 100-year existence to extract value from the approach that it has conceived.