

UNLEASHING THE KNOWLEDGE FORCE

*Harnessing Knowledge for
Building Global Companies*

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Ganesh Natarajan
Uma Ganesh



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*To
the wonderful head of our family,
Parvathy,
whose hundred years plus of
knowledge acquisition and dissemination
have not quenched her search for new frontiers*

Preface

THE SUBJECT OF Knowledge Management has been under scrutiny and research for quite sometime now. Today KM is seen as an important capability in an organization's arsenal to win competitive battles in an increasingly difficult business environment. However, it has been one of the least scientific management approaches of the last decade with a noticeable absence of proper methodologies for assessment, application or implementation in organizations, with the result that it has not really made its presence felt as a serious management practice until recently.

While the importance of capturing and exploiting knowledge has been recognized, KM has been largely an unsystematic approach in many organizations, driven more by individual initiatives and in some cases by available tools rather than any systematic method of assessing knowledge needs and knowledge integration with other customer-centric initiatives like CRM and internal organization-wide learning processes. One of the key goals of achieving better business competencies can also be the objective of organizations seeking to develop maturity in their KM processes. Organizations that can consistently develop and act on new knowledge share a common set of key management practices.

What is missing is a systematic approach to recognize the role of the knowledge force and plan the progress towards KMM by focusing on key factors that can help in making the progress better and faster. This will accelerate the process of evolution from the current understanding of knowledge as a resource to using knowledge as an enabler in a systematic process of building capability in the organization. The authors of the book have thoroughly researched Indian IT services firms and have come to the conclusion that 'knowledge force' is a prerequisite for a firm to survive and grow, and without the right impetus or the knowledge force, they cannot come into the reckoning. Entrepreneurship by professionals, which has been until recently such a rarity in India, has now come to take firm roots in the country as can be seen from the success stories of Infosys, Satyam and a host of others; the authors have come to the conclusion based on the premise that

'knowledge force' was the primary driving force in the initial stage and once firmly entrenched into the business, knowledge management was put to effective use and this was further shaped by the maturity of the business. This book has attempted to outline in detail knowledge force, the role of knowledge force in shaping the business, and has outlined a new Knowledge Management Maturity Model (KMM) to explain the different stages of knowledge maturity in keeping with the phase of business growth. The concepts and the models presented in the book have been developed based on research across multiple sectors of the economy and refined for the IT services exports industry where detailed work has been done by the authors. At the conclusion of the book, the applicability of the model in various industry sectors is discussed.

Before we commence discussions on knowledge force and knowledge management maturity models, it is important to assess the relevance of these concepts in the context of the IT Industry and also take a look at what has been the focus of research so far and what other researchers have concluded on the related concepts. Chapter 1 presents the context and the background of the industry which would help in appreciating the key dimensions around knowledge force and knowledge management maturity presented throughout the book.

In order to understand different phases of knowledge evolution and identify the factors that impact the knowledge assimilation process in organizations, firstly it is important to recognize the unique characteristics of IT entrepreneurs and how they exhibit a unique behavior in the marketplace. Only by understanding their characteristics can we start seeing the distinction between the generally accepted behavior of the firms and the factors which impact their growth and strategy. The focus of Chapter 2 is on understanding IT entrepreneurship and the various enabling and inhibiting forces for the success of the venture.

Chapter 3 introduces the concept of knowledge force and explores how its impact on business growth and strategy vary based on the age and size of the organization. Even in the early stage of the business, there is a subtle or, at times, significant distinction in their behavior and capability on the basis of their age and evolution. At the very beginning, when the organization is trying to find a foothold in terms of positioning, value offered to the customer, competitive stance and the business practices it wishes to follow, the focus is primarily on garnering enough knowledge force to stay and defend itself in the

market place. But as the organization finds its bearing in the market place and its customers start recognizing the value it has to offer, the knowledge force requires to be channelized and effectively managed and not left to chance. This is the turning point when the knowledge force starts moving into the realms of a discipline, and knowledge management gradually becomes a way of life for organizations. In other words, this is the time when organizations start recognizing the role of 'knowledge' in supporting the business strategy; until then although it is very much the 'engine' of the organization, it is not in a form and shape that is consciously recognized and managed by the entrepreneur. Chapter 4 traces the impact of knowledge force in the early stages of the business, define the 'unconscious states', spell out the impact it creates within each of the substages and use this understanding to define knowledge force frameworks which can be applied to interpret the growth and success of the firm.

Once the firm comes out of the embryonic stage and moves into the 'take-off zone', like other resources which require to be managed, knowledge management also becomes a discipline that needs to be managed. The next question that would be addressed would be which factors to focus upon and how to get the maximum out of the KM efforts at different phases of maturity of the organization. Chapter 5 defines the status and challenges of companies that have moved beyond the entrepreneurial stage to attain a level of process and business maturity in the industry, with a case study of an Indian IT services firm which sets the context for the succeeding chapters. Chapter 6 outlines the case for knowledge maturity model and based on an analysis of other prevalent models focused around efficiency improvement. Chapter 7 introduces the concept of knowledge management maturity, the stages that organizations are expected to go through in their journey to maturity and the key factors that influence the progress through the stages. Chapter 8 presents the pre-requisites for organisations to benefit from knowledge force (K Force) or KMM and highlights avenues for extending these frameworks to other industries.

A lot of what we have been presented in this book is experiential and theories have been extracted from extensive research supported by our respective practices in the industry. The book has thus made an attempt to map the complex nuances of the process of exploiting knowledge assets and help in visualizing the knowledge landscape in the context of organization building by articulating frameworks to comprehend the context and significance of the concepts being

discussed. By opening up the vistas of 'knowledge' definition and helping in interpreting what knowledge could mean to different organisations, we hope readers would be able to relate to the stages in the knowledge journey presented in the book and introspect on their own journey to harness the power of knowledge.

GANESH NATARAJAN
UMA GANESH

Acknowledgements

EVERY TEN YEARS or so, the knowledge industry comes up with a new paradigm which has the potential to transform the way organizations harness their resources, address the needs of their stakeholder and grow! Knowledge Management (KM) may not be the most recent of these paradigms—surely Software as a Services (SaaS) and Service Oriented Architecture (SOA) would take pride of place as the hot buzzwords of the industry today ! But KM has the distinction of being the most enduring and yet the most enigmatic of all management disciplines that has captured the imagination, not just of the Information Technology industry but of every CEO seeking to reach closer to the customer.

Our own quest for knowledge in this area has followed different paths, although the destination we have reached—a better understanding of the dynamics of this intriguing field of management, has been very similar. Ganesh through his experiences in running two global firms in the knowledge industry, APTECH and Zensar Technologies has been a practitioner in this area for over 15 years while Uma, through her consulting experiences with the APTECH Center for Business Transformation, Zee Interactive Learning Systems and then Kalzoom Technologies has helped many companies across industry sectors to implement robust knowledge management systems within their unique environments.

While the 1990s saw us acquiring much of our early knowledge in this field, it was our decision to pursue doctoral work at the prestigious IIT Bombay, India's premier engineering and management school, that really opened up new dimensions of knowledge and knowledge management for both of us. A book Ganesh wrote in the early part of this odyssey and the firm specializing in KM that Uma set up towards the end of her research helped us to articulate some of our preliminary thinking which has been refined through the last two years post our Ph D degrees and finds expression through this book.

We would like to thank our business partners, employee associates and clients who have enjoyed our battles with the elusive art of capturing, storing, disseminating and using knowledge in our work. A

debt of gratitude is owed to our Ph D guides, Prof A. Subash Babu for Uma and Prof Anand Patwardhan for Ganesh, who helped us in putting form to some of our hypotheses in our doctoral work and also to academicians from all over the world—Prof Nitin Nohria and Prof Michael Tushman of the Harvard Business School, Prof M.G. Koregaonkar, Prof Deepak Phatak, Prof Karuna Jain and Prof Sanjaya S. Gaur at IIT Bombay. The various consulting gurus and CEOs who willingly listened and moderated our ideas also need acknowledgement—Pradeep Bhargava of Cummins Newage, Pradeep Mullick of Mentordom, Prasad Menon of Tata Power, Robert Eccles of Advisory Capital Partners, and Sudhir Trehan of Crompton Greaves and fellow voyagers on the Knowledge Management journey—Shailesh, Shyamanta, Shazia and Juliana.

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Finally, to our perennial source of knowledge and inspiration, Karuna—thank you for your perspectives on knowledge and on every topic under the sun !

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Success in the Knowledge Economy

I

Success in the Knowledge Economy

THE CONTEXT: SUCCESSFUL FIRMS IN THE KNOWLEDGE INDUSTRY

THE UNPRECEDENTED SUCCESS of India's Information Technology and Business Process Outsourcing industry has caught the attention and share of wallet of the entire world. Today, a large proportion of the world's leading corporations get their information systems developed and supported by Indian firms. The rapid growth of IT-enabled services has won the admiration of many other industry segments in the country and, simultaneously, the ire of many politicians and union leaders in the Western world as well as of other countries competing for their share of business in the outsourcing of services.

The industry composition in the country is very interesting, with large multinational firms like IBM, EDS and Accenture accelerating their India plans, home-grown billion dollar companies like Wipro, Infosys, TCS and Satyam (the WITS) giving the incumbents a run for their money. The new aspirants in IT like HCL, Cognizant, Zensar and BPO players like WNS and Genpact are demonstrating that with a concerted focus on knowledge and innovation, a firm's size is not a determinant of success in the knowledge economy. The fascinating success stories of quite a few entrepreneurial firms dealing in specific niches show that there is a place in the sun for all kinds of companies provided they have the ability to develop and articulate a distinctive point of view to capture the attention and the business of global corporations.

The success of the IT industry in India has indeed been unprecedented. A growth over a 150 times in 15 years is just one quantitative measure of the success. What is more important is the contribution this industry has made to exports growth in the country

and the confidence it has given to all Indians in the new global order. Small wonder then that it has become the cynosure of all eyes within and outside the country and that the development of this industry is analyzed with so much interest. This book is intended to provide some interesting insights into this development and a role model that other countries and even other industry segments within the country can emulate.

The analysis we have carried out in the book is based on two key premises. The first is the classical premise that in any new industry, a large number of entrepreneurial start-ups will emerge which will grow and flourish only if the right forces are available to push them beyond their initial market access and service delivery challenges till they reach a platform of some stability. The entrepreneurial start-ups then start putting down firm roots and their critical growth processes and systems, and organizational culture and leadership begin to mature, calling for a mature method of managing processes, information and knowledge in their progress to global success. The second premise is that the critical dimension of success for any firm in the knowledge economy is their ability to manage knowledge itself and harness knowledge and knowledge management in their growth from entrepreneurship to stability to maturity and success.

The Importance of Knowledge and its Management

Why have knowledge and its management become particularly important today when it was always known that this was a key element in any information-intensive industry segment like contract manufacturing, banking services and software development. The single reason is that most successful business organizations, after a series of fits and starts, have today made the transition from data capture and processing to the installation of robust information systems that support and enable all aspects of business decision-making. Organizations have also been reasonably successful in substantially re-engineering and improving the capabilities of their business processes. Some software services firms have demonstrated their move up the capability ladder by getting certified to high levels of process capability maturity as defined by the Software Engineering Institute of the Carnegie Mellon Institute (SEI CMM Level 5). Corporations have been able to store, process, disseminate and use knowledge that is relevant across many functions of the organization and its stakeholders through training and learning processes that have matured through

experimentation and extensive use of technology. But some organizations still exhibit a wide variance irrespective of their stature in the industry on traditional measurements like market share and growth, which signifies the maturity of knowledge management.

Evolution of KM Thinking

“We believe very strongly that the age-old levers of competition—labor, capital and land—are being supplemented by knowledge, and that most successful companies in the future will be those that learn how to exploit knowledge—knowledge about customer behavior, markets, economies, technology—faster and more effectively than their competitors. They will use knowledge to adapt quickly—seizing opportunities and improving products and services, of course, but just as important, renewing the way they define themselves, think and operate.” This viewpoint of Lou Gerstner (2002), the former Chairman of IBM, is today shared by most CEOs, and is a powerful recognition of the importance of knowledge as a core asset and a differentiator of successful organizations from the ‘also rans’.

Even before the present focus on KM by researchers, there has been considerable interest in the subject of organizational learning. Organizational learning is a complex, multi-dimensional construct occurring at different cognitive levels, adaptive and generative (Argyris, 1977, 1991; Senge, 1990), and potentially encompassing multiple subprocesses (Garvin, 1993; Huber, 1991; Sinkula, 1994). It is linked more often to behavior by most researchers. According to Huber (1991), organizational learning is the development of new knowledge or insights that have the potential to influence behavior. Garvin (1993) states that meaningful learning requires behavior change because behavior change is essential to any type of organizational improvement. Knowledge, on the other hand is *“a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms”* (Davenport and Prusak, 1998). KM is an emerging set of organizational design and operational principles, processes, structures, applications and technologies that help knowledge workers dramatically enhance their creativity and ability to deliver business value.

A related recognition is the relevance of the data-information-knowledge-wisdom continuum that enables organizations to move from data acquisition to processed data that becomes information, and then to contextual relevance that converts information to knowledge. And this does not happen by addressing knowledge acquisition, storage, dissemination and use in isolation. There is a clear recognition that there are three types of knowledge that need to be managed for success (Nonaka and Takeuchi, 1995). They are as follows:

- Explicit knowledge, which is available in textual materials, reference documents, electronic mails, presentations and other artifacts
- Tacit knowledge, which is gleaned from interactions, experiences and behavior and provides the critical contextual relevance to ordinary information
- Embedded knowledge, which is the core understanding of the organization, represented in its products, services and processes.

Represented knowledge, which has the most bearing on an organization's strategies and its eventual success in the competitive marketplace, is the rich summation of all the knowledge types.

While KM as a specific focus area emerged as a concept and received early impetus in the US and Europe, after a while it got relegated to the sidelines, especially in the US; but it is being nurtured and given a new thrust by emerging companies and businesses in countries like India. KM was pushed to the sidelines by several American firms in particular, owing to the disillusionment caused by the unclear benefits, confusing technology solutions—as opposed to the holistic approach required to make KM work—and cultural misalignment, leading to lack of interest and initiative among employees to share knowledge. Over the last five years, with businesses moving toward low-cost and labor-rich destinations like India, businesses born on these strengths, or existing businesses which have managed to grow by capitalizing on these strengths, have come to recognize the advantages KM can offer to support the new growth trajectory leading to global scale of operations. It is interesting to find that not only firms engaged in IT business, who are naturally best suited to embrace knowledge management, but also firms engaged in manufacturing, retail, banking and, lately, outsourcing of business processes are actively promoting the practice of knowledge management in their respective organizations, having come to the conclusion that their ability to grow the business manifold and seek opportunities to expand globally through mergers and acquisitions can be realized only when they have

methods and the know-how to manage, transfer and reuse their knowledge assets effectively.

PERSPECTIVES ON KNOWLEDGE

Knowledge has been interpreted in myriad ways by researchers. According to the *American Heritage* Dictionary (1992), knowledge is what has been learned from experience or study. In order to comprehend the term knowledge, it would be useful to examine the perspectives emanating from two different schools—Organizational learning and KM.

Development of Organizational Learning

Organizational learning theories provide rich perspectives on the processes that generate and change organizational knowledge. It is primarily seen as a multilevel phenomenon (Huber, 1991; Levitt and March, 1988). Learning theories describe how organizations change their knowledge or behavior in response to experiences (Huber, 1991). Argyris and Schon (1978) distinguish single-loop learning, which involves incremental change within an existing framework, from double-loop learning, which involves transformative change and the testing of underlying assumptions. Tomassini (1991) identified a third dimension which pertains to how individual learning and skills are embedded in organizational culture or structure. McKee (1992) considers the distinctive capability inherent in organizations to learn from innovation as opposed to production. Organizations also learn from experience either by strategic choice or by ageing (Child and Kieser, 1981). As organizations develop and solve problems of survival, they create a culture which becomes the repository for lessons learned (Schein, 1985). They also create core competencies which represent collective learning (Prahalad and Hamel, 1990). Through organizational socialization, learning processes, knowledge and competencies are transferred between generations of employees (Van Maanen and Schein, 1979). How new experiences are perceived and shape new learning is affected by the simultaneous adaptive capabilities of groups and organizations, which goes on continuously (Lounamaa and March, 1987; Brown and Duguid, 1991).

Organizations are seen as learning through a number of processes that create new knowledge or modify existing knowledge, of which mainly three processes have attracted attention (Schulz, 2001). The first process is encoding—

organizations learn by encoding inferences from experiences in organizational routines that guide behavior (Levitt and March, 1988). The second process is exploration, which captures “search, variation, risk-taking, experimentation, play, flexibility, discovery and innovation” (March, 1991). The third process is exploitation, which captures “refinement, choice, production, efficiency, selection, implementation and execution” (March, 1991).

Development of ‘Knowledge’ Thinking

According to Schulz (2001), knowledge can be distinguished from information by its inclusion of interpretations, from beliefs by its higher degree of validity, and from wisdom by its more transient veridicality. Organizational knowledge refers to knowledge and information held by an organization that the entire, a part, or parts of the organization share (Huber, 1991) and that is frequently stored in standard operating procedures (Cyert and March, 1963), routine (Levitt and March, 1988) or rules (March, Schulz and Zhou, 2000). According to Davenport and Prusak (1998), “*Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines.*” Knowledge has been categorized under various heads based on its profile, constituents and user perspective. In the following section some of these perspectives are examined.

Tacit versus explicit

“*Knowledge is a polite word for dead but not buried imagination*”, said American poet Cummings. However, it is imaginative interpretation of knowledge that businesses benefit is the fact that has been realized by academicians and business practitioners alike. Some of them have defined knowledge as an objective commodity that can be measured and classified, while others consider knowledge as a subjective phenomenon, which is therefore difficult to access and share.

Information, on the other hand, requires knowledge to be both created and understood. Although information and knowledge are related, information per se contains no knowledge. Procedures, rules, mails, books and blueprints may contain useful information but not necessarily knowledge. They all need knowledge to be decoded and are therefore not knowledge but information, albeit interwoven with the

knowledge required to create it. Knowledge, which remains tacit, is also needed to interpret information. Although it could also be argued that “knowledge” may be embedded in a text, the reader cannot appreciate it without putting to use the required personal knowledge. Knowledge is understood as the tacit part of our traditions and experiences, while information is the small part we are able to articulate. Only individuals who have a requisite level of shared background can truly exchange knowledge. Tradition, profession and organizational belonging all carry their own assumptions, and the more overlapping these tacit assumptions and experiences are, the better from a knowledge-sharing perspective.

Explicit knowledge is the knowledge that can be easily captured artificially through manuals and standard operations, and then shared with others either through taught courses or through books for self-reading. In KM, tangible knowledge takes on the role of communicating procedures, company’s philosophy and strategy. Explicit knowledge is also interpreted as declarative and procedural knowledge at times. According to Lynn and Akgun (2000), ‘procedural knowledge is the functional or action side of the knowledge equation. Procedural knowledge can be manifested in people’s performance and in skilled actions; it is knowing how to do something, such as speaking a language, riding a bicycle or playing a musical instrument. Procedural knowledge is usually related to efficient and automatic behavior, because it is the result of practising knowledge in memory. It is related to proficiency in a task while declarative knowledge is related to knowing or learning a new task’.

Describing declarative knowledge, Anderson (1982) has proposed a model that assumes knowledge is first acquired in the form of declarative knowledge, which encodes basic facts and examples. Declarative knowledge is a representation of factual statements about objects, rules, feelings and words and is easy to explain. People can verbalize, express and demonstrate what they know and explain where and how to get that knowledge. Declarative knowledge gives individuals an interpretive mechanism, which can be used in different contexts to generate new rules. Declarative knowledge can also provide a general frame to embed more detailed new knowledge.

Causal Knowledge, according to Zack (1999) is that knowledge which describes why something occurs. Shared explicit causal knowledge, often in the form of organizational stories, enables organizations to coordinate strategy for achieving goals or outcomes.

Blackler (1993) describes various forms of explicit knowledge and refers to embedded knowledge as an important category. Embedded knowledge, is that knowledge which resides in systemic routines such as organizational procedures, rules and regulations. Another form of knowledge is 'encoded knowledge', which contains anything that uses signs and symbols to convey meaning.

Nonaka (1988), Grant (1993) and Spender (1993) have supported the argument that tacit knowledge occupies a central role in the development of sustainable competitive advantage. Tangible resources can be purchased or replicated, and hence Grant (1993) and Sobol and Lei (1994) assert that knowledge, and notably tacit knowledge, is one of the most critical resources for a firm. Polany's (1962) understanding of tacit knowledge is related both to the society in which we act and to our personal interests and commitments. When tradition is merged with personal interests and experiences, this tacit understanding is referred to as personal knowledge by Polany. Among the prerequisites for knowledge are habits of action and a certain dogma that one believes in. Such habits and beliefs are often learnt without reflecting upon them, and the same is true of socialization in certain cultures or communities.

Tacit knowledge is difficult to write down or formalize (Nonaka, 1998). Sternberg (1996) and Nonaka (1988) argue that tacit knowledge has a cognitive dimension, in the sense that it is scripted. It consists of mental models that individuals follow in certain situations. Another feature of tacit knowledge is that it is practical (Sternberg, 1996) and that it describes a process. Nonaka (1988) argues that know-how may be used as a synonym for tacit knowledge because tacit knowledge consists partly of technical skills—the kind of informal, hard-to-pin down skills captured in the term 'know-how'. Tacit knowledge is also context-specific. It is *"typically acquired on the job or in the situation where it is used"* (Sternberg, 1996), or as Nonaka (1988) puts it, *"tacit knowledge is deeply rooted in action and in an individual's commitment to a specific context—a craft or a profession, a particular technology or product market, or the activities of a work group or team."*

Tacit knowledge is that knowledge which cannot be explicated fully even by an expert and can be transferred from one person to another only through a long process of apprenticeship (Polany, 1962). Polany's famous dictum, *"We know more than we can tell"*, points to the phenomenon in which much that constitutes human skill remains

unarticulated and known only to the person who has that skill. Tacit knowledge is the skills and 'know-how' we have inside each of us that cannot be easily shared (Lim, 1999).

In contrast, explicit knowledge is relatively easier to articulate and communicate, and to transfer between individuals and organizations. Explicit knowledge resides in formulae, textbooks or technical documents. The conceptual distinction between tacit and explicit knowledge also appears in Reed and DeFillippi's (1990) discussion of causally ambiguous competencies. They describe tactics as residing in the inability of even a skilled individual to spell out explicitly the decisions and protocols that form the basis of performance. Analogous to the tacit and explicit dichotomy, Zuboff (1989) makes a distinction between embodied or action-centered skills and intellectual skills. Action-centered skills are developed through actual performance (learning by doing). In contrast, intellectual skills combine abstraction, explicit reference, and procedural reasoning, which make them easily representable as symbols and, therefore, easily transferable. In general, people from the same tradition and culture have more tacit knowledge in common than people from different traditions. Likewise, groups within the same profession or company have more tacit knowledge in common than mixed groups.

Individual versus organizational knowledge

There is also a need to distinguish between individual and organizational knowledge. According to Kay (1993), organizational knowledge is distinctive to the firm, is more than the sum of the expertise of those who work in the firm, and is not available to other firms. Here, knowledge is thought to be profoundly collective, above and beyond discrete pieces of information individuals may possess; it is a pattern formed within and drawn upon a firm, over time.

Individual learning is a prerequisite for organizational learning (Kim, 1993). Individual-level learning occurs simply by virtue of being human (McGee and Prusak, 1993). As Senge (1990) puts it, "*organizations learn only through individuals who learn. Individual learning does not guarantee organizational learning but without it no organizational learning occurs.*" The notion here is that organizational knowledge resides in the minds of employees. Nonaka and Takeuchi (1995) also point out that individual-level learning is the foundation: "*Knowledge is created only by individuals. An organization cannot create knowledge on its own without individuals. Organizational knowledge creation should be understood as a process that organizationally amplifies the knowledge created*

by individuals and crystallizes it at the group level through dialogue, discussion, experience sharing or observation.”

Some researchers support group-level learning as an alternative to the limitations of individual learning (Greeno, 1980). Group knowledge is not a mere gathering of individual knowledge. The knowledge of individual members needs to be shared and legitimized through integrating interactions and information technology before it becomes group knowledge (Tsuchiya, 1994). Once organizational teams integrate their own respective learning, learning at the organizational level starts (Bontis, 1999). According to Kay (1993), *“Organizational knowledge is distinctive to the firm, is more than the sum of the expertise of those who work in the firm, and is not available to other firms.”*

The fact that knowledge is a living and growing phenomenon in any organization is amply illustrated by the way knowledge buildup happens in any firm. The presence of training manuals, for instance is not knowledge but it is only when these artifacts are put to use by employees performing their roles better in a given situation when it becomes evident that knowledge is disseminated, internalized and used. This is when organizations truly acquire cognitive capabilities, by demonstrating knowledge management through the circumstances and situations where it is seen to have been applied. And its influence is seen to have pervaded all the participants in a knowledge management process.

Some arguments have emerged from researches who concur with this view of practical knowledge management that the practice of knowledge management in organizations has become synonymous with the learning organization in as much as it enables human capability to increase. Knowledge about the process of knowledge management, it is argued is sometimes the most important contribution of the science.

Commodity versus Community view

Knowledge literature has clearly identified two approaches to the understanding and use of knowledge – the commodity view and the community view! From the early positivism approaches of the nineteenth century, the dominant scientific view has been to regard knowledge as some absolute and universal truth, which is the commodity track particularly prevalent in the natural sciences. In such an interpretation the knowledge artifact exists and does not concern itself with recognition by people or their need to possess it.

Knowledge is a thing for which we can gain evidence, and knowledge as such is separated from the knower (Spender, 1993). A sub-category within this tradition is the view that access to information is equal to access to knowledge (McQueen, 1998).

In contrast with the objective approach that has resulted in the commodity track is the other constructivist approach, leading to the community view. As mentioned earlier, this view emanates from the belief that knowledge is created and grown only by constant interactions between individuals in a community. Alavi and Leidner (2001) have identified three subcategories within this tradition; the perspective of knowledge as a state of mind hypothesizes that individuals expand their personal knowledge through the inputs received from their environment. The view of knowledge as a capability to act suggests that it is not a specific action per se, but the ability to interpret and use information and experience to influence decisions (Watson, 1999). Knowledge as a process, finally, focuses on applying expertise, i.e. simultaneously knowing and acting (Zack, 1999).

Process versus Product View

The same distinctions that have been drawn between the commodity and community tracks of knowledge can be drawn when contrasting the “product” and “process” views. The “product” approach implies that knowledge is a thing that can be located and manipulated as an independent object. Knowledge is treated as an entity and stored in a repository to enable easy retrieval. This idea is negated by the process approach which emphasizes ways of promoting, disseminating and using knowledge and regards the development and fostering of knowledge sharing communities as the key feature of knowledge success.

In many industry segments today where the focus on processes and systems is strong, it would be easy and yet fallacious to assume that the “knowledge as a process” approach is the only way, with the focus on technical knowhow, training and manuals to enable the interpretation and use of all knowledge artifacts. Crucial knowledge artifacts like best practices which are enshrined in great firms can be developed and sustained only by adopting the “knowledge as product” view !

According to Zack (1999), as a practical matter, organizations need to manage knowledge both as object and process. Hence in practical situations, the best way would be to develop a capability to attain a fusion of the two approaches. The clear identification of knowledge assets, ranging from human knowledge to structured knowledge in the form of patents etc and customer knowledge, enabled

and captured through business intelligence and knowledge warehouses is crucial and the linkages established between individuals, teams and organizations beyond functional and process boundaries will enable the knowledge assets to be leveraged optimally.

To summarize, knowledge can be explicit or tacit. Explicit knowledge can be procedural or declarative or causal. In the context of the current study, knowledge refers to a combination of explicit and tacit organizational knowledge, which when effectively acknowledged and deployed or tracked produces value for the firm, reflecting an impact on the performance. So this leads to the next issue of what is the process involved in harnessing knowledge and putting it to appropriate use within the firm.

Knowledge Management Definitions

The literature review reveals that the terminology and focus of KM varies significantly. It is not a new movement per se, as organizations have been trying to harness their internal processes and resources that have resulted in various movements over the years as total quality management, expert systems, business processes re-engineering, the learning organization core competencies, and strategy focus (Shukla, 1997). Good managers in organizations have been using the know-how of the skilled and experienced people they hire, and processes for effective management on an ad-hoc, casual basis. However, only recently have organizations begun focusing on this aspect in a more systematic and formal manner.

Some researchers believe that KM *is* a part of the learning organization. Senge's book *The Fifth Discipline* (1990) expounded the thinking behind the "learning organization". Some researchers feel that KM seems to be displacing the concept of learning organization while some others feel that both these concepts are complementary. KM is an emerging set of organizational design and operational principles, processes, structures, applications and technologies that help knowledge workers dramatically leverage their creativity and ability to deliver business value. According to Wiig (1993), KM is the management of corporate knowledge that can improve a range of organizational performance characteristics by enabling an enterprise to be more "intelligent acting". Marshall (1997) referred to KM as the harnessing of "intellectual capital" within an organization. Contemporary KM theory recognizes that it is knowledge and not information that can serve as the greatest asset to any institution and all efforts have to be

made to enable access and application of knowledge in all areas of operations. Building and managing knowledge includes the strategies and processes for identifying, capturing, sharing and leveraging the knowledge required to survive and compete successfully in the twenty-first century (Gautschi, 1999). KM focuses on “doing the right thing” instead of “doing things right”.

According to Snyder et al (2000), one of the barriers to sharing knowledge, like data or information, across industries is finding a common language that promotes dialogue and exchange. The interesting aspect of knowledge is that unlike other depreciating assets, knowledge actually appreciates and multiplies in value as more sharing and usage occurs within a firm. Hence one measure of organizational effectiveness is the ability and mechanisms to share knowledge, which becomes the true source of sustainable competitive advantage. According to Drucker (1970), *“The basic economic resource is no longer capital, nor natural resources. It is and will be knowledge”*.

While the management of knowledge is becoming an important area of interest, the question of what constitutes KM may be posed in different ways (Allee, 1997). Simple questions like the patterns through which knowledge gets captured and retained within the firm, the impact of a wise and experienced employee leaving unexpectedly and the changes in knowledge management if there are unexpected external influences on the firm like a merger or business unit sell off are all coming under close scrutiny in a fast changing business environment. Knowledge is increasingly recognized as an important organizational asset (Iles, 1999). Its creation, dissemination and application are often seen now as a critical source of competitive advantage (Allee, 1997; Lester, 1996).

Knowledge creation is an important consideration for organizations. However, knowledge renewal is another phrase that is also seen as vital. This includes both knowledge creation and evacuation. Knowledge creation is important for its impact on competitive advantage and knowledge evacuation is equally crucial when situations change and old knowledge can cause more harm than good in a different context. This creates a significant imperative for ongoing evaluation of knowledge and learning processes.

The process of sharing or transfer of knowledge, either through normal business transactions or through more formal mechanisms have been studied in some detail by researchers. Davenport and Prusak (1998), when reviewing KM programs in practice, highlight the difference between the more formalized transfer mechanisms, such as

documents, databases, intranets and groupware, and informal exchanges which are more casual events that usually take place face to face, i.e. in conversation. These unstructured exchanges “*are vital to a firm’s success*”, and one of the essential elements of KM is to “*develop special strategies to encourage such spontaneous exchanges*”.

To sum up, KM is a challenging task involving systems, procedures, people, technology and culture and, eventually, the actions leading to productive gains for the organization. Knowledge is not static and the level of knowledge assimilation in the organization will vary over a period of time depending upon a number of factors. This leads us to examine the next important aspect of how knowledge evolves and what are the possible approaches for analyzing the different phases of the knowledge assimilation process in an organization.

RECOGNIZING THE ROLE OF KNOWLEDGE FORCE

While KM is practised as a science and focused upon as a discipline in large organizations since the benefits and impact of KM are visible in these organizations, it is important to recognize the role of ‘knowledge’ and the impact it creates on the business even in the early stages of business. It is not correct to assume that KM is irrelevant or of not much consequence when the size of the business is small. The context in which ‘knowledge’ delivers the impact and the decipherable outcomes are somewhat different in a smaller organization. Unlike a large organization where the outcomes are visible and can be co-related to specific successes of the firm, in smaller businesses this is not so easy. In the early stage of the business, it is the ability of the organization to harness the knowledge gained in the process of adapting to market and customer needs and embedding the same in the adopted business methods that ultimately helps in firmly putting the organization on the growth path. The dynamics of growth, business opportunities of the firm and the resultant parameters for measuring the success of the firm are very different while the firm is small and, therefore, the definition of and the role played by ‘knowledge’ have to be viewed differently.

Based on the detailed research, it has been observed that at the heart of an organization’s strategy process is a force, what has been termed as the ‘knowledge force’, which is powered by the knowledge workers, i.e. the employees. It is with the aid of this firepower, the ‘knowledge force’ unleashed by the organization, that the strategy of

the firms is dynamically shaped and given further momentum by the entrepreneur or the business leaders. It is this knowledge force that determines the growth strategy of the firm and is reflected in terms of the customers retained or gained, or new products or services launched from time to time. This has been observed in the case of technology ventures which face the challenge of launching new products or services from time to time for survival and growth, because of constantly evolving technology and dynamic customer requirements. In the early stage of the business, the focus is on creating 'the knowledge force' and once the organization learns how to generate and exploit this knowledge force, it starts experiencing the impact. The impact is experienced through the outcome of the enterprise—growth, expansion, acquisition of new customers and markets which firmly takes the firm from small and start-up stage to the orbit of established players and 'businesses to be watched' category. Once the firm reaches this stage, the focus shifts to managing the processes around knowledge rather than continuing to focus on the 'force' itself. In the early stages of the growth of the organization, knowledge force creates a direct and indirect impact in steering the organization strategy, but as the organization grows, knowledge force is subsumed by the larger whole and it becomes more important to manage the processes around 'knowledge' and map the different stages of its evolution aligned with the business growth.

We can get more clarity on the concept of knowledge force by the analogy of driving a car. In the initial stage, the focus of the driver is on ignition and generating the necessary momentum to start moving the car; once the car is on the road, the focus shifts to other parameters such as increasing the speed, following safety regulations, monitoring temperature conditions, ensuring passenger comfort and so on. Knowledge force is similar to creating the initial momentum for the drive, and managing knowledge is like managing a number of other parameters for driving in line with the correct procedures and systems as specified by the car manufacturer. Without the initial momentum and the car being on the road, these procedures will be of little meaning to the driver. With the right orchestration of the knowledge force, the firm takes off. With larger number of people being added to the firm to manage the business, larger customers and offerings to handle, the focus shifts from the 'firepower' to the processes and parameters which need to be managed, and hence the subject of knowledge management becomes more relevant.

As the organization embarks on a further journey of growth, not only the process of managing knowledge but, based on the maturity

of business, certain other parameters also assume more significance. The ability to foresee the opportunity trajectory and orchestrate these parameters of knowledge in tune with such dynamics will determine the growth trajectory of the firm. What are these parameters and what kind of constructs has led some organizations to success have been explained through the Knowledge Management Maturity Model (KMMM).

KNOWLEDGE MANAGEMENT MATURITY MODEL (KMMM)

KM in organizations tends to be a continuous program rather than a one-time effort largely because of the various methods in which knowledge morphs in communication modes. The ancient method of collaboration and story telling, which even today serves as a major component of training and mentoring in organizations, provides the tacit-to-tacit transfer mechanism, and technology enabled innovations like expert systems and artificial intelligence have made the normally complex process of tacit-to-explicit transfer not only possible but fairly systematic in contemporary organizations.

Constant innovation in technologies as well as the evolving knowledge requirements in a dynamic business environment makes continuity of efforts in managing knowledge not only unavoidable but even desirable. According to Gartner Update (2000), *“Knowledge Management is a discipline that promotes an integrated approach to identifying, managing, and sharing all of an enterprise’s information or knowledge assets based on relationship among people and valued information. These assets may include databases, documents, policies, and procedures, as well as previously unarticulated expertise and experience resident in individual workers.”*

It is this ongoing integration and continuing efforts to articulate synthesis and refine the KM process that makes the knowledge management maturity (KMM) process so fascinating. What are the benefits for an organization which has attained significant KM maturity? The benefits are across four dimensions:

- *Improvement in Customer Responsiveness:*

This is a logical first outcome of having knowledge available at the fingertips of the knowledge worker, and has helped many firms to respond with better speed and accuracy to their internal and external customers. According to Day (1991), *“Organizations that are well*

educated about their markets stand out in their ability to rapidly sense and act on events in volatile and fragmenting markets.” Barabha and Zaltman (1991) state that “*even small improvements in learning about the marketplace and in making creative use of market information can have a major effect in eliciting more favorable responses to the firm’s offerings*”. A case in point is that of an insurance claims call centre in Milton Keynes, UK (Natarajan and Shekhar, 2000), which substantially improved customer satisfaction by answering calls faster and settling claims more accurately. The KM system in this case dealt with the explicit information needed for handling the call apart from providing tacit prompts to the call centre agent on the most effective means of communication with the customer. Thus, it is seen that a learning culture is valuable to a firm’s customers because this learning is directed toward understanding and effectively satisfying the customers’ current and latent needs through new products, services and ways of doing business (Dickson, 1992). This should lead to ‘positional sources of advantage’ (Day and Wensley, 1988), such as greater new product success, superior customer retention and higher customer-defined quality.

- *Increase in Operating Efficiency:*

This is a crucial process feature in a competitive environment that demands every possible element of cost to be squeezed out of the balance sheet, and becomes one of the key drivers of knowledge systems in any organization. Availability of relevant knowledge has an immediate impact on efficiency at all levels. According to Wiig (1993), KM is the management of corporate knowledge that can improve a range of organizational performance characteristics by enabling an enterprise to act more “intelligently”. According to Argyris (1991), generative learning takes place when the organization is willing to question long-held beliefs about mission, customers, capabilities or strategy. It requires the development of a new way of looking at the world based on an understanding of the systems and relationships that link key issues and events. While Wal-Mart redefined the discount retail industry through its focus on logistics and information technology, it has sustained its competitive advantage through continued learning and by improving its internal efficiencies based on incremental investments and system improvements (Stalk et al, 1992).

- *Building Competencies:*

A resource or competency is a basis for sustained competitive advantage when it provides value to customers and is difficult to imitate (Barney, 1991; Day and Wensley, 1988). Prahalad and Bettis (1986) state that

businesses can be effectively managed using a dominant general management logic that focuses on the conceptualization of the business and guides the development of core capabilities. Building competencies is one of the key goals of any KM initiative and the benefits are very high if achieved. This obviously involves a large investment in tacit-to explicit knowledge transfer mechanisms and can affect competence building in a range of functions. Competence building is related to organizational excellence goals. This could result in a focus on operational excellence with a thrust on maintenance, production, R&D or through customer intimacy achieved through functions like business development, sales, marketing, after-sales support and market intelligence or through improved product lifecycle management achieved through field trials, customer feedback, design interface and so on. The impact of improved competencies will be reflected through metrics such as time to market, productivity, response time to customer complaints, inventory cycle time, employee satisfaction and so on.

- *Innovation*

This is today the key goal for most market leaders since there is a clear realization that it is innovation and not quality that builds market leaders in an environment where high quality and low cost are taken for granted by the customer. In Drucker's (1954) words, *"There is only one valid definition of business purpose: to create a customer! It is the customer who determines what the business is! Because it is its purpose to create a customer, any business enterprise has two— and only these two— basic functions: marketing and innovation."* Firms need to be innovative so as to *"gain a competitive edge in order to survive and grow"* (Gronhaug and Kaufmann, 1988). Firms with a history of successful innovation have effective systems for collecting and evaluating information that leads to the identification of opportunities (Jacobson, 1992). The role of KM in fostering an environment of true innovation cannot be overemphasized and as organizations like GE, IBM and 3M have shown internationally, and firms like Infosys and Wipro have demonstrated in new economy businesses in India, organizations which are mature in their KM practices are able to foster and sustain a climate of innovation that empowers employees, strengthens business processes and leads to extraordinary business results.

Firms manage to attain these advantages depending upon the maturity levels of KM implementation. So the next question is how do we define the levels of knowledge management maturity and what journey do firms undertake to move from level to another? When organizations are young and they do not have formal 'knowledge

management systems' in place, how do they manage to achieve excellence to create market acceptance and grow their business? In the following sections, we will take up these questions and discuss how knowledge force is created in young firms, what factors help them to maximize the impact of knowledge force to put them on to the growth map and as organizations grow, how do we measure the levels of knowledge maturity with the view to assessing the advantages arising out of implementing KM.

References

1. Alavi, M. and Leidner, D.E., "Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues", *Management Information Systems Quarterly*, Vol. 25, No. 1, 2001, pp. 107-136.
2. Allee, V., *The Knowledge Evolution*, Butterworth-Heinemann, Oxford, 1997.
3. Anderson, J.R. "Acquisition of Cognitive Skill", *Psychological Review*, 89, 1982, pp. 369-406.
4. Argyris, C., "Double-loop Learning in Organisations", *Harvard Business Review*, September/October, 1977, pp. 115-125.
5. Argyris, C., "Teaching Smart People How to Learn", *Harvard Business Review*, 69, 1991, pp. 99-109.
6. Argyris, C. and Schon, D.A., *Organisational Learning*, Reading, MA: Addison Wesley, 1978.
7. Barabha, V.P. and Zaltman, G., *Hearing the Voice of the Market: Competitive Advantage through Creative use of Market Information*, Harvard Business School Press, Boston, 1991.
8. Barney, J., "Firm Resources and Sustained Competitive Advantage", *Journal of Management*, 17, 1991, pp. 99-120.
9. Blackler, F., "Knowledge and the Theory of Organizations", *Journal of Management Studies*, 30:6, November, 1993, pp. 863-883.
10. Bontis, N., "Making Organizational Knowledge by Diagnosing Intellectual Capital", *International Journal of Technology Management*, Vol. 18, No. 5/6/7/8, 1999, pp. 432-462.
11. Brown, J.S. and Duguid, P., "Organisational Learning and Communities of Practice", *Organisation Science*, 2, 1991, pp. 40-57.
12. Child, J. and Kieser, A., "Development of Organizations Over Time", in Nystrom, P.C. and Starbuck, W.H., (Eds.), *Handbook of Organisational Design*, Oxford, Oxford University Press, 1981, pp. 28-64.
13. Cyert, R. and March, J.G., *A Behavioural Theory of the Firm*, Englewood Cliffs, NJ, Prentice-Hall, 1963.

14. Davenport, T.H. and Prusak, L., *Working Knowledge*, Harvard Business School Press, Boston, 1998.
15. Davenport, T.H. and Prusak, L., *Working Knowledge: How Organisations Manage What They Know*, Harvard Business School Press, Boston, MA, 1998.
16. Day, G.S. and Wensley, R., "Assessing Advantage: A Framework for Diagnosing Competitive Superiority," *Journal of Marketing*, 52(2), 1988, pp. 1-20.
17. Day, G.S., "Learning about Markets" (Report No. 91-117), Cambridge, MA, Marketing Science Institute, 1, 1991.
18. Dickson, P.R., "Toward a General Theory of Competitive Rationality," *Journal of Marketing*, 56, 1992, pp. 69-83.
19. Drucker, P., *Post Capitalist Society*, Harper and Collins, New York, 1970.
20. Garvin, D.A., "Building a Learning Organisation", *Harvard Business Review*, July/August, 71, 1993, pp. 78-91.
21. Gautschi, T., "Does Your Firm Manage Knowledge?" *Design News*, 54, 1999, p. 11.
22. Gerstner, L., Jr., Who Says Elephants Can't Dance? Inside IBM's Historic Turnaround, Harper Business, Nov. 2002.
23. Grant, R.M., "Organisational Capabilities within a Knowledge-based View of the Firm", Paper presented at the Annual Meeting of the Academy of Management, Atlanta, Georgia, 1993.
24. Greeno, J.G., "Psychology of Learning, 1960-1980: One Participant's Observations", *American Psychologist* 35, 1980, pp. 713-728.
25. Gronhaug, K. and Kaufmann, G., *Innovation: A Cross-disciplinary Perspective*, Oslo: Norwegian University Press, 1988.
26. Huber, G.P., "Organisational Learning: The Contributing Processes and the Literatures", *Organisation Science*, 2, 1991, pp. 88-115.
27. Iles, P., "Knowledge Management, Organisational Learning and HR Strategy: A Model and Case Studies," Kaluza, J., Strategic Management and its Support by Information Systems, Technical University of Ostrava Faculty of Economics, Czech Republic, 1999.
28. Jacobson, R., "The Austrian School of Strategy", *Academy of Management Review*, Vol. 17, No. 4, 1992, pp. 782-807.
29. Kay, J., *Foundations of Corporate Success*, New York, Oxford University Press, 1993.
30. Kim, D., "The Link between Individual and Organizational Learning", *Sloan Management Review*, Autumn, 1993.
31. Lester, T., "Minding Your Organisation's Knowledge Base", *Human Resources*, 1996.
32. Levitt, B., and March, J.G., "Organisational Learning", in W.R. Scott (Ed.), *Annual Review of Sociology*, Greenwich, CT, JAI Press, Vol. 14, 1988, pp. 319-340.

33. Lim, K.K., "Managing for Quality through Knowledge Management", *Total Quality Management*, 10, 1999, pp. 415 and 615-622.
34. Lounamaa, P.H. and March, J.G., "Adaptive Coordination of a Learning Team", *Management Science*, 33, 1987, pp. 107-23.
35. Lynn, G.S. and Akgun, A.E., "A New Product Development Learning Model: Antecedents and Consequences of Declarative and Procedural Knowledge", *International Journal of Technology Management*, Vol. 20, No. 5/6/7/8, 2000, pp. 490-510.
36. March, J.G., *Exploration and Exploitation in Organizational Learning*, 1991.
37. March, J.G., Schulz, M., and Zhou, X., *The Dynamics of Rules: Studies of Change in Written Organizational Codes*, Stanford, AC: Stanford University Press, 2000.
38. Marshall, L., "Facilitating Knowledge Management and Knowledge Sharing: New Opportunities for Information Professionals", Online 21, 5, 1997, pp. 92-99
39. McGee and Prusak, L., *Managing Information Strategically*, New York, John Wiley & Sons, 1993.
40. McKee, D., "An Organizational Learning Approach to Product Innovation", *Journal of Product Innovation Management*, 9, 1992, pp. 232-45.
41. McQueen, R., "Four Views of Knowledge and Knowledge Management", in *Proceedings of ACIS 98*, 1998, pp. 609-611.
42. Natarajan, G. and Shekhar, S., *Knowledge Management Enabling Business Growth*, Tata McGraw-Hill, 2000.
43. Nonaka, L., "Creating Organizational Order Out of Chaos: Self-renewal in Japanese Firms", *California Management Review*, 30, 1988, pp. 57-73.
44. Nonaka, I. and Takeuchi, H., *The Knowledge Creating Company*, New York: Oxford University Press, 1995.
45. Polany, M., *Personal Knowledge: Towards a Post-critical Philosophy*, University of Chicago Press, Chicago, IL, 1962.
46. Prahalad, C.K. and Bettis, R., "The Dominant Logic: A New Linkage between Diversity and Performance", *Strategic Management Journal*, 7, 1986, pp. 485-501.
47. Prahalad, C.K. and Hamel, G., "The Core Competencies of the Corporation", *Harvard Business Review*, 68, May-June, 1990, pp. 79-91.
48. Reed, R. and DeFillipi, R.J., "Causal Ambiguity, Barriers to Imitation and Sustainable Competitive Advantage", *Academy of Management Review*, Vol. 15, No. 1, 1990, pp. 88-1.
49. Schein, E., *Organisational Culture and Leadership*, San Francisco: Jossey-Bass, 1985.

50. Schulz, M., "The Uncertain Relevance of Newness: Organisational Learning and Knowledge Flows, *Academy of Management Journal*, Vol. 44, No. 4, 2001, pp. 661-681.
51. Senge, P.M., *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, New York, NY, 1990.
52. Shukla, M., *Competing through Knowledge: Building a Learning Organization*, Sage, London, 1997.
53. Sinkula, J.M., "Market Information Processing and Organisational Learning", *Journal of Marketing*, Vol. 58, No. 1, 1994, pp. 35-45.
54. Snyder, C.A., McManus, D.J., and Wilson, L.T., "Corporate Memory Management: A Knowledge Management Process Model", *International Journal of Technology Management*, Vol. 20, No. 5/6/7/8, 2000, pp. 752-765.
55. Sobol, M.G. and Lei, D., "Environment, Manufacturing Technology and Embedded Knowledge, *International Journal of Human Factors in Manufacturing*, Vol. 4, No. 2, 1994, pp. 167-89.
56. Spender, J.C., 1993, "Competitive Advantage from Tacit Knowledge? Unpacking the Concept and its Strategic Implication", Best Paper Proceedings, *Annual Meeting of the Academy of Management*, Atlanta, Georgia, 1994.
57. Stalk, G., Evans, P., and Shulman, L.E., "Competing on Capabilities: The New Rules of Corporate Strategy", *Harvard Business Review*, March/April, 70, 1992, pp. 57-69.
58. Sternberg, R.J., "Organisational Knowledge, Learning and Memory: Three Concepts in Search of a Theory", *Journal of Organisational Change Management*, Vol. 9, No. 1, 1996, pp. 63-78.
59. Tomassini, M., 'L'apprendimento rganizzativo', *Kybernetes*, 42, Gennaio-Febbraio, 1991.
60. Tsuchiya, S., "A Study of Organizational Learning", *Academy of Management Review*, Vol. 10, No. 4, 1994.
61. Van Mannen, J. and Schein, E.H., "Toward a Theory of Organizational Socialisation", in Staw, B.M., (Ed), *Research in Organizational Behaviour*, 1, Greenwich, CT, JAI Press, 1979, pp. 209-64.
62. Watson, R.T., *Data Management: Databases and Organizations* (2nd edition), John Wiley, New York, 1999.
63. Wiig, K.M., *Knowledge Management Foundations*, Schema Press, TX, 1993.
64. Zack, M., "Managing Codified Knowledge", *Sloan Management Review*, Summer, 1999, pp. 45-58.
65. Zuboff, S., *In the Age of the Smart Machine*, Heinemann Professional, New York, NY, 1989.

The Journey of Start-up IT Firms

II

The Journey of Start-up IT Firms

DISTINGUISHING ENTREPRENEURSHIP FROM SMALL BUSINESS

‘**S**TART-UP OR ENTREPRENEURIAL FIRMS’ refer to those firms which have been founded with the clear view of exponentially growing the business in the shortest possible time. Small business firms are set up to primarily address local needs, largely depending upon the owner-manager for skills or offerings which might not be unique, distinctive or scalable; most importantly, the ambition or the vision of the founder is restricted to ensuring there is a reasonable return on investment that supports the needs of the owners or managers and their immediate family. Therefore, in all probability, such firms will remain ‘small business’ even in the long run, with little appetite for risk-taking or creating significant wealth.

On the other hand, entrepreneurial firms, as can be seen, are those which have a larger vision, a distinctive value proposition created out of developing a new product or an innovative method to service an existing market or demand, and this prompts the founders to aim at larger market as targets for their business in the shortest possible time before the ‘newness’ of their offering wears off. Because of the ambitious approach to business, the entrepreneur has to have a team even though it may be small to begin with; they may or may not be employed with the entrepreneur full-time initially but will share his/her excitement in the business and will be willing to contribute towards the business building process. Thus, an entrepreneur, at the outset, demonstrates higher risk-taking ability, has a larger vision and is keen to go all out to build the business on a larger scale on the strength of the value proposition the firm has to offer. This is not to state that a ‘small business’ cannot become a large business eventually. There have been examples of small-business owners developing ‘entrepreneurial instincts’, and transforming the small business into a large-scale business. When

Microsoft set out its business, it started off in a garage and was small, however, the vision and the focus of the business was such that it quickly grew into a significant business because of the entrepreneurial spirit behind the venture. What is to be noted is that the building blocks for a 'ground-up entrepreneurship' are very different from that of a small businesses. The fundamental differentiators are around the extent of risk-taking and the vision for the business at the start-up stage. In the context of IT services firms in India, noting this distinction is all the more significant in order to appreciate the journey they have had to undertake to achieve success. The focus of this book is on those entrepreneurial firms which, despite the limited resources, limited experience-curve and limited economies of scale, were able to survive on account of their capability to provide unique and distinctive offerings through innovation.

There has been a significant shift in the characteristics of entrepreneurship over the last three decades. The 70s and 80s saw a continued domination of manufacturing industries, and a thrust on quality and creating value for customer through differentiated marketing strategies was felt necessary to expand the market share and build brand equity. However, with the advent of PCs and the resultant onslaught of several IT-related initiatives, companies such as Microsoft, INTEL, COMPAQ and various others transformed the traditional approach to business by creating new value for the customers through a whole new paradigm; suddenly, the decades-old organizations built around brands, competitive pricing and huge infrastructure found their valuations crumbling as compared to these new ventures. This new approach of companies that had learnt to create value out of intellectual property rather than physical assets became further strengthened with the rapid spread of internet at both homes and workplaces, further encouraging a brand new set of entrepreneurs to enter the market and create successful ventures. Riding on the wave of technology and exploiting the rapid changes in technology and marketplace to their advantage, these entrepreneurs unleashed new products and services. Hotmail, Yahoo and Google are but just a few examples of the entrepreneurial ventures which have redefined the markets on the strength of their ability to constantly upgrade their offerings, based on the new knowledge about the customer, technology and the marketplace that is continuously generated, sorted and put to use speedily and effectively. The shift in the focus of the approach of companies from serving existing customers to reinventing the market and finding new customers has created interest among researchers to study the internal dynamics

and has led to thinking around 'core competence' and 'opportunity share'.

TRIALS AND TRIBULATIONS OF INDIAN ENTREPRENEURIAL IT VENTURES

Over the last ten years, India has become a force to reckon with in the IT services sector. The rapid strides it has made particularly in the software services sector has caught the attention of the international market, with the result that India is being acknowledged as the 'ideal destination' for software development and outsourcing of recurring needs. While the size of the industry itself may not be a significant factor propelling global attention, the rapid growth attained over the last ten years and the projected growth rate in the coming decade are compelling enough for examining the parameters involved. According to the National Association of Software and Services Companies report (NASSCOM Report, 2007), the software industry in India was worth USD 37.4 billion in 2006 and expected to touch USD 47.8 billion in the year 2007 whereas at the turn of the century it was it was worth just around USD 8 billion. The industry is well on its target to touch predicted to touch USD 60 billion by the year 2010. Given the smaller domestic market for Indian software industries (around 23%) the Indian IT industry has been focusing its attention on the world market almost right from the beginning. Most of the credit for this goes to savvy professionals who set up entrepreneurial firms a few years back and have been reaping rich rewards.

While until sometime back the only well-known firms in the software services category from India were Tata Consultancy Services and Wipro, in the last decade several others like Infosys, Satyam, Mastek, Polaris, etc. have come into the limelight, all these being entrepreneurial ventures. Despite the dot com burst, it has been observed that some companies have managed to survive and grow into successful ventures that offer unique solutions catering to customers' needs. Lately, with the increased thrust on IT-enabled services, India has become the hot destination for the outsourcing of IT and IT-enabled services. Once again several entrepreneurial ventures have been set up in this field which are expanding and growing rapidly in a short span of time. These firms showed the capability to anticipate changes in technology, spot opportunities that could be exploited quickly, build organizations that could support the customers' requirements, thus managing to entrench themselves as strong contenders in the global marketplace.

While examining their success, it becomes apparent that these firms have aligned themselves very closely with the changing market and technology scenario and were among the first to adapt to the environmental trends. Starting with the Y2K phenomenon, moving on to capitalizing the explosion during the dot com phase and the later integration of legacy systems with internet technologies, and now onto IT-enabled services, these firms have managed to be in the forefront by carefully nurturing the knowledge resources of the firm and exploiting the opportunities effectively with their 'knowledge force'. At the same time, the industry has also witnessed the withering away or slide in growth of several companies that were unable to cope with the pressures of the industry.

MOTIVATION FOR ENTREPRENEURSHIP

As far as the new-economy Indian entrepreneurial ventures are concerned, a combination of factors seem to have inspired the remarkable growth of demand for Indian services in the world market. Some of the important triggers for entrepreneurial activity in the new economy have come from environmental conditions, financial considerations, education and experience of the entrepreneurs. The background that provided a positive climate for entrepreneurship to take off and created motivation for setting up new ventures is explained next.

The worldwide interest in business process re-engineering, the economic imperatives in developed countries of outsourcing, cost-efficient maintenance of existing mainframe systems and continuous development of new software for PCs have played significant roles in the creation of enterprises which could provide such services to the world market. India's comparative advantage in the software industry, generated from its relative abundance of skilled software personnel, coupled with its rapidly improving communications infrastructure and lower costs of manpower even amidst competition from other countries, have played a key role in creating confidence among buyers of Indian software products and related services.

The funding scenario was another major catalyst for increased entrepreneurial activity in India. Up to 1996, the concept of venture capital was virtually non-existent in India. The initial foray into financing was predominantly from institutions. Funds that were mobilized for venture investment were small in value. Unlike the

current times when there is plenty of venture capital chasing great ideas and entrepreneurs, in the 80s they had virtually no access to venture capital. The VCs in these times were mostly from banking background, and they approached the subject of venture funding much like they would approach debt financing of a project. The accent was on the asset side of the balance sheet, and value creation as a focus had not yet been fully discovered; exit strategies were being thought more around the life-term of the funds, and perhaps as nothing more. There was little or no active participation in areas where a VC could have contributed, such as financial structuring, business strategy, business enhancement through networks and creation of business through synergy amidst investee companies. In the absence of VC funding, most of the initial enterprises had to rely upon their personal savings, family support and, in a few cases, support outside the family through friends, the equivalent of 'angels'. The ecosystem was not 'venture friendly', with most people being doubtful about the success of entrepreneurship, given the immediate history and experience of Indian business which had to go through a long struggle to establish or grow, be it with the bureaucracy for the necessary permissions to set up the manufacturing facility or the international customers who were very weary about 'Indian quality'. Yet, there was a hope and dream that some people cherished, and the burning desire to do things differently prompted them to jump into the fray of entrepreneurship.

While the venture funding activities accelerated in the US in the early 90s, the rapid growth especially of the high-tech sector meant that ideas, entrepreneurs and momentum were all available in full measure. Added to this, of course, was the Indian version of the dot com boom. Professionals working in organizations were actively wooed to transform themselves into entrepreneurs, backed by venture capitalists. The range of investors now spanned incubators, angels, classical VCs and even private equity players. The one positive aspect was the sheer energy and enthusiasm that was generated, which accelerated entrepreneurship in India, hitherto largely confined to business communities. VCs were instrumental in introducing risk-taking to many members of the 'professional class'. Innovation was the key, and idea flows started equalling deal-flows at a frenetic pace never seen before (Sabarinathan, 2002). As Bygrave and Timmons (1992) found in their research, the presence of a VC investing community had a positive correlation with the level of entrepreneurial activity, and VC investing played a key role in fostering innovation.

Another factor that has been responsible for venture creation has been the high-quality technical education infrastructure created by universities in India. In addition to this, the access to state-of-the-art education in the US through thousands of young engineers each year and the experience of working with leading technology firms in India and US have possibly provided an opportunity to study the market requirements, understand customer behavior and observe technology trends from close quarters, all of which have been triggers for new venture creation. Surveying 46 technology firms in India funded by venture capitalists, Ramachandran (2001) states that most of them chose their product and technology in the same area in which they already had received exposure by way of training or earlier work experience. Some others were more radical and used their background to explore new avenues in emerging areas, especially in the context of the Indian market.

INDIAN IT ENTREPRENEURSHIP AND THE ROAD TO SUCCESS

Firstly, let us examine the key differences between the traditional entrepreneurs and the IT entrepreneurs. Unlike the craftsman-entrepreneur and the opportunistic-entrepreneur (Smith, 1967) who tend to build rigid or adaptive firms, respectively, the new type of IT entrepreneur emerging is *“better educated, less concerned about control and independence and more adaptive in his approach to the environment”* (De Vries, 1977). Unlike in the past, the IT entrepreneurs are predominantly professionals with a sound educational and technology background. This helps them get a stronger foothold in the industry right from the start (Finkestein and Hambrick, 1996; Pennings et al, 1998).

The four typical characteristics typically found in any type of entrepreneurship are a great idea or opportunity recognition, risk-taking ability, getting things done and a passion to achieve goals. When we apply these principles to IT entrepreneurship in India, what we find is that while the basic principles remain relevant, the environment and the context in which entrepreneurship was initiated call for an interesting study. The road to the success of Indian IT entrepreneurship has not been easy and the entrepreneurs have experienced several challenges along the way. Let us take a look at the key challenges faced and how they were overcome.

The biggest asset which has been in favor of these entrepreneurs was their education, and expertise and exposure born out of working in the software sector. Armed with qualifications in computer science from the country's premier engineering institutions, many of them went to the US for higher education or joined one of the few Indian companies which were beginning to win contracts from American companies, thus getting an opportunity to experience first hand corporate America's forays into automation through IT. Not only did they discover that corporations, having made huge investments in expensive mainframes and minicomputers, had ongoing needs for developing and maintaining their applications, but they also observed that, with the PC revolution sweeping through the world, the opportunity to service would be gigantic as innumerable new customers who had never contemplated getting into automation on a large scale were now keen to join the bandwagon.

While the opportunity was huge and tempting, the major challenge they faced was in convincing the large corporates in the US, UK and Western Europe about letting Indian companies handle their needs. Fortunately, companies like TCS had built a positive reputation in a short period of time on the strength of the best of talent they had recruited from top Indian schools, who displayed good English skills. Being part of these companies, helped some of the would-be entrepreneurs in establishing personal credibility with the decision makers. Businesses were, however, not ready to take the plunge and move the activities to India yet, not even through already established players like TCS, let alone the wannabe entrepreneurs. So in the initial phase the entrepreneurs dived into the opportunity pool by 'sourcing and placing bodies' and, using this route, they tried to build and strengthen the relationships with large corporates. Since it was not easy to find an alternate method to find the right resources for maintaining their applications or developing new ones, CIOs found in these entrepreneurs a ready alternative; they not only ensured a steady supply of resources—be it latest or ageing tools and technologies—but were also dependable and delivered results faster than anticipated. Entrepreneurs used their network back home in India to source talent, trained them quickly if they did not have relevant technology skills and got a passage to America or other countries, as required. The management of the supply chain was fascinating, with tie-ups with private training schools for supply of manpower (as most universities and colleges were yet to tune their curriculum to industry needs) at the downstream to setting up end-to-end living arrangement at the

upstream, right down to catering to community-specific food and entertainment habits, thus ensuring that young software professionals felt 'at home' when they arrived in their new environment. In short, Indian entrepreneurs 'sensed' the big opportunity right when the opportunity was unfolding, found a neat niche where they could build credibility with the customers and were willing to roll up their sleeves and do whatever was required to build on that opportunity. This saw the foundation for 'India brand' in software being laid silently by thousands of Indians nurtured by entrepreneurs, which eventually helped them steer the changing business needs to their advantage.

The lucky break for a significant shift in the business model came along at the onset of the Y2K problem, which meant rewriting millions of codes in a record time. It was not possible to accomplish this objective using the traditional model of deploying resources on site for various projects, given the tight deadlines and the significant business implications. For the need of the day was not only timely delivery but effective methods and tools to accomplish this objective in a cost-effective manner. Indian entrepreneurs once again seized the opportunity and set out to capitalize on the same, pioneering the trend of sending millions of codes developed in different environments to Indian companies that could deploy resources to decipher them in a short period of time and make necessary modifications to the codes as desired. Once these codes were brought to Indian locations, they not only just stayed there for further maintenance but, post the dot com era and 9/11, when corporations started focusing heavily on cost reduction, these firms became the natural partners for them for further requirements of application development and maintenance. Encouraged by these success stories and optimism, hundreds of other companies that had never considered outsourcing until then, or had considered minimal outsourcing, drew inspiration and started emulating their example. Thus, today we find hectic market activity, with pure play IT services to technology-enabled business processes being outsourced to India, and this business is slated to grow at the rate of over 30% per annum in the coming years.

Central to the successful transition from being a mere 'people provider' business to 'end-to-end services' provider from multiple locations with state-of-the-art, world-class infrastructure is the fundamental capability to adapt to changing market and technology needs that the entrepreneurial ventures have displayed. What is also noteworthy is that such a significant shift towards outsourcing could not have been accomplished but for the ability of the enterprises to

bring together the right people and create the right kind of environment such that new capabilities could be created and regenerated from time to time as required to tap the opportunity. It is truly fascinating to find several examples of firms winning contracts and then finding the right people or training them on the job to service the project. If we think that we have seen the end of all such phenomena as the critical volume of business has increased manifold now, we are mistaken. With every new business, with every new process and every minor and major shift in technology, new opportunities spurt and there is a constant need to continuously assess and update capabilities to take advantage of such opportunities. Successful firms have demonstrated their tenacity in being on top of the changes in technology and the resultant business needs and have been able to establish a dependable service delivery model. Firms that are unable to cope with the phenomenal twists and turns of technology and adapt accordingly simply get left behind in the business. This calls for an abundant source of energy in the early stages of the business, which builds the required tenacity, speed and the ability to adapt to the changes without compromising on the quality and delivery of commitments; and as the organization matures, a systematic management of knowledge assists in maintaining its competitive position in the marketplace. Our study shows that knowledge force, the energy that drives a young organization to discover its true potential and overcome all challenges, and knowledge management appropriate to the maturity level of the business are the mantras which have been instrumental to the success of these firms. In the next chapter, we will define knowledge force in detail and examine the building blocks of knowledge force.

References

1. Bygrave, W.D. and Timmons, J., *Venture Capital at the Crossroads*, Harvard Business School Press, Boston, 1992.
2. De Vries, M.E.R.K., "The Entrepreneurial Personality: A Person at the Crossroads", *The Journal of Management Studies*, February, 1977, pp. 34–57.
3. Finklestein, S. and Hambrick, D., *Strategic Leadership*, St. Paul West, 1996.
4. Pennings, J.M., Lee, K., and Van Witteloostuijn, A., "Human Capital, Social Capital and Firm Dissolution", *Academy of Management Journal*, No. 41, 1998, pp. 425–440.

5. Ramachandran, K., "Management Strategies of Venture Capital Funded Firms", *The Journal of Entrepreneurship*, Vol. 10, No. 2, 2001, pp. 129–141.
6. Sabarinathan, G., "Venture Capital and IT Firms in India-Vital Issues", *IIMB Management Review*, March, 2002, pp. 73–78.
7. Smith, N.R., *The Entrepreneur and His Firm: The Relationship Between Type of Man and Type of Company*, East Lansing, Michigan State University, 1967.

Role of Knowledge Force

III

Role of Knowledge Force

RATIONALE FOR 'KNOWLEDGE FORCE'

RECOGNIZING OPPORTUNITY AMIDST chaos is central to the concept of entrepreneurship. “*At the heart of this process (entrepreneurship) is the creation and/or recognition of opportunities*” (Timmons et al. 1987). Entrepreneurial firms are known for innovation, creativity and risk-taking, and adapting themselves to the dynamic environments presents them with the ‘window of opportunity’. Being prepared for unexpected opportunities in the marketplace and responding to them to gain competitive advantage is the essence of ‘strategic windows’ (Harvey and Evans, 1995). This would mean not only anticipating and reacting to change in market demand but also proactively creating new sets of products and services, thereby changing ‘the market’. Strategic windows for entrepreneurial organizations may be due in part to their risk-taking, pro-activeness and innovation as well as a change in the marketplace (Slevin and Covin, 1987). The important sources of innovative opportunity are change in factors and participants, changing costs, changing patterns of demand, opportunities from new markets, opportunities from new technologies and people and their motivation. (Dziura, 2001; Rothwell and Zegweld, 1981; Gold, 1977).

Extending these observations to the entrepreneurial IT ventures, it has been seen that they thrive primarily on the opportunities arising from technology changes. Anticipating and proactively defining technology-based opportunities while simultaneously orchestrating the organization to keep pace with these changes, remaining adaptive and focused on customers’ changing needs, and acquiring new knowledge have predominantly been the strategies followed by most entrepreneurial new ventures to put their firms on the path to growth. In other words, at the heart of the strategy process is the knowledge force of the organization which is powered by the knowledge workers,

i.e. the employees. It is the firepower, what we have termed as 'knowledge force', created by the capability of the organization that dynamically shapes the strategy of the new venture entrepreneurial firms and which is given further momentum and impetus by the entrepreneur, the customer and the industry. It is this knowledge force which determines the growth strategy of the firm, reflected in terms of the customers retained or gained or new products or services launched from time to time.

In technology ventures, since the necessity to launch new products or services is paramount for survival and growth, it is the knowledge force created in the organization which shapes the future of the firm and its strategies. The ability to radically transform a business despite the small size of the firm, the ability to impact upon and absorb external technology developments at a lightening speed as compared to larger firms, shorter product life cycles, and the constant information and knowledge exchange made possible by the internet and other distributed computing technologies have resulted in success stories of small firms in a very short span of time, giving us new insights into their characteristics and how knowledge force helps them survive and grow.

DEFINING KNOWLEDGE FORCE

Before we delve into our definition of knowledge force, let us examine what the two words individually connote according to researchers. According to the *American Heritage Dictionary* (1992), knowledge is what has been learned from experience or study. It is a broad concept that usually includes insights, interpretations and information. Knowledge can be distinguished from information by its inclusion of interpretations, from beliefs by its higher degree of validity, and from wisdom by its more transient veridicality (Schultz, 2001). The term 'knowledge' is being defined for the purpose of this book as the capability of an organization derived from matching the sets of skills and understanding of the firm with the current and emerging market needs, and shall comprise of competencies, experiences, relevant systems and methods to function as a collective unit as well as the ability to cope with the changing 'know-how' requirements. 'Force' is described by *Roget's II: The New Thesaurus* (www.yahoo.education) as 'the capacity to exert an influence'. Extending this definition to the force created by knowledge, the term 'knowledge force' can be defined as the impact of activity taking place in an organization and the power it has in

deciding the future of the organization and in shaping its strategic direction. In this book 'knowledge force' is being interpreted as that force which has the capability to influence the strategy of the firm, and strategy is evaluated in terms of the impact on growth, market effectiveness and profitability.

While knowledge and capabilities of employees are important variables shaping the 'fire power' of the firm, it must be noted that mere access to knowledge or capabilities is not a pre-requisite to creating the 'power' or the force. Knowledge force is a culmination of the capability of the organization ensuing from the power of the knowledge workers and channelized in the right direction by the entrepreneur, in tandem with customers' changing requirements and industry trends. Therefore, knowledge force is to be understood as that force which enables the organization to move forward on the strength of a certain know-how of the firm drawn from experiences, intellect, education and interaction with the market place, supported and nurtured by the entrepreneur in such a manner that the organization is conscious of industry and technology dynamics. The offerings, thereby, are relevant to customers' changing demands or can proactively shape the expectations of customers in tune with the offerings of the firm. The effectiveness of knowledge force is determined by the method and approach adopted to take advantage of the know-how and the environment within an organization where this knowledge force is being nurtured and supported. Ultimately, it is the application of knowledge force and channelizing it to the relevant parts of the organization that will enable it to achieve its growth-related objectives and make its strategies successful.

THE BUILDING BLOCKS OF KNOWLEDGE FORCE

The definition of 'knowledge force' explored so far leads one to conclude that we are referring to that force which is created by knowledge. While this interpretation is correct, what requires clarity is what knowledge, in the context of entrepreneurial firms, generates this 'force' and how is this knowledge created in the first place; when the organization is young and has no history or experience, how does knowledge get created, and where does this knowledge emanate from? This knowledge has to be such that it can create the necessary 'force' to 'move' the organization, and therefore the dynamics of the start-up process has to be examined carefully to arrive at an understanding of what constitutes knowledge at the start-up stage. Most research on

entrepreneurship and organization building focus on the role of the entrepreneur in an organization's success. While the role of the entrepreneur is not belittled in the context of IT enterprises, there are other factors which play an equally important role in shaping the strategy of the organization. During the start-up phase, since there are no previous operations that the firm can fall back upon and it still has to service the customers, the firm depends upon 'dynamic knowledge' as it is created and on the resultant knowledge force which is shaped by the active involvement of the four key stakeholders of the entrepreneurial venture (the entrepreneur, the employee, the customer and the industry in which the venture operates). Thus, the four building blocks of knowledge force can be summarized as follows:

- Entrepreneurial energy
- Employee capability
- Industry orientation
- Customer orientation

Let us examine how each one of these dimensions contributes to the creation of knowledge force in entrepreneurial IT companies.

Entrepreneurial Energy

The first dimension which is true of any entrepreneurial venture is that of the entrepreneur himself/herself whose passion and commitment are extremely important to the venture creation and growth. The entrepreneur's profile, and his dream and desire to build the venture bring a certain momentum to the organization. The desire of the entrepreneurs to set up the venture emerges not only on account of the opportunity they see in making new or improved offerings to customers, thereby building wealth for themselves, but also from the confidence and clarity they develop by being able to introduce disruptive methods to the business, made possible by their education, exposure to technology, networking and by their relevant experience in the industry in some cases. It is not only the process of setting up the new ventures in the technology field but also the methods deployed in managing and growing the business that seem to be markedly different from traditional ventures. Starting with not centralizing the decision-making process, and carefully bringing together a team of capable professionals who very often become stakeholders in the venture and keeping them motivated through conscious empowerment and participation in the organization building process, the IT entrepreneur is assuming a new character as compared to his/her counterpart in the traditional business.

Employee Capability

An important facet of technology entrepreneurship is the finesse with which the entrepreneur nurtures talent, directs them to absorb new technology trends and provides an environment for constant learning to take place, resulting in new capabilities being created, new ideas germinating for new offerings and new customers getting acquired in the process (Lee and Tsang, 2001). IT enterprises are built largely on the strength of the know-how and capabilities a firm possesses and develops over a period of time. While it could be argued that 'people' are important in any business, the overwhelming importance of this factor in technology ventures is due to the fact that it is the sheer knowledge, skills and capabilities that they bring to the firm that shape its offerings and growth. This is unlike the traditional economy ventures where by and large the markets are known or could be sized up for a certain period, and hence the businesses cater to the known and definable markets where the ingenuity of the entrepreneur is most critical both in sizing up the opportunity and in defining the boundary of technology within which the firm will operate. It has been observed that the quantum jump or change in business on account of the direct contribution made by the intrinsic capability of the employees in the traditional business sectors has been minimal. While there have been incremental improvements in the offerings due to quality improvement and/or cost reduction initiatives, by and large the offerings and the customer profile have remained to a great extent predictable, therefore not requiring constant updates of their capabilities at a feverish pitch. Contrary to this, the very survival and growth of the technology ventures have been made possible by their ability to keep pace with technology changes and proactive initiatives to update their capabilities and create new offerings. (Hitt et al., 2001). The greater the degree of technological uncertainty, the greater the learning or knowledge pressure facing the organization (Tushman and Nelson, 1990). The recognition of the 'power of knowledge' as the key to the success of a firm, realization of the need to respond to technology changes and proactively create new services to encash opportunities, and the acceptance that the customer plays a crucial role in shaping the thinking and in fine tuning the offering of the firm have all given rise to a new approach to strategy building among the technology-based young entrepreneurial companies. In short, it has been observed that IT ventures have been founded on the basis of new opportunities emanating from technology explosions, created on the strength of the knowledge power of the

people behind these ventures who do not just encash upon the market opportunities but redefine markets and customers with their collective enthusiasm, bullishness and proactive charting of technology directions (Itami and Roehl, 1987).

Industry Orientation

Another dimension which is of significance in the context of IT and India has been the role of the industry. Unlike many other countries where the government plays a pivotal supportive role in the development of the industry, the early successes of the industry and the entrepreneurs in India have been on account of their own concerted efforts. While it is a recognized fact that environment plays an important role in shaping the strategy of organizations (Miller and Friesen, 1983; Sandberg and Hofer, 1987), in the case of technology ventures, the industry has collectively been infusing infectious enthusiasm and a positive outlook through its dynamism. Not only is technology acting as the catalyst for the creation of new offerings, change, growth and expansion but the industry as a whole is sending signals to all stakeholders about the significance of speed of action, proactiveness, adaptability, flexibility and nimble footedness required to stay afloat and be successful. Never before have we witnessed a scenario where, by virtue of being a part of the industry, the players get a catalytical boost out of each other's successes and failures, and where they draw inspiration and foresights from each other. This could be on account of the fact that at the pace at which changes take place in the industry, no individual or company by itself can acquire all necessary knowledge and develop an understanding about the trends of technology. Therefore, companies in this sector are dependent on one another for the sharing of information, knowledge and happenings which will collectively shape their future. Collaborating, even while competing, has become the norm in IT ventures.

Customer Orientation

'Customer is the King' is a well-accepted dictum (Deshpande et al., 1993; Athanassopoulos, 2000) and the IT world has given this a new twist whereby customers are being considered 'partners'. Owing to the fact that IT enterprises are mostly engaged in the process of creating new offerings, the need to understand the customer and develop a strong orientation towards competition so as to satisfy customer requirements is recognized across the organization. The interesting

facet of the customer dimension in the IT ventures is that customers are also eager to work with companies that are willing to experiment and create offerings to suit their needs. Since some of these customers face the challenge of working with new technologies, they rely on trusted vendors to not only deliver the goods but also educate them in the process. Thus, IT ventures come across as opportunities for partnering with customers on product definition, creation, and delivery, and thereby the knowledge of both the stakeholders expands dramatically in the process.

The above analysis gives us an idea about the relevance of the four key dimensions, with respect to IT entrepreneurship, which come together to create a dynamic thrust that unleashes knowledge force. Our study shows that this is a significant distinguishing feature of IT entrepreneurs that shapes the strategy of firms and moves an organization forward. Taking into their stride the tumultuous changes occurring in the marketplace (following the constant evolutions in technology) and the resultant complexities involved in fostering the enterprise by nurturing the knowledge of the firm with a keen eye on the market forces, entrepreneurs have managed to ‘take-off’ on the strength of the knowledge force. In the next chapter, we will identify the parameters which define the four building blocks of knowledge force and analyze how the four dimensions interact with one another to create the knowledge force that shapes the strategy of the start-up firms.

References

1. Athanssopoulos, A.D., “Customer Satisfaction Cues to Support Market Segmentation and Explain Switching Behavior”, *Journal of Business Research*, No. 47, 2000, pp. 191–207.
2. Timmons, J.A., Muzyka, D.F., Stevenson, H.H. and Bygrave, W.D., Opportunity Recognition: The core of entrepreneurship. In N.C. Churchill, J.A. Hornaday, B.A. Kirchhoff, O.J. Krasner and K.H. Vesper (Eds.), *Frontiers of Entrepreneurship Research*, Babason Park, MA; Babson College, 1987, pp. 109–123.
3. Deshpande, R., Farley, J.U., and Webster, Jr., F.E., *Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms in Developing a Market Orientation*, (Ed.) Deshpande, R., Sage Publications, California, 1999.
4. Dziura, M.J., “Innovation: Sources and Strategies”, *International Journal of Technology Management*, 21.5/6, 2001, pp. 612–627.

5. Gold, B., *Research, Technological Change, and Economic Analysis*, Lexington, Lexington Books, 1977.
6. Harvey, M. and Evans, R., "Strategic Windows in the Entrepreneurial Process", *Journal of Business Venturing*, Vol. 10, 1995, pp. 331-347.
7. Hitt, M.A., Bierman, L., Shimizu, K., and Kochhar, R., "Direct and Moderating Effects of Human Capital on Strategy and Performances in Professional Service Firms: A Resource-based Perspective", *Academy of Management Journal*, February, Vol. 44, no. 1, 2001, pp. 13-28.
8. Itami, H. and Roehl, T.W., *Mobilizing Invisible Assets*, Harvard University Press, Cambridge, MA., 1987.
9. Miller, D. and Friesen, P.H., "Archetypes of Strategy Formulation", *Management Science*, 9, May, No. 24, 1978.
10. Rothwell, R. and Zegveld, W., *Industrial Innovation and Public Policy: Preparing for the 1980s and 1990s*, London: Frances Pinter Publishers, 1981.
11. Sandberg, W. and Hofer, C., "Improving New Venture Performance: The Role of Strategy, Industry Structure, and the Entrepreneur", *Journal of Business Venturing*, Vol. 2, 1987, pp. 5-28.
12. Schulz, M., "The Uncertain Relevance of Newness: Organizational Learning and Knowledge Flows", *Academy of Management Journal*, Vol. 44, no. 4, 2001, pp. 661-681.
13. Slevin, D.P. and Covin, J.G., "The Competitive Tactics of Entrepreneurial Firms in High and Low Technology Industries". In Churchill, N.C., Kirshhoff, B.A., Krasner, O.J., and Vesper, K.H. (Eds.), "Frontiers of Entrepreneurship Research", Proceedings from the 7th Annual Babson College Entrepreneurship Research Conference, Wellesley, Babson College, Massachusetts, 1987.
14. Tushman, M.L. and Nelson, R.R., "Introduction: Technology, Organizations, and Innovation", *Administrative Science Quarterly*, No. 35, 1990, pp. 1-8.

Knowledge Force and Business Success

IV

Knowledge Force and Business Success

KNOWLEDGE FORCE AND STRATEGY

FACED WITH A unique set of challenges as outlined in the previous chapter, technology ventures call for an approach entailing a multi-dimensional perspective towards strategy building. Strategy formulation process in such companies, especially in the IT services firms, is complex, and it is often felt that strategies cannot be built with a long-term perspective. With frequent technology changes and the resultant impact on customer expectations, competition dynamics and emerging market trends, these ventures demand a mechanism to evaluate their market stance frequently and re-orchestrate their strategy with speed on an ongoing basis. In these firms, we find that people, their capabilities and the firm's offerings resulting from these come together to create a value proposition which is differentiated from others; hence, the strategy can be deemed to arise out of this intrinsic characteristic, thus qualifying to be part of the 'resource utilization' school. In keeping with the necessity to relate to the rapid changes in the economy, the pro-active market play scenario, customer driven rather than product push markets and predominance of 'people' power in shaping the firm's direction, the strategy of the entrepreneurial IT firms takes a multi-dimensional approach centered around the 'knowledge force'.

Knowledge force enables employees to go beyond the expectations of their role or job description and, emulating and imbibing entrepreneurial instincts, expand their boundaries of work, explore new dimensions because of their constant urge to learn and as a result of acquiring new skills and capabilities push the firm to change its strategy and direction. This is made possible by creating a congenial work climate that nurtures innovation, experimentation and exchange

of ideas. Shepherd, Ettenson and Crouch (2000) term the skills, knowledge and resources of the firms as 'educational capability'. Ventures with high education capability have a marked advantage in hastening customer substitution (Slater, 1993; Rogers, 1983), and therefore the profitability of the firm and the industry will also be enhanced (Porter, 1980). The key to this amazing learning and discovery process is the excitement that the technology world has to offer to these employees. Their very retention and contribution to the firm are fuelled by the technology and knowledge-enhancing environment that prevails in the organization, bringing us to the role the entrepreneur has to play in enabling employee force to become strong enough to act as a catalyst in the strategy formulation process.

Unlike the traditional ventures where the entrepreneur was solely credited with strategy formation, in the new economy ventures, the entrepreneur has to increasingly play the role of facilitator and catalyst even in the start-up phase or the growth phase. This is because no one individual will have all the knowledge and skills required to service the dynamic technology environment; the entrepreneur is not expected to possess all the wherewithal himself but he is expected to nurture his team and direct their capabilities towards the desired goal. According to Barhami (1996), developing versatile employees and leveraging their different capabilities in order to cope with different situational needs is a matter of pivotal importance for knowledge-based companies, as employees' capabilities, commitment, motivation and relationships mainly affect knowledge creation. In other words, by proper nurturing of the employees' capabilities, the entrepreneur creates a positive push towards a stronger knowledge force that can impact the strategy formulation process.

Schumpeter (1934) attributed the emergence of new products and processes to new 'recombinations' of knowledge. Taking this view further, Penrose (1959) called the organization a 'knowledge repository', emphasizing the importance of the experience and knowledge accumulated within the firm. In the new economy venture firms, what is also found is that since the market for a given product or service is still at a nascent stage, very often customers are being educated about the use of the offering, and while doing so organizations and people in these organizations learn to predict what the next version of their offering should be. Their collective enthusiasm and initiative nudges the firm to formulate its next strategy for growth. Customers, being eager to acquire a new service or experiment, create a positive impact on the firm to stretch itself and deliver the service. Close personal

contact with the customers gives the firm a clear perspective about the direction they should pursue in terms of product development; and with the aid of the entrepreneur-manager the firm is able to ready itself for exploiting the opportunity. Industry bodies and media create a healthy and positive (at times over-hyped) climate for business which not only motivates the firm to push itself further in its quest for knowledge but by following the signals from these key influencers, the knowledge force is nurtured in the right direction.

It has therefore been observed that knowledge force is the core of the strategy of the new economy entrepreneurial firm and there are a number of factors which work upon this core and strengthen or give shape to it. While the effectiveness of applying knowledge force can be seen from its impact on the strategy, knowledge force itself can be measured by four factors, namely 'entrepreneurial energy', 'employee capability', 'customer orientation' and 'industry orientation'. These factors have been used to build a model that will help guide the strategy formation process in the new economy.

KNOWLEDGE FORCE FRAMEWORK

The importance of evaluating knowledge assets is supported by several research studies including organizational learning (Huber, 1991; Levitt and March, 1988), resource-based and knowledge-based views (Barney, 1986; Grant, 1996, Foss, 1996) and work on knowledge management (Nonaka, 1994, Stewart, 1994). According to Drucker (1993), knowledge has quickly become the only meaningful resource in the new information society, irrevocably replacing traditional factors of production such as labor, capital and land. Itami (1987) supports this view when he states that "*in our present economy, more and more businesses are evolving whose value is not based on their tangible resources but on their intangible resources.*" With knowledge, skills and capabilities being the core of the offerings of these ventures, sustained competitive advantage can be achieved only through distinctive competencies so as to achieve success. (Hitt and Ireland, 1985). Firms are realizing that there is no sustainable advantage other than what a firm knows, how it can utilize what it knows, and how fast it can learn something new (Myers, 1996).

While all these researches focus on the increasing relevance of knowledge in organization building, what is of interest to us is defining what constitutes 'knowledge' for a young entrepreneurial organization, how does the organization convert that into a 'fuel' and how do we measure the impact on the strategy which creates the

momentum to move the organization forward. The model proposed tries to address these issues and the conceptual framework explaining the basic construct of the model is presented in Fig. 4.1.

The extent and impact of the knowledge force can be explained with the analogy of energy levels and fitness of human beings. Just as being fit enables a human being to perform several activities, knowledge force, it is argued, enables the firm to steer towards progress. A human being, depending upon his level of fitness, undertakes various physical activities, and the effectiveness of fitness levels can be reflected in the type of physical activity undertaken, for example, jogging, trekking, walking, cycling, etc.; in the case of knowledge force, we see its impact being felt on the strategy—on the growth strand, profitability strand or marketing effectiveness strand. Fitness usually depends upon a number of factors like exercising, dietary habits, genetic characteristics and so on. The measures of fitness could be several—blood test, stamina test, temperature, stress test, dietary habits, hereditary characteristics, etc. Similarly, we have identified factors that would influence knowledge force, based on the understanding of the implications of the dimensions which impact the organization evolution process in new economy entrepreneurial firms. This has helped us, in turn, evaluate the impact of the knowledge force.

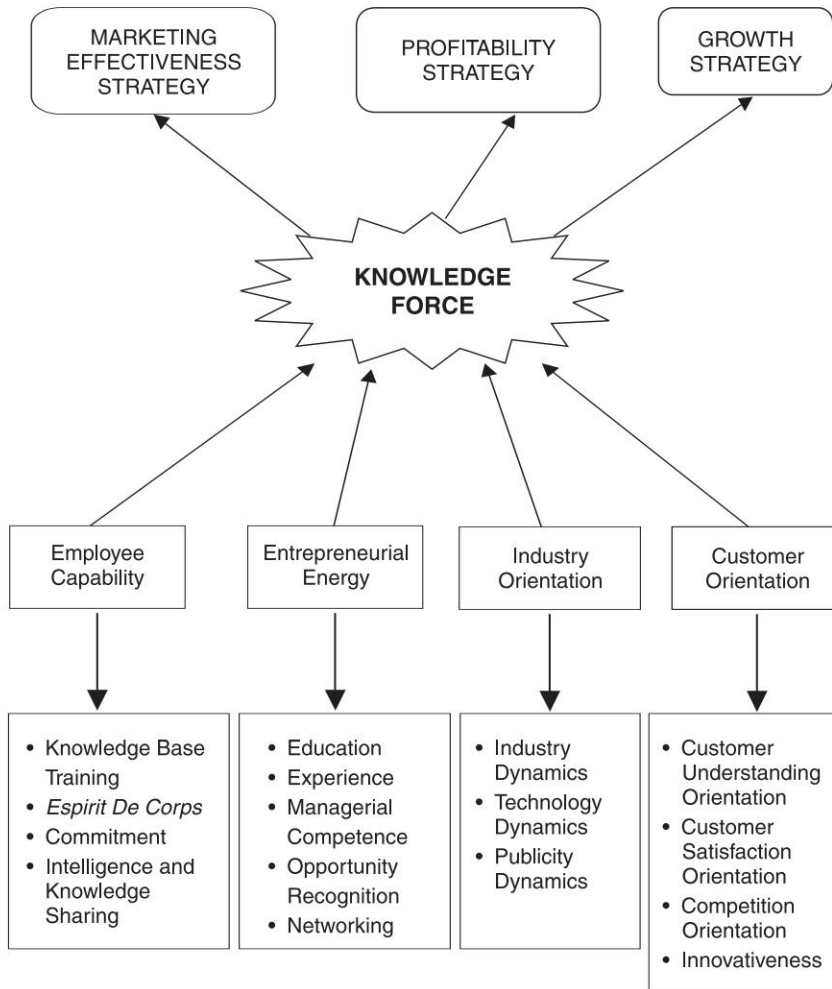
The model, as shown in Fig. 4.1, comprises of four dimensions, each of them being measured by different variables as indicated in the boxes shown below them. The structural relationship between the four dimensions and knowledge force is indicated at the next level with the help of arrows emanating from the four dimensions. Finally, the measures of knowledge force are indicated at the top, with the arrows emanating from knowledge force to the strategic outcomes, namely marketing effectiveness strategy, growth strategy and profitability strategy. In the following sections, each of these concepts is explained in detail.

Entrepreneurial Energy

With the knowledge force becoming the core for strategy formulation in new economy ventures which are technology intensive, does the entrepreneur become a 'dumb sleeping owner'? On the contrary, the presence of knowledge force demands that entrepreneurs have the necessary traits which will enable them to nurture organizational capabilities and act as a catalyst to take advantage of other positive elements in the environment, all contributing to an effective strategy formulation process.

Figure 4.1

Model depicting the role of knowledge force in the new economy entrepreneurial ventures



Unlike traditional ventures where the entrepreneur is the soul of the firm, new economy ventures have led to a new paradigm in entrepreneurship that create entrepreneurial energy necessary to energize organizations towards their strategic objectives. Thus entrepreneurial

energy is the first measure of knowledge force and comprises characteristics of the entrepreneur and the methods of functioning which create the necessary energy to activate the organization.

There have been several studies on entrepreneurial characteristics, both from the perspective of the state of entrepreneurship (Brockhaus, 1980) as well as from the perspective of their impact on business performance (Sandberg, 1986). In the context of knowledge force, the focus will be restricted to a select few variables of the personality characteristics, which have a direct bearing on the strategy formulation process. Entrepreneurial energy is measured by these factors—entrepreneur's experience, education, networking ability, opportunity recognition ability and managerial competence.

a) Education

While there are many success stories about school dropouts going on to becoming successful entrepreneurs, in technology ventures the trend is increasingly towards professionals and those with work experience setting up ventures. The research findings about the correlation of education background of the entrepreneurs and the success of the ventures are mixed. Stuart and Abetti (1990) found that education level was negatively related to the performance of technical firms, whereas Robinson and Sexton (1994) found a positive relationship. Our research also found a very strong co-relation between the educational qualification of the entrepreneur and the performance of the firm. In the context of educated professionals increasingly getting involved with new ventures, there is a reason to believe that education will equip the entrepreneur with better analytical skills, thereby making the strategy formulation process sharper.

b) Prior Experience

Prior experience in related business is a big asset for an entrepreneur, for it helps him to avoid the pitfalls and shrinks the learning curve for the new firm he has set up (Cooper and Dunkelberg, 1986; Braden, 1977). An entrepreneur's experience can be of three types, entrepreneurial-previous experience in start-ups, technical-previous experience in working with technology and managerial experience in managing teams and building business. Our study covered all three types of experiences. While it has been found that at times, prior experience can be a stumbling block when drastic change is called for (Jo and Lee, 1996), by and large the combined experiences of managerial and technical functions support a positive relationship between an entrepreneur's experience and performance (Duchesneau

and Gartner, 1990). Past experience will enable the entrepreneur to seize an opportunity when he 'sees' it and encourage the team to exploit it, thus contributing towards the strategic direction of the firm.

c) Opportunity Recognition

Smilor and Feeser (1991) call it 'talent' when they refer to "*entrepreneurs who recognize market opportunities and organize companies to try to take advantage of those opportunities.*" Chandler and Hanks (1994) state, "*Although opportunities in a given environment may exist, the quality of the opportunity actually selected and operationalized is contingent upon the founder's ability to recognize and envision taking advantage of opportunity.*" Bygrave (1993) defines an entrepreneur as someone who perceives an opportunity and creates an organization to pursue it. Davidsson (1991) has pointed out in his model of determinants of small firm growth that while actual growth takes place on account of ability, need and opportunity, motivation for growth is an important catalyst for actual growth, which in turn is fuelled by perceived ability, perceived need and perceived opportunity. Once the possible demand in an opportunity is seen, allocating the necessary resources towards the project, monitoring and fine-tuning the offering and launching the service at the right time when the customer is in the right frame of mind and the environment is ripe for such a service are all essential ingredients of 'timely action'. Timely action will give an edge to the firm to strengthen its positioning in the marketplace and receive customers' positive acknowledgment. Additionally, it will create the necessary momentum within the organization for furthering the business and encourage the employees to move on to the next phase of the learning curve. The lead time between the pioneer's entry into the market and the appearance of the first follower, at least initially, delays competitive rivalry within the industry (Shepherd, Ettenson and Crouch, 2000). Longer lead times enable the firm to charge premium prices (Porter, 1980), broaden the product lines (Robinson and Fornell, 1985), achieve cost-advantages both in the short term as well as in the long term because of the experience curve (Abell and Hammond, 1979) and also create barriers of entries for competition (Porter, 1980). By virtue of the fast changing technology scenario in which technology intensive firms operate, not only will opportunities just pass by if not acted upon promptly, but catching up also will prove difficult.

d) Networking

The role of networking in the entrepreneurial venture building process has been a well-researched subject for years. Since the venture itself is a social entity, and from the stage of its creation, the entrepreneur tends to rely upon sources of information and knowledge from a network of friends, lawyers, associates, family members, associations, academicians, etc. and continues to expand his network and rely on these sources to sharpen his business acumen. These networks provide him with linkages that enable him to acquire the necessary resources related to the business and *“the more successful a new venture is, the more likely it will be associated with the entrepreneur having identifiable business contacts or linkages”* (Carsrud, Gaglio and Olm, 1999). According to Jarillo-Mossi (1986), firms relying more heavily on external resources grow faster. The network also provides a natural overview in the local setting and substitutes physical with social proximity, i.e. creates a ‘personal community’, in other arenas (Wellman, 1988). Falemo (1989) found in his studies a direct link between strategy and networking, as the entrepreneur relies on the network for both product development and marketing. Thus not only do the personal networks of the entrepreneur impact on his performance in the firm, but personal and strategic interests of the firm also happen to merge.

e) Managerial Competence

Extending Rotter’s (1966) locus of control theory, Miller, Vries and Toulouse (1992) have developed the congruence theory stating that *“there will be a balance or congruence among variables describing the personality of the chief executive, the strategy of the firm and some of the consequent features of environment and structure”*. Building upon the concept of ‘Logical Incrementalism’ of Quinn (1978), it should be noted that the various elements of the strategy piece come together over a period of time and they need to be orchestrated carefully by the entrepreneur to become relevant in the strategy framework of the firm. Rizzoni (1999) supports this view while describing the factors of success for ‘new technology based small firms’ where he mentions the necessity of a ‘high level of entrepreneurship and managerial skills’. What is notable here is that in order to build successful firms, in addition to the right education background and understanding of technical issues (Cooper and Dunkelburg, 1987; Lorrain and Dussault, 1988), the ability to ‘manage and give leadership to the team’ becomes very important. In fact, it has been found that those entrepreneurs who are fastidious about their technical skills and are unable to balance

their attention towards ‘managing people’ and building the organization tend to become unsuccessful, especially beyond the start-up phase (Tashakori, 1980; Flamholtz, 1986).

Employee Capability

The second measure of knowledge force is employee capability. It is the capability created out of the collective strength of the employees of the firm. It refers to not only their education and know-how but the work environment which they help create and function in. Tovstiga (1999) says, *“Increasingly, organizations also are understanding that their knowledge processes are inextricably linked to the organization’s internal context—its internal management practices, learning culture and knowledge base.”* The extent of employee capability is measured by the knowledge base of the employees, the *esprit de corps*, the commitment, the level of intelligence and knowledge sharing and training.

a) Knowledge Base

Being a knowledge-intensive enterprise, the basic knowledge base, i.e. education and skills that employees possess, is the most important component that shapes the impact of employee capability. Although the importance of knowledge can be traced back to the ancient Greeks, the first evidence of codification of knowledge has its roots in scientific management. Taylor (1911) attempted to formalize workers’ experiences and tacit skills into objective rules and formulae. It was Simon (1977) who recognized the limitations of human cognitive capacity and coined the term ‘bounded rationality’. While traditional inputs of capital are limited by physical space or monetary constraints, intellectual capital generation may be limited by the collective ‘bounded rationality’ of the organization.

b) Commitment

The entrepreneurship process is significantly influenced by the attitudes and behavior of individuals (employees) who are involved in new venture creation (Withane, 1996). In this study, commitment is measured as a psychological attachment; Commitment of the employee to the vision and the business of the firm is essential for the success of the venture. Especially since ‘knowledge workers’ in technology ventures are involved in ‘increasing and building the know-how’, their collective bonding, pride and aligning their personal goals with the organizational goals are often seen as a pre-requisite for strengthening employee commitment. Kumar et al (1994) determined that affective relationship

commitment results in better organizational performance, whereas calculative and moral commitment resulted in lower performance.

c) *Espirit de Corps*

Espirit de corps is an attitude or frame of mind. According to Carnevale and Wechsler (1992), “*the development of trust in a relationship is reciprocal, so that individuals respond in kind to the trust or mistrust directed toward them.*” A sense of pride in belonging to an organization in which all departments and individuals work towards the common goal of satisfying customers and creating energy that binds them as one unit is an extension of the sense of commitment. If the employees are market-oriented, they have a common goal of serving customers, and when these parties exert efforts to achieve this common goal they are engaging in cooperative behaviors (Anderson & Narus, 1990). In technology ventures, organizations undertake several initiatives to consciously create an environment that promotes this team spirit, because of their keenness to protect the human talent and prevent turnover or demotivation on account of any minor or major irritants in the work atmosphere.

d) *Intelligence and Knowledge Sharing*

Drucker (1993) stated in his book *Post Capitalist Society*, “*The basic economic resource is no longer capital, nor natural resources. It is and will be knowledge.*” Accumulated knowledge and experience becomes expertise, i.e. the ability to apply knowledge in a variety of situations and achieve successful results. Knowledge is commonly believed to exist in tacit and explicit forms. Explicit knowledge is defined as being recorded and imparted by traditional learning methods. Tacit knowledge allows the expert to use information better and makes the information more valuable. The relevant aspects of expertise are recorded and shared throughout the organization in order to enable superior performance of critical organizational processes. In young entrepreneurial firms which are basically knowledge intensive firms, knowledge flows comparatively easily within the organization and it is through these exchanges that new competencies and ideas are created.

e) *Training*

Individual learning is a pre-requisite for organizational learning. According to Nonaka and Takeuchi (1995), “*Knowledge is created only by individuals. An organization cannot create knowledge on its own without individuals. Organizational knowledge creation should be understood as a process that organizationally amplifies the knowledge created by individuals*

and crystallizes it at the group level through dialogue, discussion, experience sharing, or observation.” While training has long been recognized for its role in updating skills and as a source of motivation, in the case of new economy ventures, since there are frequent changes in the technology and dramatic transformations in market dynamics from time to time, formal training is seen as essential to keep employees ‘fighting fit’ and abreast of changes. Once organizational teams integrate their own respective learning, learning at the organizational level starts. This level of organizational learning requires the conversion of individual and group learning into a systematic base of organizational intellectual capital (Shrivastava, 1986).

Customer Orientation

Customer orientation entails the sufficient understanding of one’s target buyers and sufficient responses to their needs, through which, other things being equal, one continuously creates a superior value for the buyers or an augmented product (Levitt, 1980). Customer orientation requires, in part, that a seller understand a buyer’s entire value chain (Day and Wensley, 1988) not only as it is today but also as it will evolve over time subject to internal and market dynamics. Deshpande, Farley and Webster (1999) define customer orientation as the set of beliefs that puts the customer’s interest first, ahead of those of all other stakeholders. They view customer orientation as being a part of an overall, but much more fundamental, corporate culture. Kohli and Jarowski’s (1990) description of customer orientation focuses on an organization-wide generation and dissemination of, and responsiveness to, market intelligence.

It is customer orientation which motivates a firm to explore new areas or expedite work on partly developed ideas and products and give them proper shape such that they meet the customer’s expectations. Thus, customer orientation is an important barometer of the knowledge force that impacts upon the strategic direction of the company. The ability to remain customer-oriented depends upon customer understanding orientation, customer satisfaction orientation, competitor orientation and innovativeness.

a) Customer Understanding Orientation

The path of innovation can be pursued by two different approaches, the ‘need pull approach’ and ‘the discovery push approach’ (Barreyre, 1976). Need pull is commonly understood as ‘customer pull’ which takes place where a clear need is already established and the customers

are ready to be serviced. When there is customer pull, one can expect competition, as the demand factor is already known. Customers are in a position to articulate their needs and this becomes the starting point for a firm to start working on the product or the service offering. Discovery push relates to the scenario where a discovery or mastery of technology has already taken place and efforts are made to market this technology to the customer by finding possible applications. In reality it is likely that the firm will be adopting a mix of both these approaches, sometimes happening simultaneously and at times alternating.

An entrepreneurial technology venture responds to both these situations, in the case of the former, as the pull is already created and the customer is eager to experiment and sample the offering, and at times expects customization; with the latter approach, once the customer is made aware of the possibility of the offering, a match with the customer's felt or perceived need is made through an iterative process, and once 'in principle' acceptance of the concept occurs, the customer expects to learn more about the offering, is ready for pilots and collaborative development of the product, or offerings in certain cases. Since customers are newly experiencing these services and yet at the same time eager to experiment and adopt new offerings, they come to depend upon the firms that are first off the block with these services. Therefore, knowledge force derives a big boost by being focused on customer understanding.

b) Customer Satisfaction Orientation

The customer is attracted to the seller and remains with the seller so long as the customer perceives superior value from the seller. With the higher level of orientation of customer satisfaction, the firm's chances of increasing its sales to new and current customers increase. Through word of mouth and other means, these loyal customers help attract new customers to the business (Reichheld, 1993). A poor alignment with prospective customers and a poor relationship with current customers reduce revenues and increase costs.

When the customer has dealt with the entrepreneur or the key employees of a firm or with the firm in the past and has had a positive experience, the customer is willing to 'trust the firm' with a new service. Even if the customer is not yet fully ready to buy the service or the product, because of the past relationship, trial orders or pilots or small orders for referrals are possible. In the early days of the entrepreneurial venture, such support is extremely useful for building the base of the business. The higher the customer satisfaction orientation,

the higher will be the impact on the overall customer focus and the resultant impact on the knowledge force.

c) Competition Orientation

Apart from the acknowledgment from customers and the media, since it is a knowledge game, firms keep tabs on competition through the industry network and constantly try and benchmark their offerings against that of competitors to make an honest assessment on their own. To create value for buyers that is greater than that created by its competitors, a seller must understand the short-term strengths and weaknesses and long-term capabilities and strategies of both the key current competitors and the key potential competitors (Aker, 1988; Day and Wensley, 1988; Porter 1980, 1985). The dynamics created by competitors' activities and a close following helps an organization charter its future road map and ensure that it stays ahead of competition. Firms will be in a position to service their customers effectively when their knowledge force is fine-tuned based on the understanding of the competitor's moves. New product development plans depend upon the assessment of who are the likely competitors, and what their strategy is likely to be.

d) Innovativeness

Drucker (1954) spelt out the importance of organizational innovativeness as follows: *"There is only one valid definition of business purpose: to create a customer... It is the customer who determines what the business is. Because it is its purpose to create a customer, any business enterprise has two—and only these two—basic functions: marketing and innovation."* While the importance of 'innovativeness' has been recognized, researchers have lately been focusing upon the impact of innovativeness on the organizational performance. According to Gronhaug and Kaufmann (1988), a firm needs to be innovative so as *"to gain a competitive edge in order to survive and grow"*. In the context of new economy ventures, innovativeness is the hallmark of a firm's ability to create new markets and expand existing ones. Innovation is a 'must' for these ventures to remain in the marketplace as the threat of new entrants and substitution is very high in an industry where entry barriers are often very low.

Industry Orientation

Industry orientation is the fourth measure of knowledge force. Since knowledge is shaped by the flow of information and communication

through both formal and informal channels, the role of industry orientation in the strategy discussion needs a careful look. According to (1994), *“Where markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products.”* An organization can benefit a great deal if it knows how to harness industry orientation, and strategy efforts will pay off handsomely by correct assessment and application of industry orientation in the organization’s strategy efforts.

In technology ventures, the dynamics of changes in the industry are very complex and far-reaching as compared to other industries. The industry has been able to make great strides of growth because of this uniqueness, and organizations which are constantly keeping a tab on these to adapt themselves are able to generate a stronger knowledge force that results in a positive direction of the strategy of the firm. Industry orientation is determined by the combined effects of industry dynamics, technology dynamics and publicity dynamics.

a) Industry Dynamics

The industry environment within which a firm operates also creates a substantial ‘push’ especially in the context of entrepreneurial technology ventures. The environment was defined by Duncan (1972) as the relevant physical and social factors outside the boundary of an organizational decision-making. Sandberg and Hofer (1987) argue that environmental variables must be considered when examining strategy content and performance in new ventures. Cooper (1993) also considers environment to be one of the key influences on entrepreneurial firm performance. From an information processing perspective, the environment is important because it creates uncertainty for managers, especially top management. Environmental uncertainty increases information processing within organizations because managers must identify opportunities, detect and interpret problem areas, and implement strategic or structural adaptations (Hambrick, 1982; Galbraith, 1983). An information advantage about environmental opportunities and problems depends on the management’s perception of signals that other organizations miss (Dutton and Freedman, 1984). According to Miller and Freisen (1978), *“Dynamism in the environment is manifested by the amount and unpredictability of change in customer tastes, production or service technologies, and the modes of competition in the firm’s principal industries.”*

b) Technology Dynamics

As Kohli and Jaworski (1990) define it, technology refers to the entire process of transforming inputs to outputs and delivering those outputs to the customer. Technology has been changing very rapidly, and it is the ability to cope with these changes, proactively identify the future technology directions and gear up to these changes that form the cornerstones of success of the new economy entrepreneurial firms. In other words, the change brought about by technology has by itself presented several opportunities to the entrepreneurs, and thus the industry has been forging ahead on account of the technology dynamics. As Tushman and Anderson (1986) state, “*Technological change, an element of environmental instability creates a variety of opportunities.*” The lack of dependencies and stakeholder constraints characterizing young firms (Dodge, Fullerton and Robbins, 1994) enables them to stay relatively fluid and flexible in their product or market commitments and take advantage of such opportunities.

c) Publicity Dynamics

Just as in other industries, technology ventures are also backed by associations and interest groups which play an active role in propagating the ideas of such ventures, educating the public and the potential customers, opening doors for the companies, creating industry opinion in key matters, liaising with the government on behalf of the member companies and expediting the rate of change required to transit into the practices of the new economy. Industry bodies are very important for entrepreneurial young ventures as they provide cost-effective services and, at the same time, the much needed exposure to the firms as well as the entrepreneurs to showcase their offerings and network with the relevant people and customers. Media and associations such as NASSCOM and CSI have played a very important role in not only shaping the requirements of the customer and expanding the marketplace but also in facilitating the two way exposure—(a) developments in the entrepreneurial firms and (b) fostering new ideas and thinking for the future by sharing developments and happenings worldwide.

Entrepreneurial Outcomes

The objective of the current study is to examine how knowledge force impacts on strategy. This means that we need to look at the entrepreneurial outcomes. Strategy that is shaped by knowledge force is reflected in the performance of the organization and this can be assessed in multiple ways. In the proposed model we capture this in

three strands, namely growth, marketing effectiveness and profitability. The impact of knowledge force is likely to be different on each of these strands of strategy based upon the strength of its measures.

SHAPING STRATEGY WITH KNOWLEDGE FORCE

In order to understand the role of knowledge force in strategy evolution, it is important to examine how these variables determine the effectiveness of the four dimensions of strategy. In the previous sections the determinants of knowledge force, namely customer orientation, employee capability, entrepreneurial energy and industry orientation, have been explained and the measures of these four latent variables explored, the essence of which is presented in Table 4.1.

Table 4.1

Measures of latent variables

Dimension	Measures
Entrepreneurial Energy	Education, Experience, Managerial competence, Opportunity recognition and networking
Employee Capability	Knowledge base, <i>Espirit de corps</i> , training, Intelligence and knowledge sharing.
Industry Orientation	Industry dynamics, Technology dynamics and Publicity dynamics
Customer Orientation	Customer satisfaction orientation, Customer understanding orientation, Competition orientation and Innovativeness

While studying the relationships between knowledge force and the four determinants of knowledge force, it should be noted that the measures of these four factors have relationships among themselves and are believed to be influenced by one another. Therefore, before we examine how knowledge force is shaped, since the activity base in the organization leads to and is a result of several dynamics, it is important to first understand the implications of these variables. In other words, each of the above variables interacts with other variables, causing certain dynamics or a resultant of certain dynamics. A variable can be an influencer as well as be influenced by others simultaneously. It is difficult to compartmentalize them and treat them as independent

variables in the context of organizational dynamics. Only by recognizing the inter-relationships of these variables would it be possible to derive a better understanding of how they shape the four determinants of knowledge force. If these relationships did not exist, then it may be construed that the knowledge force will be non-existent or weak. In other words, industry orientation, customer orientation, entrepreneurial energy and employee capability are nested and strengthened by these inter-relationships. Therefore, it is important to investigate these relationships to get a clear perspective of their impact on the knowledge force. The following section presents the possible influencers for each variable and explains how these relationships are shaped.

STUDY FINDINGS

In order to examine the relationships among the measures and their impact on the knowledge force, a detailed study of 95 entrepreneurial firms representing the IT services industry was carried out. The objective was to analyze the impact and interrelationships among the factors identified which were likely to influence the knowledge force of the organization. The dynamics of interaction among different variables and the influence they create on other variables—endogenous or exogenous—make an interesting study. These effects could be either direct, where it was the structural coefficient linking the two variables, or indirect where the effect of one variable on another could be through one or more intervening variables as defined by the product of associated structural coefficients that link the variables in a particular structural chain. Finally, the sum of the direct and indirect effect was defined as the total effect of an independent variable on a dependent variable.

The analysis showed that there was a two-way relationship among several variables, as an influencer sometimes and being influenced at other times, some positive and some negative. Among the three endogenous variables considered for evaluating the significance of influence, customer satisfaction orientation featured prominently, followed by education in direct, indirect and total effects. The positive influence of education on the performance variables of the firm reiterated the findings of previous research studies (Cooper and Dunkelberg, 1987; Thompson, 1986). The significance of customer orientation on performance variables was confirmation of the findings of previous research studies (Athanasopoulos, 2000; Deshpande et al., 1993; Houston 1986; Parasuraman, 1987).

Managerial competence may not have prominent relationships or the highest influence on other variables, but 'path analysis' has given us insights about the implications of direct and indirect effects of managerial competence. Managerial competence was found to have direct effects on opportunity recognition and commitment, reasonable indirect effects on *esprit de corps*, and affected to a small extent competition orientation, industry dynamics, technology dynamics, publicity dynamics, intelligence and knowledge sharing and training and customer understanding orientation. Thus, managerial competence affects all the four dimensions of the strategy process through a mix of direct and indirect effects on some of the variables, confirming that managerial competence is an important influencer in the organization dynamics.

The analysis of the influence of the fourteen exogenous variables on each other revealed that experience and networking are the two variables which influence the maximum number of variables (six each). This proves that entrepreneurial experience combined with networking capability is crucial for a firm's development process. This finding is in line with the findings of previous studies as well. Gasse (1982) pointed out that an entrepreneur's experience can influence performance positively or negatively. Teach et al (1985) in their study on software venture teams have stressed that previous experience in the software industry is the most significant contributor to the success of the current microcomputer software firm.

Although the entrepreneurs covered in the sample were doing limited networking, path analysis has confirmed that even so, networking is an important variable impacting on six out of the fourteen variables under study, namely innovativeness, technology dynamics, intelligence and knowledge sharing, training, customer understanding orientation and industry dynamics. Networking is a vibrant variable which is also impacted by customer satisfaction orientation, knowledge base of the employees and education of the entrepreneur directly, besides the indirect effects of other variables. The findings confirm the observations of previous studies on the importance of networking (Aldrich et al., 1987; Ostgaard and Birley, 1996).

The next three important exogenous variables which impact other exogenous variables are customer understanding orientation, intelligence and knowledge sharing and training, impacting four variables each. This finding highlights the importance of training and knowledge sharing in the entrepreneurial new economy ventures and the orientation to customer needs to be able to proactively adapt to changing requirements.

It is observed that while different variables interact among themselves and a certain impact is created on the strategy of the firm, there is an intervening latent variable— knowledge force— which impacts the strategy process in the firm. Knowledge force is an important force appearing between the variables determining the four dimensions of the strategy and strategy itself. While the previous research findings have shown how these variables impact upon the performance of the organization directly, it is argued that it is knowledge force which shapes the strategy of the firm, and hence it is an important driver of performance in entrepreneurial new economy firms. Since knowledge force is a conceptual energy or force, a mechanism is needed to measure the extent of knowledge force generated and these measures are entrepreneurial energy, employee capability, industry orientation and customer orientation. It is this knowledge force—generated out of the activity base in the company—that creates an effect on the strategic direction of the firm. It is argued that the multiple variables impacting performance contribute towards the creation of a knowledge force which is unique to every organization. This view is supported by two interesting studies carried out earlier: Emery and Trist (1972) have stated that the behavior of an organization may be understood by examining four sets of system interdependencies—environmental, organizational and the input–output interrelationships connecting organization with environment. Murray (1984) states that *“the entrepreneurial purpose configures itself as an organization so as to survive in, and deal effectively with, its environmental by combining resources through its structural and process design decisions. Its choice of inputs (resources and information) and outputs (products/services and information) bind organization and environment together, providing the open system of the organization with the inflows and outflows necessary for survival and growth. The set of decisions involved in this choice constitutes a complex interrelated system defining strategy.”*

We will next examine how the dynamics in the relationships of different variables pave the way for the creation of knowledge force and how these variables help in determining the effectiveness of the four dimensions involved in strategy making

It has been established that there are a number of variables impacting organization performance and that they interact among themselves. However, with the degree of influence and the variables in each relationship varying, in order to understand the role of knowledge force in the strategic direction of the firm, the dynamics of knowledge force with respect to these variables is examined independent of the

dynamics of inter-relationships which exist amongst these variables. For this purpose, let us investigate the characteristics of the four determinants of knowledge force and how these variables act as their measures. Towards this objective, data was applied on the model and the results analyzed under three categories:

- Measuring the four dimensions
- Structuring relationships between knowledge force and the four dimensions.
- Measuring knowledge force

Further, in order to extract precise indicators reflecting the knowledge force prevalent in different stages of the business, it was decided to divide the companies as per the number of years of existence. The first set of companies observed in Model I consisted of all 95 companies whose average age was four years. The second set of companies observed in Model II consisted of companies whose average age was three years. The third set of companies observed in Model III consisted of companies whose average age was two years. Let us now compare the impact across various models and examine how knowledge force impacts the organization differently at different stages of business.

KNOWLEDGE FORCE AT DIFFERENT STAGES OF THE FIRM

The Knowledge force framework that has been developed is based on the structural and measurement dimensions of knowledge force and it studies the resultant impact of knowledge force on the three strategies, namely growth, market share and profitability. Structural Equation Modeling was chosen as the methodology for testing the hypotheses and analysis thereof. The cause-effect model tested by applying SEM techniques and LISREL software for generating results have been used to present the key findings and major inferences.

Based on the analysis of findings of different models, a comparison of models on all the indicators of knowledge force and the impact of knowledge force has been carried out, and the findings presented here.

A Comparative Analysis of Models I, II and III

In order to compare the effectiveness of knowledge force of different lifespan, Models I, II and III are taken into consideration as all these models have recognized the error terms and all the possible measures for the four dimensions.

Measures of entrepreneurial energy

The original measures of entrepreneurial energy as hypothesized included education, managerial competence, networking, and experience and opportunity recognition. However, after observing the behavior of the variables in the first model, new measures of the four dimensions were observed for entrepreneurial energy, the comparison of which is presented in Table 4.2 for Model I, Model II and Model III.

Table 4.2**Measures of entrepreneurial energy**

Variables	Positive Indicators			Negative Indicators		
	Model I	Model II	Model III	Model I	Model II	Model III
Education					•	•
Experience	■	■	■			
Managerial competence					•	•
Networking			■	•	•	
Opportunity recognition			■	•	•	
Knowledge base	■					
Training	■	■	■			
Commitment				•		
<i>Espirit de corps</i>			■	•	•	
Intelligence & Knowledge sharing			■	•	•	•
Innovativeness			■			
Competition		■		•		•
Orientation						
Customer understanding orientation	■		■			
Customer satisfaction Orientation	■			•	•	•

It may be noted from Table 4.2 that opportunity recognition and networking, which are positive indicators of entrepreneurial energy in young firms, become negative indicators as firms grow older. This reflects the fact that while in the early stages the entrepreneur has to play a big role personally in terms of recognizing new opportunities for the firm and leveraging his network connections, as the firm grows older, the entrepreneur perhaps becomes an impediment by his direct involvement, calling for systemic interventions through other means. Similarly *esprit de corps* is a positive indicator in young firms whereas it becomes a negative indicator in older firms, along with commitment, indicating that when the firms are younger the entrepreneur can bind them together better through his direct involvement; but the scenario changes as the firm grows older and the number of people in the firm increases, throwing up a challenge for the entrepreneurial energy to continue to have a direct and positive impact on the camaraderie in the firm.

It may also be noted that customer satisfaction orientation and intelligence and knowledge sharing remain negative indicators however young or old the firms are, indicating that entrepreneurial energy is not effective for triggering them. Managerial competence and education of the entrepreneur surprisingly are negative measures of entrepreneurial energy in the case of young firms, which means that there could be a mismatch between the entrepreneur's education and the entrepreneurial energy needed to build the firm in the early days of the venture and that his managerial competence is not effective. It may be noted that managerial competence does not feature as either a positive or negative indicator in Model I, from which it can be noted that even if managerial competence of the entrepreneur is not adequate or apt, the firm has other mechanisms for its development and to build its strategy. Experience and training provided to employees are two measures of entrepreneurial energy which remain positive irrespective of the age of the firm. While experience can only get enriched and contribute towards organization growth, training provided to employees brings about indirect motivation in the entrepreneur and steers him towards new opportunities for the firm; he will seek new business continuously on the strength of the confidence derived from the training activity.

Measures of employee capability

The original hypothesis had tested the model with employee capability measuring knowledge base, commitment, intelligence and knowledge

sharing, training and *esprit de corps*. However, subsequent to testing the hypothesis, it was realized that there could be other measures which could be important and thus impact on the knowledge force through the four dimensions, and after accounting for the error terms also the model was tested again. Further, it has been observed that the composition of these measures of dimensions have been found to vary in each model. Hence, a comparison of the indicators as reflected in Models I, II and III was carried out and the salient details are presented in Table 4.3.

Table 4.3**Measures of employee capability**

Variables	Positive Indicators			Negative Indicators		
	Model I	Model II	Model III	Model I	Model II	Model III
Education	■					
Experience	■	■	■			
Managerial competence				•		
Networking	■	■				
Opportunity recognition				•		•
Knowledge base	■	■	■			
Training					•	•
Commitment	■	■	■	•	•	
<i>Espirit de corps</i>			■			
Intelligence &	■	■	■			
Knowledge sharing						
Innovativeness						•
Competition Orientation				•		
Customer understanding orientation						
Customer satisfaction orientation	■	■	■			
Industry dynamics	■		■			
Technology dynamics	■	■	■			
Publicity dynamics	■	■				•

From Table 4.3, the following observations can be made. The firm being young, the impact of media and publicity is not perhaps realized by the employees, unlike with the older firms. It could therefore be discerned that in ventures which are young, the fine-tuned alertness to publicity may not be high among employees. In fact, due to lack of proper orientation, publicity dynamics can be negative. It is interesting to note that the higher the employee capability, the more likely that measures such as innovation, training, opportunity recognition and networking ability are negative as the firm still struggles to keep the itself together in terms of its vision and direction, with managerial competence not reflecting as a positive indicator. As the firms grow older, *esprit de corps* is likely to be reduced as can be seen in Model I and Model II where it becomes a negative indicator. While there are several similarities in the positive indicators, in Model I the education of the entrepreneur is a measure of employee capability, which signifies that this factor helps in attracting employees in mature firms. It may be noted that irrespective of the age of the firm, technology dynamics, customer satisfaction orientation, intelligence and knowledge sharing, commitment, knowledge base and experience remain the positive measures of employee capability, signifying the importance of these variables and the conditions which allow them to be positive in an organization.

Measures of industry orientation

Industry orientation was originally hypothesized to be measured by industry dynamics, publicity dynamics and technology dynamics. However, upon scrutiny it was observed that there could be other measures defining industry orientation and these measures differed depending upon the age of the firm. An attempt has been made here to compare how these measures behaved in the three models constructed on the lines of the age of the firm, the details of which are presented in Table 4.4.

Publicity dynamics is a negative indicator in young firms showing that only after the firms are five years of age or older, do they realize the full impact of industry orientation; industry dynamics and technology dynamics, however, are realized even in the early stage. In the early stages, due to suspicions and insecurity, knowledge sharing among employees may be less and hence is seen as a negative indicator of industry orientation. However, it may be noted that commitment is a positive indicator of industry orientation in young firms and it could turn into a negative indicator in older firms. Since opportunity

Table 4.4**Measures of industry orientation**

Variables	Positive Indicators			Negative Indicators		
	Model I	Model II	Model III	Model I	Model II	Model III
Education						
Experience						•
Managerial competence						
Networking	■	■				•
Opportunity recognition						•
Knowledge base	■	■	■			
Training			■	•	•	
Commitment		■	■	•		
<i>Espirit de corps</i>						
Intelligence & Knowledge sharing	■	■				•
Innovativeness						
Competition orientation				•	•	•
Customer understanding orientation			■	•	•	
Customer satisfaction orientation						
Industry dynamics	■	■	■			
Technology dynamics	■	■	■			
Publicity dynamics	■	■				•

recognition, networking and experience of the entrepreneur are shown as negative indicators of industry orientation, caution needs to be exercised to ensure that industry orientation is minimized in the early stage of the firm so that these abilities and advantages of the entrepreneur are not lost completely. Training is a positive indicator of industry orientation in young firms, but in older firms training is a negative indicator which means that factors other than external environment could be the basis and motivation for training. Networking is an important measure of industry orientation as the firm grows older and it implies that the organization is ready to start exploiting the

opportunities through networking, thus making industry orientation more vibrant. Knowledge base of the organization remains a positive measure irrespective of the age of the firm, thus highlighting the importance of this variable in the organization dynamics. It is the width and depth of the knowledge base that triggers a momentum to entrepreneurial activity in the new economy era. Competition orientation remains a negative measure whatever be the age of the firm. This could signify that the intense industry orientation could make organizations lose sight of their immediate competition and this is a danger that organizations which are constantly innovating need to be careful about.

Measures of customer orientation

Customer orientation was hypothesized to be measured by customer understanding orientation, customer satisfaction orientation, competition orientation and innovativeness. However, just like the other three dimensions, it was observed that in the case of customer orientation also the measures were likely to differ with differing ages of the firms, the details of which have been captured through Models I, II and III. A comparison of the measures in the three models is presented here.

Customer understanding orientation and customer satisfaction orientation are negative indicators in young firms whereas they are positive in older firms. This means that customer orientation does not lead to better understanding of the customer and better efforts in satisfying his requirements at early stages of the firm; this is perhaps because the process of defining customers and their profile evolves over a period of time and takes a while before it stabilizes. Opportunity recognition, which is a positive indicator of customer orientation in the early stage of the firm, becomes a negative indicator as the firm grows older, signifying that the entrepreneur's capability in recognizing opportunities are not sufficient and, in fact, they could even become detrimental if they are just resident in the individual and the firm needs to find other means of exploring new opportunities. In the early stage, entrepreneurs' opportunity recognition skills get a boost with better customer orientation of the firm. In the early stage of the firm, when the organization is not fully prepared to deal with the complexities of customer requirements, with higher customer orientation, commitment of employees could be affected as the mechanism to deal with the complexities may not be in place or not fully understood by the employees. However, as the firms grow older, this aspect is addressed

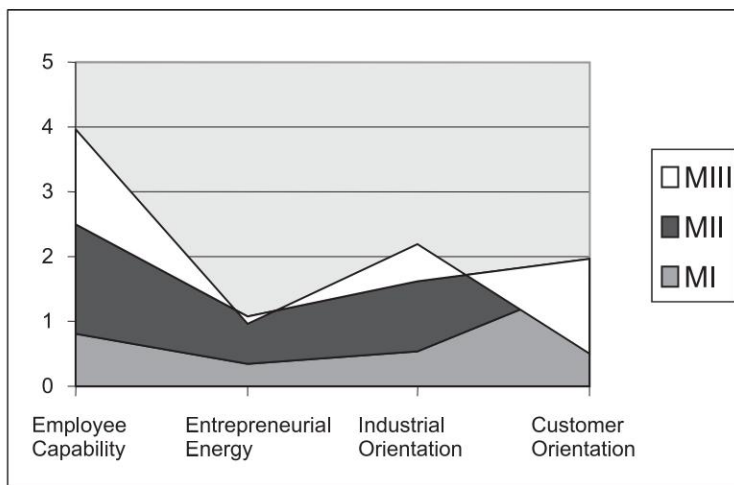
by the firm and hence the commitment of the employees becomes a positive measure, with higher levels of confidence. With higher levels of customer orientation, industry dynamics becomes negative whether in young or old firms, signifying that focusing on a firm's clients can be detrimental to industry dynamics as the firm may not be interested in the overall industry implications. If the knowledge base is high, it is likely that customer orientation is low and vice versa. This means that in order to attract high talent into the firm and to remain a customer-orientated firm, there is a need for carrying out publicity drives with educational institutions and among the youth.

Table 4.5**Measures of customer orientation**

Variable	Positive Indicators			Negative Indicators		
	Model I	Model II	Model III	Model I	Model II	Model III
Education						
Experience						
Managerial competence						
Networking	■	■	■			
Opportunity recognition			■		•	
Knowledge base				•	•	•
Training						
Commitment	■	■				•
Espirit de corps						
Intelligence & Knowledge sharing						
Innovativeness	■		■			
Competition Orientation	■	■	■			
Customer understanding orientation	■	■				•
Customer satisfaction orientation	■	■				•
Industry dynamics				•	•	•
Technology dynamics						
Publicity dynamics			■			

Determinants of knowledge force

Just as it has been observed that the behavior of the variables measuring the four dimensions are likely to vary with differing ages of the firms, the determinants of knowledge force as defined by entrepreneurial energy, employee capability, customer orientation and industry orientation will also reflect different characteristics. The details of the findings of the comparison of the four determinants as observed in Models I, II and III are presented here.

Figure 4.2**Determinants of knowledge force**

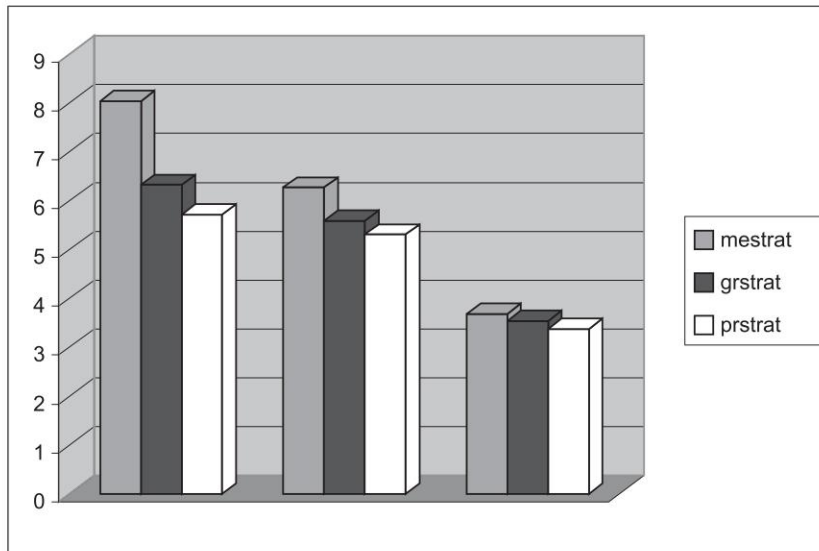
It may be noted from Fig. 4.2 that unlike older firms, in firms that are five years old or younger, entrepreneurial energy and customer orientation do not have a positive relationship with knowledge force. Employee capability and industry orientation show a positive relationship, but employee capability is weaker and industry orientation marginally stronger. What is significant from this finding is that despite customer orientation and entrepreneurial energy being negative, employee capability and industry orientation play a significant role in the early stage of the venture, helping in the creation of knowledge

force. The combined effect of employee capability and industry orientation is so strong that even if entrepreneurial energy is weak or negative and the understanding of the customer is not yet strong, knowledge force is generated which is the essence for strategy formation in new economy ventures. In other words, even though young firms are not tuned to customer requirements very well and the entrepreneur is still grappling with management issues, the employee capability is a strength which is instrumental in moving the organization forward and it provides the maximum fuel for the operations. Also, since the organization is young, there is a lot of enthusiasm and hence the flexibility and speed with which they spot changes in technology and industry trends and adapt help them remain competitive and successful. In older firms, all the four measures of knowledge force are positive, with customer orientation being the strongest in the older firms, indicating that as firms mature their understanding of the customer grows stronger. And this understanding overpowers any other dimension of the firm. However, employee capability, entrepreneurial energy and industry orientation are high in firms whose average age is 3 years. This could imply that there is the danger of organizations becoming weaker in these dimensions as they grow older. This also implies that there is no steady state for knowledge force and the organization has to continuously orchestrate its capabilities, competencies and environmental factors in such a manner that it is able to find its own rhythm and exploit the four dimensions fully so as to maximize the knowledge force.

Impact of knowledge force

Having observed that the four determinants of knowledge force behave differently with different lifespans of the firm, the impact that knowledge force creates on strategy will also differ with age. The detailed comparison reflecting the impact of knowledge force in Models I, II and III are presented next.

It may be noted from Fig. 4.3 that as a result of negative entrepreneurial energy and customer orientation and also the weaker impact of employee capability, the measure of knowledge force indicates less impactful marketing effectiveness strategy, growth strategy and profit strategy in younger firms. The impact of knowledge force is significantly higher as compared to the increase in the impact of growth and profitability strategy as the firm grows.

Figure 4.3**Impact of knowledge force on strategy**

mestrat—Marketing Effectiveness Strategy
 grstrat—Growth Strategy
 prstrat—Profitability Strategy

THE LINKAGES OF KNOWLEDGE FORCE

So far, the study and the analysis have focused on examining the hypotheses related to the measures of the four dimensions, and investigating the impact of knowledge force on strategy variables. In order to get further insights about how knowledge force gets shaped, it would be useful to examine the linkages of knowledge force with the four dimensions and how the behavior of the variables measuring the four dimensions are related to knowledge force. In this analysis, while examining the linkages, the variables which were found to be the common measures across the three models were explored to see if some meaningful findings would emerge. The linkages were examined from four perspectives and a comparison carried out across Models I, II and III. The details of the findings are presented here.

Linkage of Knowledge Force with Entrepreneurial Energy

At the first instance, the linkage of knowledge force is studied with respect to entrepreneurial energy, measured by education, managerial competence, opportunity recognition, networking and experience. The details of the findings from the three models and a comparison thereof are presented in Table 4.6.

Table 4.6

Linkage of knowledge force with entrepreneurial energy

Variable	Model I	Model II	Model III
Lifespan	0.5-23	Upto 10	Upto 5
Avg. age of the firm	4.2	3.02	2.0
Education	5.91	6.03	6.05
Experience	1.07	1.01	0.99
Knowledge base	2.02	3.71	1.99
Employee strength	56	48	48
Managerial competence	2.06	2.09	2.02
Opportunity recognition	5.29	5.34	5.35
Networking	2.92	2.98	2.97
Age	36.81	35.94	35.31
Knowledge force impact	Highest	High	Low

From Table 4.6, we get a bird's eye view of the linkages of knowledge force with entrepreneurial energy. Education of the entrepreneur is more or less of the same level in firms which are up to five years old as well as those up to ten years old. Experience of the entrepreneur is the highest in the total sample of firms. It is less in the other two cases, with very little difference between the two. Knowledge base is the highest in the firms up to ten years old and lowest among the firms whose age is five years or less. The number of employees is maximum in the older firms and the same in the other two categories. The findings highlight that the ability to attract higher levels of talent is better in older firms but firms which are 10 years of age or older may not necessarily attract high talent. An analysis of the profile of firms studied indicates that these firms typically are in data services and may not offer exciting cutting-edge technology opportunities to attract professionals with higher

qualifications. Also, when the firms are younger they may not find it easy to attract top level talent and perhaps they may also not need high level talent in large numbers at the early stages. It can also be concluded that it is not necessary that the older the firm, the higher the knowledge base of the firm, even with large number of employees. In other words, even though the number of employees may be more in older companies, knowledge force is higher on account of the role the entrepreneur continues to play as can be seen from the experience of the entrepreneur which is the highest among all categories. This could signify that in older firms, even though the education of the entrepreneur and the knowledge base of the employees are lower even with higher number of employees, knowledge force is the highest because of the high levels of experience the entrepreneur possesses. This also implies that in new economy ventures the entrepreneur has to ensure that the knowledge pool at the disposal of the firm is well-orchestrated and directed towards the vision and the goals of the firm so as to be able to generate the maximum knowledge force, which is reflected through its strategy and performance. In order to understand how effective the managerial capability of the entrepreneur is, the capabilities in terms of managerial competence, networking and opportunity recognition and entrepreneurial age were examined. It is notable that the combined effects of networking, managerial competence and opportunity recognition were also weaker in firms whose average age was 4.2 years as compared to firms whose average age was lower. Since the entrepreneurial age is highest in these firms and they have the maximum experience, it is concluded that the combined effects of the entrepreneurial experience and the experience of the firm itself, having been in the business longer, help them generate higher levels of knowledge force.

As compared to those firms whose average age was 4.2 years, in firms which were on an average 3.2 years old, all key variables showed the highest and most positive values, indicating that the organization was able to get the best out of the entrepreneurs at this stage. However, one area they were weak in was the area of capitalizing on the highest level of knowledge base that they possessed; they were unable to foster their employees' power adequately to create higher levels of knowledge force.

Linkage of Knowledge Force with Customer Orientation

In the second linkage of knowledge force that is examined, customer orientation has been considered. While examining the linkages, it was

felt useful to include the strategy variables to get a comprehensive and more insightful perspective of this dimension. The detailed comparison of the linkages in three models is presented here.

Table 4.7

Linkage of knowledge force with customer orientation

Variable	MI	MII	MIII
Innovativeness	2.89	3.15	2.92
Customer satisfaction orientation	4.06	4.06	4.04
Customer understanding orientation	3.79	3.76	3.76
Competition orientation	3.46	3.47	3.47
Knowledge Force	Highest	High	Low

From Table 4.7, the analysis of the impact of knowledge force indicates that in the mature firms the impact of knowledge force and the impact on marketing effectiveness strategy are the highest. In order to identify the possible approach of the firm towards the customer, upon examining the variables defining customer orientation, it was found that only customer understanding orientation was marginally higher in the firms with an average lifespan of 4.2 years, and all other variables were almost on par with their characteristics in other categories. Innovativeness showed the lowest value, probably indicating that the older the organization, the more the chances of employees' penchant for innovation being curbed due to environmental and internal factors. Despite this, the impact of knowledge force on marketing effectiveness strategy was the highest and the impact on all strategies was significantly more than in other models. Hence it would be prudent to examine other variables to find out how a higher level of knowledge force was created in these organizations.

Linkage of Knowledge Force with Industry Orientation

The third linkage of knowledge force examined is that of industry orientation as reflected in the three models. A detailed comparison of the three models is presented here.

Table 4.8**Linkage of knowledge force with industry orientation**

Variable	MI	MII	MIII
Industry dynamics	4.09	4.09	4.08
Technology dynamics	3.66	3.66	3.69
Publicity dynamics	3.48	3.46	3.5

It can be observed from Table 4.8 that industrial dynamics and technology dynamics are identical in the firms with average lifespans of 4.2 years and 3.2 years. However, publicity dynamics is marginally better in the former as compared to the latter but lower than that of firms with an average lifespan of 2.5 years. This signifies that while mature firms understand the publicity dynamics better, the value is not significant enough for the knowledge force to be high and its impact is most on marketing strategy. Therefore, the variables defining employee capability were observed next to develop better insight about the impact of knowledge force.

Linkage of Knowledge Force with Employee Capability

Lastly, the linkage of knowledge force with the measures of employee capability was analyzed; the detailed comparison across the three models is presented in Table 4.9.

Here also no difference was found between the firms whose average age was 4.2 years and 3.02 years, respectively. The only exception was the knowledge base of the employees. Despite knowledge base being significantly lower, as mentioned earlier, with the

Table 4.9**Linkage of knowledge force with employee capability**

Variable	MI	MII	MIII
Commitment	3.71	3.71	3.71
<i>Espirit de corps</i>	3.4	3.41	3.38
Knowledge and intelligence sharing	4.11	4.11	4.07
Training	4.26	4.26	4.26
Knowledge base	2.02	3.71	1.99

entrepreneur's higher experience as well as the experience of the organization, a higher impact of knowledge force was perceived. The measure of knowledge force in the three models indicates that while the knowledge force is the highest in model I, it also shows the highest level of customer orientation, followed by employee capability.

KEY LEARNINGS ABOUT KNOWLEDGE FORCE

The role of knowledge force in the strategy process of new economy entrepreneurial venture has been analyzed extensively. Starting with understanding the behavior of individual variables involved in the strategy process, an investigation of their inter-relationships has been carried out and a model constructed for testing the determinants of knowledge force, the impact of knowledge force on strategy and the measures of the four dimensions of the strategy process. While the initial analysis helped in understanding the relationships between different variables, it was felt that it would be useful to identify certain relationships in which the variables could be impacted indirectly so as to clarify the strategy process and the role of knowledge force in strategy creation. Upon testing the model, useful insights about the behavior of strategy variables at different stages of organization evolution were derived along with an understanding about their role in making knowledge force more effective. The interaction process of the variables and the patterns of influence on other variables—endogenous or exogenous—have been investigated. These effects could be either direct or indirect where the effect of one variable on another could be through one or more intervening variables. It should, however, be noted here that the inferences drawn were based on a limited number of hypothesized relationships considered to be most important. There could be several other permutations and combinations of relationships, and hence to that extent the findings are not total and complete. Further investigation of other relationships should be carried out to establish the other possible effects of variables.

From the series of analysis carried out about the various perspectives of knowledge force, several interesting conclusions could be drawn. Firstly, it has been established that since an organization is a dynamic entity, at different ages of the firm, the measures of the four dimensions are likely to vary. In the process, the linkages with knowledge force will also vary with time. The four dimensions of knowledge force have a mix of measures, which together define how knowledge force will impact on strategy. Based on these findings, a new strategy

framework has been proposed which recognizes that the same variable can measure more than one dimension, and that at different stages of the firm the measures are likely to differ, unlike the previously proposed model in which the measures were presented as unique and static irrespective of the age of the firm. This new strategy framework has been constructed based on the findings of characteristics that firms are likely to have at different stages of evolution and the behaviors of the variables and dimensions defining the organization thrust at different stages. The knowledge force framework explained in the next chapter will help in understanding the shaping and effectiveness of knowledge force with the evolution of the firm and its role in the strategic direction of entrepreneurial technology ventures.

References

1. Aaker, D.A., *Strategic Market Management* (2nd ed.). New York: John Wiley, 1988.
2. Abell, D.F. and Hammond, J., *Strategic Market Planning: Problems and Analytical Approaches*. Englewood Cliffs, N.J., Prentice-Hall, 1979.
3. Aldrich, H., Rosen, B., and Woodward, W., "The Impact of Social Networks on Business Founding and Profit a Longitudinal Study", in Churchill, N.C., Hornaday, J.A., Kirchoff, B.A., Krasner, O.J. and Vesper, K.H. (Eds), "Frontiers of Entrepreneurship Research". Wellesley, MA: Babson Center for Entrepreneurial Studies, 1987, pp. 154–68.
4. Anderson, J.C. and Narus, J.A., "A Model of Distributor Firm and Manufacturer Firm Working Partnerships", *Journal of Marketing*, Vol. 58, October, 1990, pp. 1–15.
5. Athansopoulos, A.D., "Customer Satisfaction Cues to Support Market Segmentation and Explain Switching Behavior", *Journal of Business Research*, Vol. 47, 2000, pp. 191–207.
6. Bahrami, H., "The Emerging Flexible Organizations, Perspectives from Silicon Valley", *The California Management Review*, 34, 4, reprinted in P.S. Myers (ed.) 1996. *Knowledge Management and Organizational Design*, Boston, Butterworth-Heinemann, 1996, pp. 55–75.
7. Barney, J.B., "Strategic Factor Markets: Expectations, Luck, and Business Strategy," *Management Science*, No. 32, 1986, pp. 1231–41.
8. Barreyre, P.Y., "The Management of Innovation in Small and Medium-Sized Industries," Extracted from the article published in *Revue d'Approvisionnement*, No. 2, 1976.

9. Braden, P.L., *Technological Entrepreneurship*, Ann Arbor, MI: Graduate School of Business Administration, The University of Michigan, 1977.
10. Brockhaus, R.H., "Risk Taking Propensity of Entrepreneurs", *Academy of Management Journal*, No. 23, 1980, pp. 509–520.
11. Bygrave, W.D., "Theory Building in the Entrepreneurship Paradigm", *Journal of Business Venturing*, No. 8, 1993, pp. 255–280.
12. Carnevale, D.G. and Wechsler, B., *Trust in the Public Sector, Administration & Society*, Vol. 23, No. 4, 1992, pp. 471–494.
13. Carsrud, A.L., Gaglio, A.M. and Olm, K. W., Entrepreneurs–Mentors, Networks, and Successful New Venture Development: An Exploratory Study, *Frontiers of Entrepreneurship Research*, 1999, pp. 229–235.
14. Chandler, G.N. and Hanks, S.H., "Market Attractiveness, Resource-based Capabilities, Venture Strategies, and Venture Performance", *Journal of Business Venturing*, Vol. 9, No. 4, 1994, pp. 331–350.
15. Cooper, A., "Challenges in Predicting New Firm Performance", *Journal of Business Venturing*, Vol. 8, 1993, pp. 241–253.
16. Cooper, A.C. and Dunkelburg, W.C., "Entrepreneurial Research: Old Questions, New Answers and Methodological Issues", *American Journal of Small Business*, Vol. 11, No. 3, 1987, pp. 11–21.
17. Cooper, A.C. and Dunkelburg, W.C., "Entrepreneurial Research: Old Questions, New Answers and Methodological Issues", *American Journal of Small Business*, Vol. 11, No. 3, 1987, pp. 11–21.
18. Cooper, A.C. and Dunkelburg, W.C., "Entrepreneurship and Paths to Business Ownership", *Strategic Management Journal*, Vol. 1, No. 7, 1986, pp. 53–68.
19. Davidsson, "Continued Entrepreneurship: Ability, Need, and Opportunity Determinants of Small Firm Growth", *Journal of Business Venturing*, Vol. 6, 1991, pp. 405–429.
20. Day, G.S. and Wensley, R., "Assessing Advantage: A Framework for Diagnosing Competitive Superiority", *Journal of Marketing*, Vol. 52, No. 2, 1988, pp. 1–20.
21. Deshpande, R., Farley, J.U., and Webster, Jr., F.E., *Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms in Developing a Market Orientation*, (Ed.) Deshpande, R., Sage Publications, California, 1999.
22. Dodge, H.R., Fullerton, S., and Robbins, J.E., "Stage of the Organizational Life Cycle and Competition as Mediators of Problem Perception for Small Businesses", *Strategic Management Journal*, Vol. 15, 1994, pp. 121–134.
23. Drucker, P.F., *The Practice of Management*, New York: Harper and Row, 1954.
24. Drucker, P., *Post-Capitalist Society*, Harper and Collins, New York, 1993.
25. Drucker, P., *The Practice of Management*, New York: Harper and Row, 1954.

26. Duchesneau, D.A. and Gartner, W.B., "A Profile of New Venture Success and Failure in a Merging Industry", *Journal of Business Venturing*, Vol. 5, 1990, pp. 297–312.
27. Duncan, R., "Characteristics of Organizational Environments and Perceived Environmental Hostility", *Administrative Science Quarterly* Vol. 17, 1972, pp. 313–327.
28. Dutton, J.M. and Richard, D.F., "Uncertainty and Firms' Strategic Behaviors", Working Paper, New York University, 1984, referred by Daft, R.L., Sormunen, J. and Parks, D., "Chief Executive Scanning, Environmental Characteristics, and Company Performance: An Empirical Study", *Strategic Management Journal*, Vol. 9, 1988, pp. 123–139.
29. Emery, F.E. and Trist, E.L., *Towards a Social Ecology*, Plenum Press, London, 1972.
30. Falemo B., "The Firm's External Persons: Entrepreneurs or Network Actors?" *Entrepreneurship and Regional Development*, Vol. 1, 1989, p. 167.
31. Flamholtz, E.G., *How to Make the Transition from an Entrepreneurship to a Professionally Managed Firm*, San Francisco, Jossey Bass Publisher, 1986.
32. Foss, N.J., "Knowledge-based Approaches to the Theory of the Firm: Some Critical Comments", *Organization Science*, September–October, Vol. 7, No. 5, 1996, pp. 470–476.
33. Galbraith, J.R., "Strategy and Organization Planning", *Human Resource Management*, Vol. 22, No. 12, 1983, pp. 64–77.
34. Gasse, Y., "Commentary Elaboration: Elaborations on the Psychology of the Entrepreneur," In Kent, C.A., Sexton, D.L., and Vesper, K.H. (Eds.). *Encyclopedia of Entrepreneurship*, Englewood Cliffs, NJ: Prentice–Hall, 1982, pp. 58–71.
35. Grant, D. Metaphors, "HRM and Control", in *Organization Development: Metaphorical Explorations*, Oswick, C. and Grant, D., (eds.), London: Pitman, 1996, pp. 193–208.
36. Gronhaug, K. and Kaufmann, G., *Innovation : A Cross-disciplinary Perspective*, Oslo: Norwegian University Press, Vol. 3, 1988.
37. Hambrick, D.C., "Environmental Scanning and Organizational Strategy", *Strategic Management Journal*, Vol. 3, 1982, pp. 159–174.
38. Hitt, M.A. and Ireland, R.D., Corporate Distinctive Competence, Strategy, Industry and Performance, *Strategic Management Journal*, Vol. 6, 1985, pp. 273–293.
39. Houston, E.S., "The Marketing Concept: What It Is and What It is Not," *Journal of Marketing*, Vol. 50, April, 1986, pp. 81–87.
40. Huber, G.P., "Organizational Learning: The Contributing Processes and the Literatures", *Organization Science*, Vol. 2, No. 1, February, 1991, pp. 88–115.

41. Itami, H., *Mobilizing Invisible Assets*, Cambridge, MA: Harvard Business School Press, 1987.
42. Jarillo-Mossi, J.C., "Entrepreneurship and Growth: The Strategic Use of External Resources", Doctoral Thesis, Harvard Business School, quoted in the article, by Gibb, A. and Davies, L., "In Pursuit of Frameworks for the Development of Growth Models of the Small Business", *International Small Business Journal*, Vol. 9, No. 1, 1986, pp. 15-63.
43. Jaworski, J.B. and Kohli, A.K., "Market Orientation: Antecedents and Consequences", *Journal of Marketing*, Vol. 57, No. 3, 1993, pp. 53-71.
44. Jo, H. and Lee, J., "The Relationship between an Entrepreneur's Background and Performance in a New Venture", *Technovation*, Vol. 16, No. 4, 1996, pp. 161-171.
45. Kohli, A.K. and Jarowski, B.J., "Market Orientation: The Construct, Research Proposition and Managerial Implication", *Journal of Marketing*-April, Vol. 54, 1990, pp. 1-18.
46. Kumar, N., Hibbard, J.D., and Stern, L.W., "The Nature and Consequences of Marketing Channel Intermediary Commitment", *Marketing Science Institute Working Paper*, Report Number. Vol. 94, No. 115, 1994, pp. 1-33.
47. Levitt, T., "Marketing Success Through Differentiation of Anything", *Harvard Business Review*, Vol. 58, (January-February), pp. 83-91.
48. Levitt, B. and March, J., "Organizational Learning", *Annual Review of Sociology*, Vol. 14, 1988, pp. 319-340.
49. Lorrain, J. and Dussault, L., "Relation Between Psychological Characteristics, Administrative Behaviors and Success of Founder Entrepreneurs at the Start-up Stage", *Frontiers of Entrepreneurial Research*, Babson Centre for Entrepreneurial Studies, Wellesley, MA, 1988, pp. 150-164.
50. Miller, D. and Friesen, P.H., "Archetypes of Strategy Formulation", *Management Science*, Vol. 24, No. 9, May, 1978.
51. Miller, D., De Vries M. F. R. K and Toulouse, "Top Executives Locus of Control and Its Relationship to Strategy-Making, Structure, and Environment", *Academy of Management Journal*, Vol. 25, No. 2, J-M, 1992, pp. 237-253.
52. Murray, J.A., "A Concept of Entrepreneurial Strategy", *Strategic Management Journal*, Vol. 5, 1984, pp. 1-13.
53. Myers, P.S., *Knowledge Management and Organizational Design*, Butterworth-Heinemann, Oxford, 1996.
54. Nonaka, I., A., "Dynamic Theory of Organizational Knowledge Creation". *Organization Science*, Vol. 5, No. 1, 1994, pp. 14-37.
55. Nonaka, I., Takeuchi, H., *The Knowledge Creating Company*, New York: Oxford University Press, 1995.
56. Ostgaard, T.A. and Birley, S., "Personal Networks and Firm Competitive

- Strategy—A Strategic or Coincidental Match?” *Journal of Business Venturing*, Vol. 9, 1996, pp. 281–305.
57. Parasuraman, A., “Customer Oriented Corporate Cultures are Crucial to Services Marketing Success”, *Journal of Services Marketing*, Vol. 1, No. 1, 1987, pp. 39–46.
 58. Penrose, E., *The Theory of Growth of the Firm*, Basil Blackwell, London, 1959.
 59. Porter, M. *The Competitive Advantage of Nations*, Free Press, New York, 1980.
 60. Porter, M., *Competitive Advantage*, New York: Free Press, 1985.
 61. Porter, M.E., *The Competitive Advantage of Nations*, Free Press, New York, 1980.
 62. Quinn, J.B., “Strategic Change: Logical Incrementalism”, *Sloan Management Review*, Fall, 1978, pp. 7–21.
 63. Reichheld, F.F., “Loyalty-based Management”, *Harvard Business Review*, March–April, Vol. 71, 1993, pp. 64–73.
 64. Rizzoni, A., “Technological Innovation and Small Firms: A Taxonomy”, *International Small Business Journal*, Vol. 9, No. 3, pp. 31–42, 1999.
 65. Robinson, P.B. and Sexton, E.A. “The Effect of Education and Experience on Self-employment Success”, *Journal of Business Venturing*, Vol. 9, 1994, pp. 141–156.
 66. Robisnosn, W.T. and Fornell, C., “The Sources of Market Pioneer Advantages in Consumer Goods Industries,” *Journal of Marketing Research*, Vol. 22, 1985, pp. 305–317.
 67. Rogers, E.M., “Progress, Problems, and Prospects for Network Research: Investigating Relationships in the Age of Electronic Communication Technologies”, *Social Networks*, Vol. 9, No. 4, 1987, pp. 285–310.
 68. Rotter, J.B., “Generalized Expectancies for Internal versus External Control of Reinforcement”, *Psychological Monographs: General and Applied*, 80, Whole No. 609, 1966.
 69. Sandberg, W.R., *New Venture Performance: The Role of Strategy and Industry Structure*, Lexington Books, Lexington, MA., 1986.
 70. Sandberg, W. and Hofer, C., “Improving New Venture Performance: The Role of Strategy, Industry Structure, and the Entrepreneur”, *Journal of Business Venturing*, Vol. 2, 1987, pp. 5–28.
 71. Schumpeter, J.A., *The Theory of Economic Development*, Cambridge, MA: Harvard University Press, 1934.
 72. Shepherd, D.A., Ettenson, R., and Crouch, A., “New Venture Strategy and Profitability: A Venture Capitalist’s Assessment”, *Journal of Business Venturing*, Vol. 15, 2000, pp. 449–467.
 73. Shrivastava, P., “Learning Structures for Top Management”, *Human Systems Management*, Vol. 6, 1986.
 74. Simon, H.A., *The New Science of Management Decision*, Englewood Cliffs, Prentice-Hall, Third Edition, 1977.

75. Slater, S.F., "Competing in High Velocity Markets", *Industrial Marketing Management*, Vol. 24, No. 4, 1993, pp. 255–268.
76. Smilor, R.W. and Freeser, H.R., "Chaos and the Entrepreneurial Process: Patterns and Policy Implications for Technology Entrepreneurship", *Journal of Business Venturing*, Vol. 6, 1991, pp. 165–172.
77. Stewart, A., "Your Company's Most Valuable Asset: Intellectual Capital. In: *Fortune*, October, Vol. 3, 1994, pp. 28–33.
78. Stuart, R.W. and Abetti, P.A., "Impact of Entrepreneurial and Managerial Experience on Early Performance," *Journal of Business Venturing*, Vol. 5, 1990, pp. 151–162.
79. Tashakori, M., *Management Succession: From the Owner-Manager to the Professional Manager*, New York, Praeger, 1980.
80. Taylor, F., *The Principles of Scientific Management*, New York, Harper and Brothers, 1911.
81. Teach, Tarpley and Schwartz, "Who are the Software Entrepreneurs?" *Frontiers of Entrepreneurship Research*, Hornady, Skills, Timmons and Vesper; (Eds), Published by Center for Entrepreneurial Studies at Babson College, Wellesley, M.A., 1985, pp. 435–451.
82. Thompson, P., "Characteristics of the Small Business Entrepreneur in Canada, *Journal of Small Business and Entrepreneurship*, Vol. 4, No. 1, 1986, pp. 5–11.
83. Tovstiga, G., "Profiling the Knowledge Worker in the Knowledge-Intensive Organization: Emerging Roles", *International Journal of Technology Management*, Vol. 18, Nos. 5/6/7/8, 1999, pp. 731–744.
84. Tushman, M. and Anderson, P., "Technological Discontinuities and Organizational Environments", *Administrative Science Quarterly*, Vol. 31, 1986, pp. 439–465.
85. Wellman, B., "Networks as Personal Communities", 130–184 in Wellman and Berkowitz (Eds.) *Social Structures: A Network Approach*, New York: Cambridge University Press, 1988.
86. Withane, S., "Broadening the Concept of Entrepreneurship: A Multidisciplinary Approach," *Journal of Enterprising Culture*, Sept., Vol. 4, No. 3, 1996, pp. 225–240.

Knowledge Force Frameworks for IT Service Firms

V

Knowledge Force Frameworks for IT Service Firms

KNOWLEDGE FORCE FRAMEWORK AND START-UP FIRMS

BASED ON THE findings presented in the previous chapter, the current chapter posits the knowledge force framework which will help focus on the role of knowledge force and the factors influencing the growth and strategy of entrepreneurial IT firms. While certain frameworks on growth models have been proposed by researchers for small businesses, in view of the unique characteristics of start-up IT ventures and the importance of 'knowledge force' in strategy evolution, it was felt necessary to develop a new framework.

THE FRAMEWORKS IN PERSPECTIVE

Having established that in new economy entrepreneurial firms, between the variables that impact upon the strategy itself there exists a knowledge force, the objective now is to examine the possible postures that knowledge force can help create at different stages of organization evolution and the approaches that can be adopted to strengthen knowledge force, which in turn will impact the strategy process. It has been observed that the strategy and performance of firms depend upon how they drive and direct knowledge force. Hence, by focusing on what type of knowledge force can be created, and by aiming to maximize it, an entrepreneur can take the organization forward. It should also be noted that this knowledge force will not be static and is likely to change in terms of its effectiveness and constituents depending upon a number of factors. Based on the findings of the current study of new economy entrepreneurial firms during their growth stage, three possible knowledge force frameworks have been identified:

- **Market focused Knowledge Force:** Knowledge force in this model is tuned to very good customer orientation, resulting in the marketing effectiveness of the organization being high. The organization is customer focused and is capable of making its offerings in tune with the customer requirements.
- **Adaptive Knowledge Force:** Knowledge force in this model is powered by both employee capability and good industry orientation. The organization is still in the process of getting a grip on customer requirements, but on the strength of its employee capability it is able to adapt to industry trends quite well.
- **Resource based Knowledge Force:** Knowledge force in this model is primarily built around employee capability. This is an organization which is young and is completely focused on its own capabilities. It has some understanding of industry trends and is trying to find its feet in the marketplace.

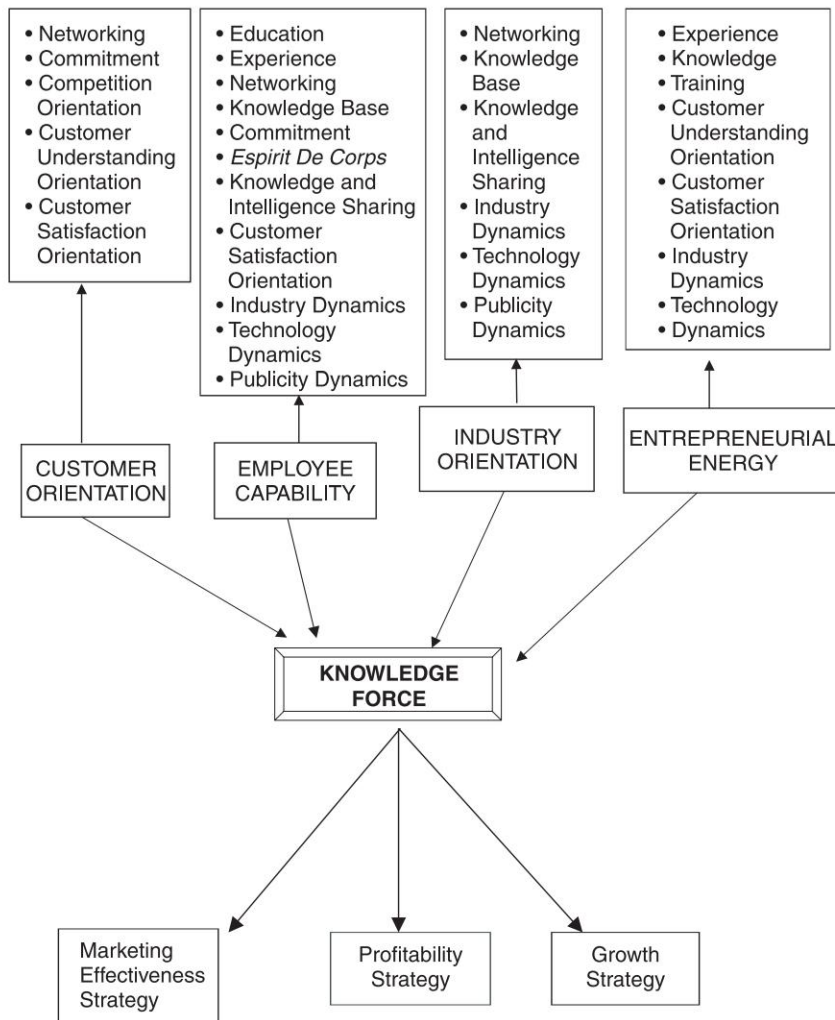
Market Focused Knowledge Force

As depicted in Fig. 5.1, in this model, for every dimension being measured there are variables which are outward facing, namely customer related and industry related networking, signifying that in order to become customer focused, it is important to inculcate a sense of market orientation in every sphere of activity of the organization. Since it was observed in this model that employee capability is second only to customer orientation in terms of the measures of knowledge force, the influence of knowledge base was seen to be also prevalent across the organization in all dimensions except for customer orientation. Knowledge force that is market focused is the most effective, as can be discerned from the impact it creates on strategy dimensions of the firm. Not only is knowledge force maximum among the three models, but its impact on the marketing effectiveness dimension of the strategy is significantly higher than its impact on the other two strategies.

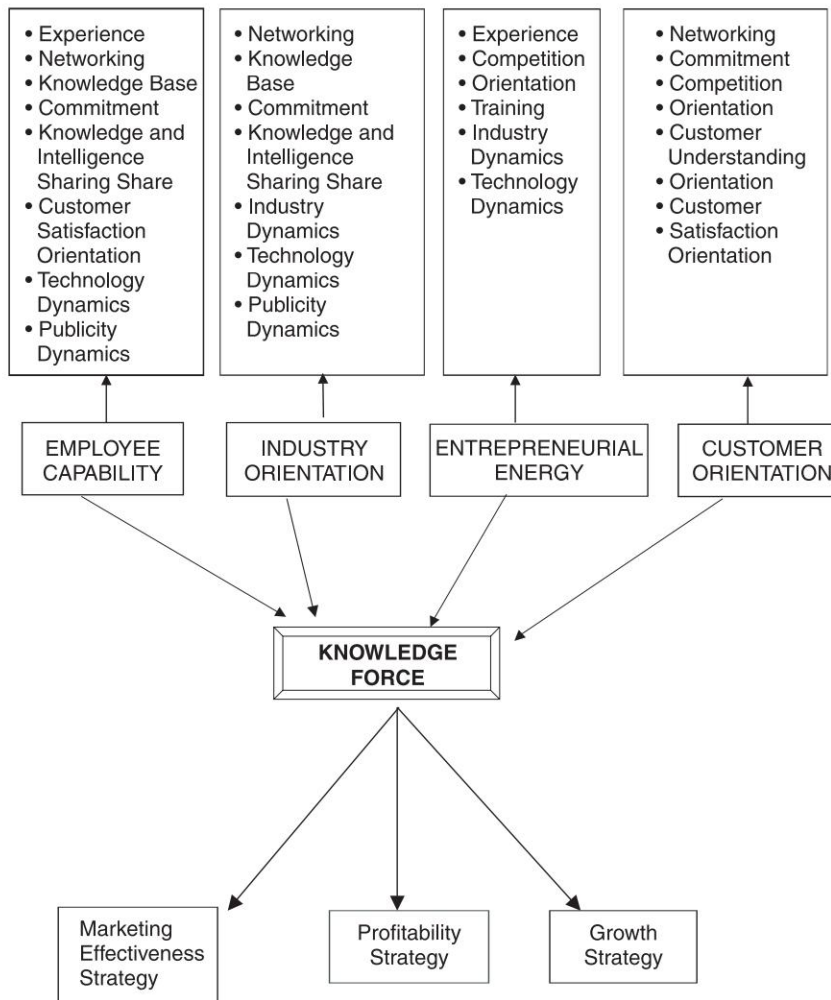
Adaptive Knowledge Force

Knowledge force is driven in this model through the adaptive capability of the new venture firm. As can be seen from Fig. 5.2, it may be noted in this model that the organization is adaptive, i.e. it is able to adapt itself to the changes in the industry with the support of high employee capability. Entrepreneurial ability to orchestrate organization resources is highest among all the models. It may be noticed that customer orientation is low but better than the resources model, and this

Figure 5.1

Market focused knowledge force

indicates that the organization is still focused on the industry trends and trying to get its offerings more in tune with industry trends rather than making them customer centric. The organization continues to sift through the understanding derived from the happenings in the industry

Figure 5.2**Adaptive knowledge force**

and is learning to define its customer requirements accurately; hence, although the knowledge force is better than that in the resource based model it is still lower than that of organizations whose knowledge force is built around market focused capabilities. The impact of adaptive knowledge force on the three strategy dimensions—marketing

effectiveness, growth share and profitability—is lower than in the market focused knowledge force model, with the difference in the impact of knowledge force on marketing effectiveness as compared to growth and profitability also being much less in this model.

Resource Based Knowledge Force

In this model, knowledge force is primarily derived out of the strength of employee capability. From Fig. 5.3, it can be observed that the variables defining the resource capabilities of an organization influence all its dimensions. Resource capability is the strength which the organization tries to exploit in its early stage with an eye on industry trends. However, since its customer orientation is weak and so is its entrepreneurial capability to bring about better integration, the impact of knowledge force on strategy is quite low in this model. The impact of knowledge force on the three strategy dimensions—marketing effectiveness, growth and profitability—is the lowest of all three models and the impacts are also very close to one another.

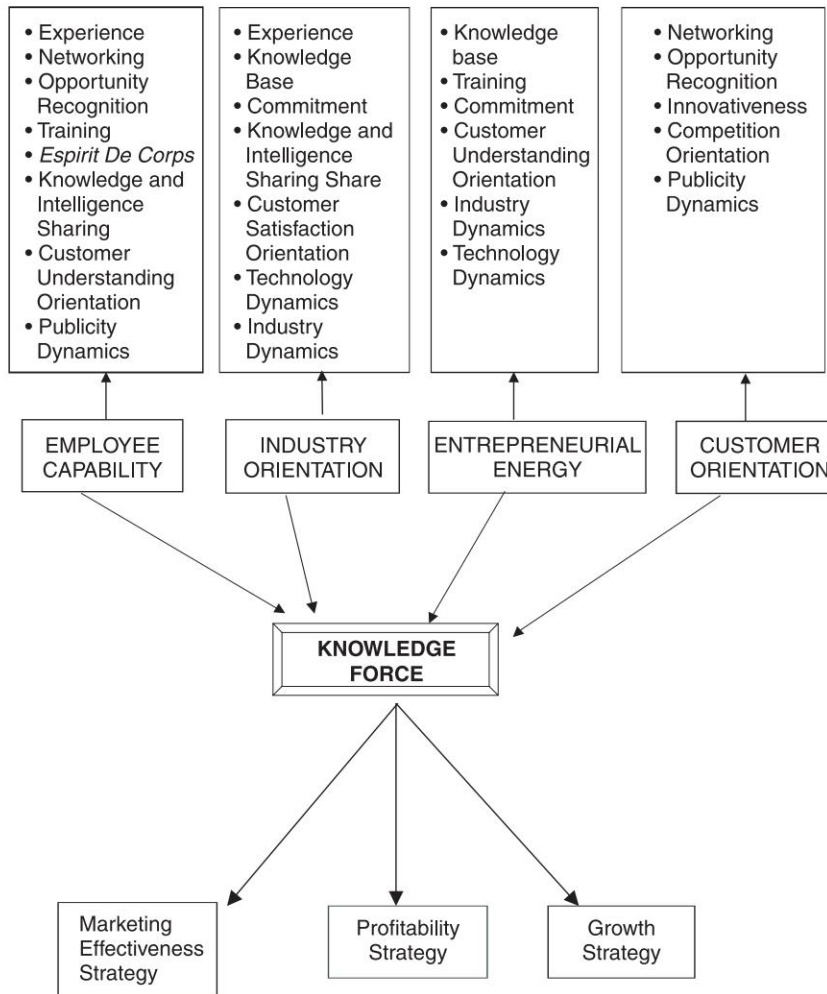
THE DYNAMIC NATURE OF KNOWLEDGE FORCE

The knowledge force frameworks presented earlier reflect the posture the organization adopts at various stages of evolution of its business. As the firm grows older, it develops better understanding of the various facets of the business and thus its posture also will change. It should, however, be noted that the postures are not static and they could keep changing even when the firm is mature, depending upon what strengths the organization possesses at a given point of time. It is not unusual to find among new economy entrepreneurial ventures organizations, which were adaptive at one point of time, suddenly going back to being resource based, as the market becomes tougher and there are constraints of financial resources and markets that have to be addressed and the struggle for survival becomes the core issue. This trend is observed among many companies which flourished during the hey-day of the dot com revolution, where their onus was on operating from the posture of customer focus, but with the downturn they had to revisit their strategy and their posture.

At this stage it is also useful to bear in mind that the access to financial resources could be an important factor with a significant role in the direction that the firm takes, the confidence that emanates from the entrepreneur and the long-term and short-term objectives of the

Figure 5.3

Resource based knowledge force



firm. Especially in new economy ventures, it is often found that brilliant concepts or product prototypes are created by young professionals but lack of resources force them to adopt a particular posture and not fully exploit the potential of the market. This has led to several firms dying prematurely in the new economy; sometimes,

not being able to scale up quickly at the right time denies them the opportunity to have a healthy growth.

In the study carried out, companies at different phases of growth were examined, but the focus remained primarily on the early stage alone as the average lifespan of the firms was 2.0 years. While the constraint was imposed by the profile and size of the sample itself, it should be noted that in new economy entrepreneurial ventures even a three-month long existence is quite substantial in terms of the impact it can create and the organizational dynamics it would go through, given the rapid changes in technology and customer requirements. Hence, the observations from the models proposed give us very useful insights about the early stage behavior and posture of the firms with respect to their strategy.

RECOGNIZING THE POWER OF KNOWLEDGE FORCE AND THE INFLECTION POINT FOR KM

Knowledge force is akin to what Murray (1984) describes as “*momentum of a particular strategic stand that carries the organization forward*”. This force is the vital energy of an organization that shapes the strategy. Authors of recent studies have proposed that individual, organizational and environmental dimensions combine to provide a comprehensive prediction of venture performance and growth (Baum et al., 2001; Covin and Slevin, 1997; Chrisman et al., 1998; Lumpkin and Dess, 1996). Murray (1984) states that “*entrepreneurial strategy is the creation or recreation of the fundamental set of relationships characterizing an organization’s behavior: its environmental, internal and input-output parameters*”. Building on these studies, the current study examined the influence of the combination of entrepreneurial energy, employee capability, customer orientation and industry orientation on knowledge force. The variables measuring these four variables could cut across categories and be involved in multiple relationships and could act as positive or negative measures, indicating that these variables cannot be related to just any one specific dimension of strategy building, but would reflect the direct or indirect role they play in the dynamics of other dimensions of the firm as well. Thus, the study also confirms Quinn’s (1978) concept of logical incrementalism that the enactment of an entrepreneurial strategy will show more process characteristics than any notion of rapid, fully programmed and systematic change.

The other conclusion drawn from these findings is that the age of a firm does play an important role in the effectiveness of knowledge

force and that there are different challenges organizations face at each stage of organization evolution with respect to orchestrating the organizational activity and focus. In older firms, experience of the entrepreneur is also found to be higher as is the strength of employees. The primary motive for setting up a venture is the expertise of the entrepreneur. Knowledge force is stronger in older firms which have higher levels of experience and education. With the understanding derived about the dynamics of some of the key variables involved in the performance of organizations, it can also be concluded that organizations need to be sensitive about the behavior of all these variables and their complexities in relationships. The findings confirm the argument of Aitken (1963) that researchers are better served by studying, conceptualizing and prescribing for entrepreneurial behavior as an organizational phenomenon and not as the act of an individual.

It has been observed that the impact of knowledge force is stronger in older companies, with the maximum impact being felt in older and younger companies on marketing effectiveness strategy. Therefore, it is being concluded that the stronger the knowledge force in new economy entrepreneurial firms, the stronger will be its impact on marketing effectiveness strategy. Another important finding is that in younger firms below five years of age, the impact of knowledge force is felt more or less uniformly across all three dimensions of the strategy; in the older organizations a different scenario is noticed. The impact of knowledge force in the marketing effectiveness strategy stands out much higher than the other two, with even growth strategy showing significantly higher impact than profitability strategy. Thus, it can be concluded that with increasing maturity of organizations, the importance of knowledge force gains further momentum as organizations learn to bring better integration between its various capabilities and activities in the firm. This also signifies the importance of harnessing knowledge force for better effectiveness of the organization.

Another important finding is that in older firms, employee capability, entrepreneurial energy, industry orientation and customer orientation positively impact knowledge force. This highlights the fact that as organizations mature, they are in a better position to harness the total potential of the firm, which is reflected through the impact knowledge force makes on strategy. In firms which are younger, i.e. less than five years old, this is not so as it is observed that both entrepreneurial energy and customer orientation are weak.

It may also be noted that apart from the four determinants of knowledge force considered, there could be other determinants that

have not been considered in the current study, and hence the findings are limited to the behavior of the model with the given variables.

In order to understand the role of knowledge force and the potential impact it can create on strategy, the proposed knowledge force framework traces the growth and progression of the firm to the type of knowledge force it possesses at any given point of time. Thus, knowledge force could be adaptive, resource based and market focused, which would determine what kind of posture the organization can possibly assume. The three types of knowledge force identified and the frameworks proposed thereof to analyze the behavior and the posture of the firms are based on the findings of the current study as applicable to the start-up stage of firms in the new economy entrepreneurial segment. It is quite likely that an organization can move from being adaptive to market focused directly or start as a market focused firm right from the beginning. However, it is most likely that the firms will go through the three phases as indicated with time, given that they need to learn and adapt to both internal and external dynamics. Hence, it should be noted that there is no time bound evolutionary process that organizations go through. The transition from one phase to another will entirely depend upon the organization's motive to set up the venture, the realization of its priorities, the recognition of its strengths in the four dimensions and the ability to harness the same, which will matter in the context of knowledge force.

The knowledge force framework outlined in this chapter is with specific reference to technology services companies in the early stage of business. As the organizations grow and find their own rhythm in the market place, the strategic thrust of the organization, impacted by knowledge force emanating from the four dimensions of entrepreneurial energy, employee capability, customer orientation and industry orientation, will get shaped by other factors as well and will demand a structured approach. This is not to state that knowledge force is no longer relevant or will not have a role to play in shaping the strategy of organizations. What is being highlighted is that there will be more focus in terms of formalizing the methods of knowledge capture, storage and dissemination, necessitating knowledge management to be viewed as a discipline. Therefore, it will be pertinent to study the impact of knowledge management practices on strategy in larger and well established organizations, as KM becomes a multi-faceted discipline with a pre-defined set of expectations. With management and employees beginning to draw strength and support from KM discipline, organizations realize the need to enhance the capabilities of the KM

systems. While embarking on their journey of knowledge management, organizations will discover different levels of excellence and success related to the maturity levels of their own KM systems. In the next few chapters we will examine in detail the knowledge maturity model and the factors that enable organizations to move from one level to another.

References

1. Aitken, H.G.J., "The Future Entrepreneurial Research", *Explorations in Economic History*, Fall, 3-9, 1963.
2. Baum, J.R., Locke, E.A., and Smith, K.G.A., "Multidimensional Model of Venture Growth", *Academy of Management Journal*, Vol. 44, No. 2, 2001, 292-303.
3. Chrisman, J.J., Bauerschmidt, A., and Hofer, C.W., "The Determinants of New Venture Performance: An Extended Model", *Entrepreneurship Theory and Practice*, Vol. 23, No. 1, 1998, pp 5-29.
4. Covin, J.G. and Slevin, D.P., "High Growth Transitions: Theoretical Perspectives and Suggested Directions," in Sexton, D.L., and Smilor, R.W., (Eds.) *Entrepreneurship 2000*, 99-126. Chicago: Upstart Publishing, 1997.
5. Lumpkin, G.T. and Dess, G.G., Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance, *Academy of Management Review*, Vol. 21, 1996, pp. 135-172.
6. Murray, J.A., "A Concept of Entrepreneurial Strategy", *Strategic Management Journal*, Vol. 5, 1984, 1-13.
7. Quinn, J.B., "Strategic Change: Logical Incrementalism", *Sloan Management Review*, Fall, 1978, 7-21.

The Progression of the Indian IT Industry and the Scope for Knowledge Management Maturity Model

VI

The Progression of the Indian IT Industry and the Scope for Knowledge Management Maturity Model

THE SOFTWARE INDUSTRY IN INDIA—SOME DIMENSIONS

THE SOFTWARE EXPORTS industry in India started in the 1980s when one company, Tata Consultancy Services (TCS), discovered that Indian engineers from prestigious institutions like the Indian Institutes of Technology could be sent to the USA and placed as programmers in organizations at a significant premium. For almost a decade this was the predominant model of earning dollar revenues, although some efforts had started by the end of the 1980s to begin complete projects wherein some of the work was executed at offshore locations in India.

A great legitimizing event that helped the pursuit of major projects offshore was the realization of the Year-2000 software problem where a two-digit date in software programs was expected to cause malfunctions in major computer systems when the date changed from 99 to 00. This forced many large corporations to send millions of lines of code to Indian companies for impact analysis and reengineering. While this happened at a rapid pace in the latter half of the 1990s, many of the early pioneers in this segment like TCS, Infosys and Wipro realized that large applications, once moved to India, would continue to be maintained and migrated to new technology by the same vendors. This, coupled with the emerging need to create new applications for the fast-growing internet companies, set the Indian software export industry on a high growth track of over 50 per cent every year from

1997 to 2000, with markets spreading slowly from the USA to UK to all parts of Europe, Middle East, Africa, Japan and South East Asia.

Even though the bursting of the dot com or internet company bubble and the petering out of the Year-2000 related business caused a decline in the growth to a more sedate 30 per cent in the following years, the value of the Indian software exports industry has been firmly established with mature outsourcers like CISCO, GE and other Fortune 500 companies using Indian firms for developing core technologies as well as developing, maintaining and migrating business applications. An industry that was worth a few million dollars of exports in the early 1990s has grown to nearly 30 billion US dollars by the end of 2006, with over thirty companies clocking revenues of over 100 million US dollars and half a dozen finding a place in the billion-dollar revenue club.

The Strategic review of the industry published by industry association NASSCOM in January 2007 mentions that over FY2001-2006, India's share in global sourcing is estimated to have grown from 62 percent to 65 percent for IT and 39 percent to 45 percent for BPO. The report points out that the healthy tech-sector performance was sustained by above forecast GDP growth across the key economies of Europe and the US, as well as in emerging markets. Outsourcing continued to be the primary growth engine with global delivery forming an integral part of most sourcing strategies.

IT services exports, accounting for 55-57 percent of total exports, are growing at an estimated 36 percent and are expected to reach USD 18.1 billion in the current financial year. Newer areas of application and infrastructure management, testing, etc. are gaining traction, with their share in the business-mix growing steadily. BPO continues to grow in scale and scope, with firms increasingly adopting a vertical focused approach. Total exports for this segment are expected to exceed USD 8.3 billion in FY 2006-07, growing by 32 percent over the previous year. Lastly, increasing traction in offshore product development and engineering services is supplementing India's efforts in own IP creation. This group is growing at 22-23 percent and is expected to report USD 4.9 billion in exports, in FY 2006-07.

All this demonstrates that India continues to be the destination of choice for most global outsourcers. The Nasscom reports states that over FY2001-2006, India's share in global sourcing is estimated to have grown from 62 percent to 65 percent for IT and 39 per cent to 45 percent for BPO. The visibly higher preference for India is driven by its unmatched superiority when measured across a range of parameters

that determine the attractiveness of a sourcing location including abundant talent and adequate firm and industry level initiatives to make the young workforce worthy of employment in the global IT industry.

UNIQUE FEATURES OF THE INDIAN SOFTWARE EXPORTS INDUSTRY

The Software exports industry in India is one of those rare phenomenon of an industry that managed to grow and achieve global recognition in spite of having a very low domestic base. While today, there is some focus on the domestic market with many Indian user firms like Bharti, Maruti, Jet Airways and HDFC Bank acquiring global ambitions and capabilities in their own right, the exports industry has always aspired to and attained standards that enable it to service the best of the global corporations—GE, American Express, CISCO and most of the Fortune 500 and FTSE 100 firms.

In comparison to the domestic industry in India, this industry is different because it has learnt to cater to the exacting schedules and service level expectations of very demanding global customers. The quality and precision of communications, the ability to engage with customers at all stages during customer acquisition, the software development life cycle, and the support services during and after the client engagement are all expected to be of significantly higher quality, placing high demands on leadership as well as project management and human resource management capabilities of organizations.

Indian export firms have a strong track record of delivering a significant and potent combination of cost, quality, security and innovation which enables it to have a sustained position as offshore destination of choice for global organizations for their information technology and business process outsourcing work. While the skills requirement for servicing domestic clients is all the same, the focus on information security, process maturity in quality and knowledge management maturity receives much more importance amongst software exporters in comparison to their peers who serve the domestic market.

Emphasis on Quality and Information Security

The NASSCOM Strategic Review Report (2007) states that demonstrated process quality and expertise in service delivery has been a key factor driving India's sustained leadership in global service delivery. Since the inception of the industry in India, players within

the country have been focusing on quality initiatives, to align themselves with international standards. Over the years, the industry has built robust processes and procedures to offer world class IT software and technology related services.

Today, India-based centers (both Indian firms as well as MNC-owned captives) constitute the largest number of quality certifications achieved by any single country. As of December 2006, over 440 Indian companies had acquired quality certifications with 90 companies certified at SEI CMM Level 5 – higher than any other country in the world.

Capability Maturity Model (SW-CMM) for Software

The Capability Maturity Model for Software (**CMM** or **SW-CMM**, Paulk et al., 1995) is a model for judging the maturity of the software processes of KM and for identifying the key practices that are required to increase the maturity of these processes.

The **SW-CMM** was developed by the software community under the stewardship of the Carnegie Mellon Software Engineering Institute. This model is one of the three that provides the basis for the initial CMM Integration SM (**CMMISM**) product suite. The Software CMM has become a de facto standard for assessing and improving software processes. Through the SW-CMM, the SEI and community have put in place an effective means of modeling, defining and measuring the maturity of the processes used by software professionals.

The Capability Maturity Model for Software describes the principles and practices underlying software process maturity and is intended to help software KM improve the maturity of their software processes in terms of an evolutionary path from ad hoc, chaotic processes to mature, disciplined software processes.

The CMM is organized into five maturity levels:

- **Initial:** The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort and heroics.
- **Repeatable:** Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.
- **Defined:** The software process for both management and engineering activities is documented, standardized, and integrated into a standard software process for the KM. All projects use an approved,

tailored version of the KM's standard software process for developing and maintaining software.

- **Managed:** Detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.
- **Optimizing:** Continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies. Predictability, effectiveness and control of an organization's software processes are believed to improve as the organization moves up these five levels.

Except for Level 1, each maturity level is decomposed into several key process areas that indicate the areas an organization should focus on to improve its software process.

The key process areas at Level 2 focus on the software project's concerns related to establishing basic project management controls. They are Requirements Management, Software Project Planning, Software Project Tracking and Oversight, Software Subcontract Management, Software Quality Assurance, and Software Configuration Management.

The key process areas at Level 3 address both project and organizational issues, as the organization establishes an infrastructure that institutionalizes effective software engineering and management processes across all projects. They are Process Focus, Organizational Process Definition, Training Program, Integrated Software Management, Software Product Engineering, Inter-Group Coordination, and Peer Reviews.

The key process areas at Level 4 focus on establishing a quantitative understanding of both the software process and the software work products being built. They are Quantitative Process Management and Software Quality Management.

The key process areas at Level 5 cover the issues that both the organization and the projects must address to implement continual, measurable software process improvement. They are Defect Prevention, Technology Change Management, and Process Change Management.

Each key process area is described in terms of the key practices that contribute to satisfying its goals. The key practices describe the infrastructure and activities that contribute most to the effective implementation and institutionalization of the key process area.

The Indian IT-BPO sector is committed to extending its unmatched reputation in quality, to information security and is working on a four-pronged program to achieve this objective. This comprises: a) engaging

key stakeholders (policy makers, industry players, enforcement agencies, etc.) to build a common understanding of the key issues relating to information security—in the context of global service delivery; b) educating industry constituents about developments in information security policies and practices; c) enactment of policy reform required to ensure compliance; and d) assisting in the effective enforcement of policy frameworks by encouraging the practice of periodic security audits and certification, developing and maintaining an incident response database and facilitating greater cooperation with enforcement agencies.

These efforts have been endorsed by customer organizations and by representatives of independent regulatory bodies who have visited the operations of several IT-BPO firms and have found the information security environment in India to be matching and often exceeding the levels in their own home-countries. Notwithstanding the strong track record, Indian IT-BPO firms and the authorities are aware that vulnerability of information is a global problem and efforts towards minimizing these risks need to be continuous and constantly enhanced. The National Skills Registry and the Cyber-labs initiatives launched over the past 18-24 months are now running successfully and the industry proposes to consolidate these efforts by establishing a Self-Regulatory-Organization that will identify a basic set of security and privacy standards, that member companies will be expected to adhere to.

In the last chapter we discussed the role of knowledge force in taking young firms beyond the initial teething troubles associated with any start-up and placing them on a platform of stability and future growth. But sometimes the trouble it takes for a firm to go from start-up to ten million dollars in revenue is actually multiplied as the firm then tries to grow from ten to a hundred million and further from a million to a billion. Every organization in the second stage today, be it HCL, Hexaware, NIIT or Zensar, can attest to many of the maturity problems which includes, but need not be limited to, the following three core areas:

1. The ability of management teams to scale and adopt a different style for managing growth as compared to the challenges of managing survival and initial client acquisition.
2. The imperative of moving beyond dependence on a few key people to reliance on robust processes and information systems to make project outcomes more predictable and repeatable.

3. Building a services portfolio that caters to the complete transformation needs of a client rather than just one or more of their IT or business process outsourcing needs.

All these growth processes need one key bedrock capability—the management of knowledge and the maturity of knowledge management systems to cater to the growing needs of the firms. Most software firms in the middle to large category have already made substantial progress in making their software development and human resource management processes more predictable by adopting models like SEI CMM and PCMM.

The People Capability Maturity Model

The People Capability Maturity Model (**P-CMM**) adapts the maturity framework of the Capability Maturity Model for Software (**CMM**, Paulk, 1995) for managing and developing an organization's workforce. The motivation for the P-CMM is to radically improve the ability of software organizations to attract, develop, motivate, organize and retain the talent needed to continuously improve software development capability. The P-CMM is designed to allow software organizations to integrate workforce improvement with software process improvement programs guided by the CMM. The P-CMM can also be used by any kind of KM as a guide for improving their people-related and workforce practices.

Based on the best current practices in the fields such as human resources and organizational development, the P-CMM provides organizations with guidance on how to gain control of their processes for managing and developing their workforce. The P-CMM helps organizations characterize the maturity of their workforce practices, guide a program of continuous workforce development, set priorities for immediate actions, integrate workforce development with process improvement, and establish a culture of software engineering excellence. It describes an evolutionary improvement path from ad hoc, inconsistently performed practices, to a mature, disciplined development of the knowledge, skills and motivation of the workforce, just as the CMM describes an evolutionary improvement path for the software processes within an organization.

The P-CMM consists of five maturity levels that lay successive foundations for continuously improving talent, developing effective teams, and successfully managing the people assets of the organization. Each maturity level is a well-defined evolutionary plateau that

institutionalizes a level of capability for developing the talent within the organization.

The key process areas at Level 2 focus on instilling basic discipline into workforce activities. They are work environment, communication, staffing, performance management, training, and compensation.

The key process areas at Level 3 address issues surrounding the identification of the KM's primary competencies and align its people management activities with them. They are knowledge and skills analysis, workforce planning, competency development, career development, competency-based practices, and participatory culture.

The key process areas at Level 4 focus on quantitatively managing KM growth in people management capabilities and in establishing competency-based teams. They are mentoring, team building, team-based practices, organizational competency management, and organizational performance alignment.

The key process areas at Level 5 cover the issues that address continuous improvement of methods for developing competency, at both the organizational and the individual level. They are personal competency development, coaching and continuous workforce innovation.

In addition to these well-known models which are widely used in the Indian and global IT industry, a number of other maturity models have also been applied to build a systematic approach to managing knowledge and capability.

Change Proficiency Maturity Model

A five-stage maturity model framework was developed as a tool to assess existing corporate competency at change proficiency, as well as to prioritize and guide an agility transformation or improvement strategy. The framework is based upon a progression through five stages of working knowledge and strategic focus for practices and procedures, with separate competency tracks for both proactive and reactive proficiencies. The framework is used to build a Change Proficiency Maturity Model for a specific business practice. Change proficiency is being focused as a necessary and fundamental enabler for the agile enterprise. The nature of process improvement and mastery has become a major focus for many industries in the last few years. Maturity models developed by others for process mastery at total quality management (TQM) and also at software development have both provided role models for the Change Proficiency Maturity Model.

The five stages of maturity provide a metric for measuring a company's proficiency on the two axes of interest: proactive and reactive change proficiency. The key change issues for each critical business practice are developed using *Response Ability* analysis, which refers to a collection of analytical methods based on eight *Change Domains*, four in the proactive realm and four in the reactive realm. As a company progresses through these maturity stages there is a specific and different emphasis on change proficiency metrics at each stage. These metrics are associated with the change process itself and refer to the *time* to affect a change, the *cost* of making a change, the quality (*robustness*) of the change process, and the breadth (*scope*) of the change capability.

To assess the maturity of a practice one identifies the knowledge base employed in decision support, the metric focus of active strategies, and the exhibited competencies in both proactive and reactive change, all relative to a previously determined set of change issues.

The Knowledge Journey

KPMG Consulting UK carried out a research in 1998 and repeated it in 2000. In 1998, KPMG was interested in the extent to which organizations were aware of KM, took it seriously and were pursuing initiatives to implement it. In 2000, the scope of the research was extended to investigate further organizations claiming that they were implementing KM effectively.

KPMG defined four key areas of KM as people, process, content and technology. In each area there are certain activities to be done, all together constituting 15. Firms can be assessed according to how they implement these activities. On the basis of the assessed activities the firm is placed on a five-level model called the 'Knowledge Journey'. The model starts from the 'knowledge chaotic' level and it progresses to 'knowledge centric'. An organization is 'knowledge chaotic' in the sense that it does not demonstrate a relationship between the importance of KM and the achievement of organizational goals, whereas it is 'knowledge centric' when KM procedures are an integral part of an organization and individual processes and the value of knowledge is reported to stakeholders.

The KM Formula

From academia, Gallagher and Hazlett (1999) intended to provide a tool for measuring KM capabilities of firms. Their aim was to provide

a benchmarking tool, similar to KPMG's. Gallagher and Hazlett was of the view that there is no single way to build a KM function. They investigated knowledge from the viewpoints of culture, infrastructure and technology. They claimed that these three components should be developed in synergy according to their model, the 'KM formula'.

Gallagher and Hazlett defined four levels of KM maturity, starting from 'aware' to 'optimizing'. They proposed to use the method of critical success factors in the previously mentioned three dimensions in order to determine the position of a firm on the ladder (Gallagher and Hazlett, 1999).

Optimizing Knowledge Use

Klimko (2001) has proposed a five-level model with the view of optimizing knowledge resources.

- **Level 1—Initial:** At this level the organization is working without paying any specific attention to KM activities. KM is often considered black art or lip service, and its activities are simply equated to managing information.
- **Level 2—Knowledge Discoverer:** At this level the organization is aware of the importance of its existing knowledge but still considers it a form of information management. The primary focus of interest is defining, scanning and distributing the existing knowledge. These activities are made for the sake of strengthening current competitive advantages of the organization. The main challenge is how to codify and deploy the discovered knowledge. The approach of the implementation is mainly technology based. Typical technology-based tools needed on this level are textual database management systems, intranets, decision support systems. Possible pitfalls are the misevaluation of existing knowledge and too much reliance on technology.
- **Level 3—Knowledge Creator:** At this level the organization is seeking the creation of new knowledge in order to build new competitive advantages. The primary focus is on finding the required new knowledge that serves the interest of future business. Top level management is committed to KM and accepts its existence. The challenge is in understanding future business needs and making forecasts on the business environment. Exploration of knowledge is carried out by broad-based approaches like brainstorming, mentoring programs, core competencies approach, learning organization approach and human resource approach (Wiig, 1993). Technology plays only a secondary role. A pitfall is wasting too much

effort in exploring knowledge that does not serve the interest of the business. In other words, the creation does not provide an acceptable return on interest.

- **Level 4—Knowledge Manager:** At this level KM is institutionalized in the organization. There are individuals and/or organizational units dedicated to KM. The KM function has formal, documented processes. Knowledge processes are measurable, and therefore quantitative control is possible. KM interfaces with the quality management function. The primary focus is on balancing the available resources between discovery and creation of knowledge. KM is expected to support preserving competitive advantages as well as create new ones. Sophisticated technology-based tools of knowledge creation like knowledge engineering data mining are consciously applied. The challenge is how to integrate existing and created knowledge, and also how to institutionalize KM processes. A pitfall is formulating a KM function for its own sake.
- **Level 5—Knowledge Renewer:** At this level the scope of KM is broadened to the alliances of the organization. The primary focus of interest is to share knowledge with other organizations, and to exploit common ways of knowledge creation. It is done for the sake of common business interests. The KM function improves itself continuously, in an optimizing manner.

The Efficiency Focused Model

The five-stage knowledge maturity model of Cadence moves from Ad hoc, Repeatable, Defined, Managed and Optimizing stages. At the ad hoc stage there are no formal practices and the organization is dependent on individual skills. At the next stage, there is focus on training, project management guides are made available, and individuals choose and plan projects which are supported by a proper implementation plan. In Stage III, methods and procedures are standardized and adopted company wide. For every project, phase end decisions are made through sign-offs, and regular status reports of projects are made available. Emphasis is also on quality, timely delivery, regular communications and human resources management. In Stage IV, project steering teams are appointed, resource loading and leveling are carried out periodically, costs are tracked for every project and risks are evaluated. In Stage V, process measures are clearly define and monitored and there are regular audits and feedbacks of the same given to the people concerned.

Across the study of KM models and knowledge evolution in organizations, drawn from both researchers and practitioners, the impact of KM on the inherent capability of the organization and the dynamics of using a consistent improvement of processes of KM to develop the overall maturity of the firm, a la the SEI CMM Carnegie model approach, have been evident in some of the key models.

From this analysis, two preliminary conclusions could be drawn:

1. There is a need for a multi-stage model for any KM to move from its early beginnings in KM to a true state of KM maturity.
2. A balanced approach to considering all the factors is essential for maturity; focus on either technology or people to the exclusion of other factors does not seem to be a truly balanced approach.

A number of factors that could influence an organization's progress in the KM maturity journey have been mentioned by various researchers and include leadership, human motivation, sound business processes and effective systems, all of which have a role to play in the creation, transfer and renewal of knowledge though there is no systematic attempt mentioned in the literature to identify key factors that determine the KM capability in an organization or help it progress on the journey towards KM maturity. The research carried out by authors point strongly towards the concept of 'knowledge force' from the very early stages of the firm evolution and, in due course, the need for formalizing 'knowledge management' as a discipline.

The research also shows that the ability of any organization to assimilate knowledge varies over a period of time and the different knowledge evolution models have focused on conversion from data to knowledge as well as tacit to explicit to tacit conversions during the stages of evolution. The research on capability-related knowledge evolution has pointed to stages of competency and capability building, and the multiple knowledge maturity models that have been propounded by practitioners as well as academicians have focused on progressive use of tools and technologies, growth, benchmarking and processes. However, unlike in the case of the well-delineated and well-documented Process Maturity model of the Carnegie Mellon Software Engineering Institute, there is no comprehensive model for identifying explicit stages in knowledge maturity or methods for identifying the stage reached either through measurement of characteristics or competencies shown during the progress to knowledge maturity.

The next chapter will present such a model and analyze its applicability to the software industry.

References

1. Gallagher, S. and Hazlett, S.A., "Using The Knowledge Management Maturity Model (KM3) as an Evaluation Tool", Draft paper for the Conference on 'Knowledge Management: Concepts and Controversies 10-11 February, 2000: University of Warwick, Coventry, United Kingdom, <http://bprc.warwick.ac.uk/km028.pd>, 1999.
2. Klimko, G., "Knowledge Management and Maturity Models: Building Common Understanding", Proceedings of the 2nd European conference on Knowledge Management, The IEDC Bled School of anagement, Bled, Slovenia, 8-9 November, 2001, <http://www.mcil.co.uk/2-proceedings-eckm2001.html>, 2001.
3. Paulk, M.C., Weber, C.V., and Curtis, W., (Eds), *The Capability Maturity Model: Guidelines for Improving the Software Process*, Addison-Wesley Publishing, New York, 1995.

Implications of Knowledge Management Maturity Model for the Software Industry

VII

Implications of Knowledge Management Maturity Model for the Software Industry

THE LOGIC FOR a Knowledge Management Maturity Model (KMMM) in the Indian IT industry is strong, for all the reasons that have been discussed in the previous chapter. In the current scenario where attrition of skilled manpower remains one of the critical concerns of all industry CEOs, the need to have a predictable and step-by-step movement towards knowledge management maturity cannot be over-emphasized. The authors through their work in the industry and detailed research within and across IT and other service industry firms have developed a KMMM approach that clearly identifies the stages in an organization's journey towards maturity and also the factors that enable the organization to progress through these stages in the quickest possible time.

IDENTIFICATION OF K-STAGES

There are four stages in the progress towards knowledge maturity.

1. The pre-knowledge initiation stage

A stage where organization success in getting business has been largely due to being first in the market with a great product or idea, with no attempt to establish any processes for knowledge capture or dissemination even among current practitioners. The ability to respond knowledgeably to customers or acquire new customers with knowledge is lacking and so is the ability to impart knowledge born out of experience to new employees.

2. The knowledge initiation stage

A stage where organizations have established through a combination of technology and management push an information-sharing mechanism by which regular reporting, sales force automation and updating ensure that at least explicit information capture occurs on a regular basis and is tapped for all customer-related transactions. There is some amount of predictability in knowledge sharing at the service delivery level, but there is little or no sharing of knowledge within the sales community and also between sales and service delivery. This results in generally satisfied customers but poor replicability of success because of lack of knowledge inputs to the sales force. The focus is still largely on explicit information sharing, and little or no effort is made to enable tacit knowledge capture or sharing.

3. The knowledge action stage

A stage where the need is felt to establish processes and procedures for systematically capturing, storing, sharing and using intelligence gained out of interactions within as well as outside the firm with key customers, suppliers, shareholders and so on. The beginning of tacit capture, at least at an anecdotal level, is also evident.

4. Towards knowledge maturity

A stage where KM is an integral part of business activity and both explicit and tacit knowledge are shared by employees of a function and across geographies, functions and hierarchies.

Typically, it is firms in the knowledge industry, including all the software firms studied by the authors, that exhibit such capabilities. The driving force is the ever-increasing demand from the customers for higher and higher value addition and the little patience they display in having to repeat intelligence transfer to new employees. This forces firms to glean every possible bit of information and knowledge from every moment of truth with customers. This maturity is less evident on the supplier side, though key shareholder interactions in closely watched software companies do take on these characteristics.

Comparison of Knowledge Maturity Stages with SEI CMM Levels

As mentioned in the previous chapter, the best use of a stage-wise move to maturity is in the SEI CMM Process Maturity model of the Carnegie Mellon Institute and it has been felt appropriate to compare

progress through KMM stages as evinced in these cases with the process maturity stages described in the model.

The Knowledge Management Maturity Stages (hereafter called K-Stages) could be linked to the five levels in the SEI CMM Process Maturity model as follows.

Level 1 is ad hoc or chaotic, where repeatable processes are not documented and very often not used. Organizations in the first knowledge stage exhibit this apathy when it comes to KM processes as well.

Level 2 is repeatable, where processes like project planning, sub-contract management, configuration management and software quality assurance are well-documented and used. Organizations in the knowledge initiation stage exhibit some of these characteristics in the service delivery function while the sales function is still ad hoc or Level 1.

Level 3 is defined, where the same processes are used across the organization. At this level, the organization demonstrates process focus and definition across the board and has in place good software product engineering and integrated software management, and also peer reviews, inter-group coordination and training programs organized on a regular timetable to instill process discipline. Organizations in the knowledge initiation and knowledge action stage exhibit symptoms of this level.

Level 4 is managed, where quantitative process and strategic business management is put in place. Knowledge action organizations which expand to sales force automation and CRM show this capability in the sales function, while the introduction of e-learning initiatives enables this level to be achieved in service delivery.

Level 5 is optimizing, where process and product data is used for strategic business improvement. In this phase, defect prevention, technology change management and process change management become part of the organization's work culture. It can be surmised that the knowledge action stage in KM is a pre-requisite for an organization to even aspire to this stage, and this stage would then be a pre-requisite for attaining the knowledge maturity stage.

The K-stages that have emerged through the authors' study of organizations in the manufacturing, banking and software sectors are as follows:

- Pre-knowledge, where no efforts are made to address knowledge as a resource.

- Knowledge initiation, where the recognition of the use of explicit knowledge is coupled with some early actions.
- Knowledge action, where the organization sees the early benefits and initiates methodical frameworks to harness both explicit and tacit knowledge.
- Knowledge maturity, where business results are evident through KM.

IDENTIFICATION OF K-FACTORS

What are the driving forces that enable some organizations to move steadily across these definable stages to maturity while other organizations stay at a suboptimal level and are unable to reach the potential that exists in all organizations to aspire to and reach knowledge maturity? Through the organizations studied, many disabling factors and deterrents emerged, some revealed through discussions with employees and some emerging through the study of analyst reports and industry views of the firms.

Some of the key factors that have emerged from the companies studied are as follows:

- A climate of mutual cooperation within the organization that ensures that key customer and project information and insights are shared.
- Efforts to institutionalize and use processes to capture and store information and knowledge on a regular basis. This has emerged as a common trigger in all three firms to get some formal movement in the KM journey towards maturity.
- Availability of strong leadership to demand and reward true information, experience and KM environment within the organization and create a spirit of teamwork.
- Developing cross-functional information systems that enable the capture, storage, dissemination and use of knowledge across the organization.
- The nature of the industry and the customers served.
- The extent of information intensity of the products and services offered by the companies.
- The importance given by the organization leadership to the availability of accurate data and information for fact-based decision-making.

After analyzing these factors and validating with a survey of literature, the following key factors have been identified as influencers

in the KMM process. These factors (hereafter called K-Factors) are as follows:

1. Business process readiness
2. Technology infrastructure
3. Human behavior
4. Leadership

The discussion that follows surveys these factors and their importance as defined in literature and provides a context-specific definition of each factor to serve as the base for analysis of the present cases and as the basis for the next phase of research.

Business Process Readiness

Business process readiness can be defined as the ability of the function to capture, store, disseminate and use knowledge across its various constituents efficiently and effectively.

Hull et al. (2000) define business processes as knowledge about internal administrative, technical and management operations through which the organization identifies and delivers products and processes. The processes and routines by which a firm manages technologies and skills are central to the firm's ability to gain the potential benefits associated with technologies and skills. Hammer and Champy (2001) provide a detailed account of an organization's processes and routines as they theoretically fit into a firm's value chain.

It is through method that the inquiry takes a form. Often, the processes are seen as an ordered set of procedures, and these are applied according to some regime or strategy. If the method is adaptable, then its form can change, enabling its set of procedures to be applied in a changing order. This is due in principle to the use of controls that confirm or adjust the progress of the inquiry as it develops.

Business process readiness in the context of this model is defined as the ability of business processes that have been established in the organization to capture, store, disseminate and use knowledge in day-to-day sales-support and service-delivery functions.

Technology Infrastructure

Technology infrastructure encompasses the integration of the core or bedrock systems in the organization to enable quick access to information needed for effective monitoring and decision-making. Specific usage of

business intelligence and KM tools would be an additional requirement as the organization progresses to higher K-stages. New computer networks allow a richer and more complex exchange of information and knowledge (Sanchez, 1996) among designers and organizational units.

According to Bowonder and Miyake (2000), technology management in a dynamic context is essentially the process of managing knowledge ecosystems. Technology management is managing technological knowledge to sustain competitiveness in an uncertain and competitive business context. It evolved to satisfy an existing need for managing rapid technological change and technological uncertainty as well as complexity. The issues became manifold because of globalization of technology. The ecology of knowledge has changed enormously in recent years. The globalization of R&D, global competition, evolution of global standards and evolution of the internet (Tapscott, 1996) have changed the landscape of the knowledge universe. The number and nature of interactions are changing in the knowledge ecosystem. The internet and intranets are changing the flow and delivery of information in the form of increased value-added interactions.

Technology infrastructure in the context of this model is defined as the availability of integrated technologies to enable quick access to information needed for effective monitoring and decision-making.

Human Behavior

Behavior change is the link between knowledge development and performance improvement (Slater and Narver, 1999). Human behavior is a key K-factor which would determine both the technological and psychological readiness of people to move towards a knowledge-sharing environment that determines the progress of the organization across various K-stages. The significance of human behavior is highlighted by Pearce and Bodnar (2000) when they state that irrespective of the excellence of information systems or the streamlining of procedures and methods, the human component is ultimately the main determining factor in corporate performance effectiveness. People, and their choice to exchange knowledge in complex networks within an organization, should be the driving issue in considering KM. People are fundamental to most organizational strategies, but in particular a strategy of knowledge-sharing and mobility must be founded on a respect for the behavioral choice of individuals.

According to Nevis et al. (1995), the nature of learning and the way in which it occurs are determined by the organization's culture or sub-cultures. There are a variety of ways in which organizations create and maximize their learning. Von Krogh et al. (1996) refer to 'knowledge connections', which provide the potential for people to convey messages. These are principally made up of relationships, both those formed on an informal basis and those that occur through more formal means as a result of structure and the underlying culture of an organization. At this level, potential connections, such as when a customer asks for types of services other than those obviously provided by the organization, may be ignored or filtered out.

These explorations of the issue of knowledge mobility and references to organizational culture and behavior indicate recognition of the complex and dynamic nature of knowledge and knowledge transfer in organizations. Dougherty (1999) states that people have the ultimate key to successful knowledge connection because they make choices of sharing or concealing knowledge, wanting to know more or wanting to learn. In order to raise the volume and quality of knowledge exchange (presumably a goal of an organization that claims that knowledge is its key asset), people must choose to interact and share knowledge at a level over and above that required to get their job done. For knowledge to be shared at an organizational level, for it to connect, there has to be a voluntary action on behalf of the individual. To connect is a human thing and will only happen if people choose to do it.

Human behavior in the context of this model is defined as the readiness of people technologically and psychologically to move towards a knowledge-sharing environment

Leadership

Leadership is the make or break K-factor in the success of any KM initiative. Many companies are able to move out of their initial chaotic state to some level of knowledge initiation, but are unable to graduate to knowledge action because of lack of continuing leadership focus.

Leadership has been defined differently by several researchers examining it from multiple dimensions. Four things stand out in leadership: First, to lead involves influencing others. Second, where there are leaders there are followers. Third, leaders seem to come to the fore when there is a crisis or special problem. In other words, they often become visible when an innovative response is needed. Fourth,

leaders are people who have a clear idea of what they want to achieve and why. Thus, leaders are people who are able to think and act creatively in non-routine situations, people who set out to influence the actions, beliefs and feelings of others. In this sense being a 'leader' is personal. It flows from an individual's qualities and actions. However, it is also often linked to some other role such as manager or expert. Not all managers are leaders and not all leaders are managers. The following assumptions can be made of leaders:

- Leaders ask for data and information on regular basis.
- They ask for data for decision-making.
- They reward knowledge based actions and decisions.
- They practice knowledge retrieval and use actively.

Leadership in the context of this model is defined as the push given by senior management and their active participation to make KM successful across the organization.

The importance of each of these factors in the Indian software exports industry is worth an analysis. Most firms studied have uniformly positive human motivation to attain higher levels of customer closeness, both in the sales and service delivery functions, though lack of focused leadership has prevented the firm from making the final transition to knowledge maturity. In a sense, it seems that while presence of positive human behavior is a pre-requisite for progress or even sustenance of knowledge maturity stages, there are other factors that enable the push from stage to stage.

The push towards the knowledge action phase has been possible in these firms largely due to the introduction of collaborative technologies including a formal knowledge management system which has enabled team workers in India as well as overseas locations, and in some cases even customer representatives, to undertake collaborative project management and monitoring. The reason why most organizations fail to make the transition to knowledge maturity in any of the dimensions studied is clearly a result of the lack of active leadership push or action in the area of KM. The CEO of one firm in the study chose to make KM a team priority but did not yet provide any 'lead by example' usage of KM systems; neither did he make it mandatory in sales and service delivery reviews for complete information to be discussed and presented as the base of any analysis or recommendation. Upon further analysis, it was found that in the firm there was a small KM initiative being nurtured in the software development function in one of the centres servicing their key client.

This initiative was aimed at expeditiously supporting the teams in the frequently found trouble-shooting areas. As the client was particular about the quality and speed of support, the firm had to have a backup when experienced people were not available on a particular day or when the company lost people and had to spend time to get new people up to speed. Thus the KM initiative, which was primarily launched to support their own requirements, remained a 'team priority' and did not find priority with the management team and the CEO. Neither did the customers trigger the company to launch a corporate-wide KM system nor did the company or CEO feel the pressure to manage the business growth needs using means other than traditional modes of face-to-face, telephonic or mail communications.

Based on the research and the analysis of findings, the study showed that to move from the pre-knowledge K-stage to the knowledge initiation stage, the key push had to be provided by the institution of processes. The use of technology then enabled certain key functions particularly involved in processes like supply chain management, finance and human resource management to move into the action phase, and the final push into knowledge maturity was provided by leadership. To avoid regressing at any stage to the previous stage, large amounts of motivation and training were brought into play.

The preliminary conclusion reached is that while human behavior is a necessary condition for progress in the maturity sequence, the sufficient condition moves from process to technology to leadership as the organization moves through the stages. Moreover, a certain minimum threshold is required to be reached in each K-factor before an organization is ready to make the transition into the next K-stage.

It has been established that there are definite stages in the progress of any organization towards knowledge maturity and it is possible to identify some key factors that enable the organization to progress from stage to stage. There has also been an initial hypothesis developed that while human behavior is a necessary condition that is required not only for progress through stages but also to avoid regressing once a stage has been achieved, the sufficient condition for progress from the pre-knowledge stage to knowledge initiation is business process readiness, for progress from knowledge initiation to knowledge action is technology and, finally, it is only leadership that can provide the final push from knowledge action to knowledge maturity.

STAGE-WISE TRANSITION OF FACTORS AND KNOWLEDGE DYNAMICS

Through the cases that have been studied, the following observations have been made about the changes in characteristics and relative importance of each of the K-factors.

K-Stage 1—Pre-knowledge

1. Business process readiness

Business processes are driven more by external statutory needs and some departmental initiatives at this stage and there is little or no planned process for sharing of information within or across departments. Organizations in this stage also display lack of any attempt or understanding of the process view of the customer or supplier, with the result that these key stakeholders experience significant 'waiting time'. The realization of these lacunae and the first attempts to design cross-functional business processes unfold the stage when a firm really moves into knowledge initiation.

2. Technology infrastructure

Technology infrastructure is conspicuous by its absence in this stage, with some efforts at computerizing core functions like accounting and payroll and, in the case of manufacturing, some automation initiatives for storekeeping and critical manufacturing processes. In services firms, some level of messaging is practiced in this stage.

The move towards knowledge initiation does not seem to need any significant technology investment though connectivity through intranets typically supports the first process integration initiatives.

3. Human behavior

Human behavior is typically individualistic and in many cases chaotic at this stage. Many organizations struggle with information hoarding, and customer knowledge is locked deep in the minds of individuals. The first move towards knowledge initiation needs awareness among core team members that sharing of knowledge is a necessary process both for the organization and, in many cases, also for the continuing evolution and growth of individuals.

4. Leadership

Organization leadership is typically focused on customers or technologies depending on the origins of the company, and in this

stage it is very typical for leaders to disregard and even flout processes. The pre-requisite for moving into Stage 2 is the willingness of leaders to support a process integration initiative even if they do not intend to follow processes themselves.

While all the factors are important, the key driver from Stage 1 to 2 is the maturing of cross-functional business processes. All other factors play a support role to this key initiative. In our three cases, the integration of sales to resource planning to execution processes had been done in both the software and contract manufacturing firms while the retail bank had integrated the entire banking process for the customer.

K-Stage 2—Knowledge Initiation

1. Business process readiness

The significant characteristic of business processes in this stage is the ability to move information across departments and identify key knowledge elements that need to be shared across functions. The processes at this stage are still designed to focus on explicit-to-explicit information-sharing. The threshold for moving into this stage appears to be the willingness to make an effort to look at tacit-to-tacit sharing and also processes for commencing explicit-to-tacit initiatives.

2. Technology infrastructure

This is the stage when technology begins to make an impact by providing access to shared data and enabling work flows to be automated within the organization using intranet and internet technologies. Technology, in fact, becomes the key driver of the move from initiation to action, since the threshold between collaborative software and document tools on the one hand and business intelligence-based tacit-to-explicit initiatives on the other becomes the key step towards the action stage.

3. Human behavior

Human behavior in this stage sees the transition from the extreme ‘caveman’ approach to improved communication, and the formation of sharing communities where tacit-to-tacit knowledge exchange begins to happen. Incentive plans for sharing knowledge are put in place and advertised. This factor reaches the stage threshold where knowledge-sharing communities are supported by technology, and individuals exhibit willingness to provide frequent inputs to the KM system.

4. Leadership

Leadership mentions the need to share knowledge at every forum and becomes the strongest proponent of KM.

The critical determinant of readiness to move into knowledge action is when leaders translate words into action—from being mere advocates, they start using KM tools and lead the way by personal example.

In the transition from Stage 2 to 3, technology evolution becomes the key factor. This is where the retail bank was unable to succeed, while the contract manufacturing firm made a conscious effort through introduction of enterprise resource planning software. A formal KM system serves the purpose of cross-functional process integration in a software firm.

K-Stage 3—Knowledge Action

1. Business process readiness

Business processes during Stage 3 move beyond the basic sharing of information to deeper capture and analysis of supplier competencies, customer preferences and employee needs with suitable triggers across functions to serve these evolving needs in the quickest possible manner. The process of knowledge capture, storage, dissemination and use is institutionalized.

The significant trigger for moving to a maturity stage for the business process factor is the blending of tacit knowledge capture and use with the mature explicit processes.

2. Technology infrastructure

Technology in this phase again moves from the proactive phase in Stage 2 to a more supportive phase to the mature business processes. There are, however, new technology initiatives like business intelligence capture from market facing interactions and the conversion of knowledge objects to learning objects to serve the needs of the entire employee community. Technology maturity peaks at this stage and when a foundation is laid for quick evaluation and integration of new knowledge-enabling tools into the overall technology framework of the organization, this factor is ready for the push into knowledge maturity.

3. Human behavior

Human behavior is the one factor that can drive an organization which has reached the knowledge action stage back to knowledge initiation

or even knowledge oblivion. Hence, this factor needs constant attention through the early stages of knowledge action all the way into knowledge maturity.

Human behavior in the knowledge action stage moves from experimentation with KM to the creation of knowledge champions to the formation of knowledge communities to the integration of these communities with the very nature of work in the organization. Similarly, there is a symbiotic relationship with the leadership factor that then moves the organization to the knowledge maturity stage, akin to the iterative relationship between business process and technology in the earlier stages of the knowledge maturity journey.

4. Leadership

Leadership probably plays the most crucial role at this stage when it sees the true utilization of knowledge as a strategic resource for the organization and the use of KM as a potent competitive weapon in the marketplace.

Strong leadership, which views knowledge as a core strategic asset, is able to see possibilities of restructuring the business around core competencies, thereby both necessitating and enabling the creation of expert communities and best practice knowledge-sharing.

In all the three companies, this stage is yet to occur, though the software firm's leadership is taking proactive steps to make KM reviews a part of its management meetings and KM frameworks a key competitive differentiator for customers. This will enable them to move to the maturity stage.

K-Stage 4—Knowledge Management Maturity

As in the case of total quality management, KM maturity is a state that is almost utopian and it is quite likely that this is not a sustainable state for any organization, which itself is a possible subject for future research. At the very least, one could say that during those brief periods when an organization exhibits knowledge maturity, the four factors will exhibit the following characteristics:

1. Business process readiness

Business processes in this stage go far beyond the here and now of business operations and move into proactive processes for creating innovative offerings, using the wisdom gleaned from customers and collaborators to build opportunity share in future marketplaces. Story

telling and expert caching are made integral parts of knowledge dissemination processes within and beyond the organization to embrace all stakeholders.

2. Technology infrastructure

Technology continues to support and create new opportunities for innovation by providing automated structuring tools to continuously make the tacit-explicit transition a reality. It provides adaptive knowledge crawlers and agents who help in the real time search for decision supporting information and knowledge. Widespread use of extranets, electronic data interchange and emerging collaborative technologies makes the knowledge interface with stakeholders completely seamless.

3. Human behavior

Sharing of knowledge through formal and informal means is taken for granted as the organization becomes practice based rather than product or geography structured, and the gap between the knowledge source and knowledge destination is seamlessly bridged by highly motivated knowledge workers.

4. Leadership

Curiously but predictably, leadership ceases to have any role to play in the knowledge mature organization, since processes technology and human motivation become the key drivers, enabling leaders to move into the background and be available more as mentors and coaches to keep the knowledge corporation on the right track. In fact, during those brief periods when the organization, in a particular project or during a period of crisis, threatens to regress from the knowledge maturity stage, the role of leaders is to guide it back to maturity rather than once more taking the reins and driving it. This will probably be the true test of knowledge maturity for business units, organizations, societies and even whole civilizations.

ANALYSIS OF NECESSARY AND SUFFICIENT CONDITIONS FOR STAGE TRANSITION

The many organizations that provided these insights to the authors have all shown how only a balanced approach to the four factors can enable a continuous forward movement in the knowledge maturity process. The weakest factor in the manufacturing firm has been strong leadership, although they do have good processes and reasonable

technology. The retail bank, however, has seen technology as the deterrent, with processes unable to mature because of their dependence on individual motivation for sharing of customer knowledge rather than relying on enabling technologies. The software firm has reached a mature level of knowledge action and is preparing for knowledge maturity status because of the well-developed nature of all four factors, though the leadership level to move to and sustain maturity is only beginning. All the characteristics mentioned in the knowledge maturity stage have been seen in this firm at various points and all that is needed is the leadership role to change and consistency to be achieved in the other three factors for sustenance of the maturity level.

Three key conclusions have been reached through the case analysis and the development of the KMM model. They are as follows:

1. There is clearly a KMM framework with definable stages for organizations across industry sectors.
2. Leadership, process, technology and human behavior are key factors that influence the ability of companies to move up the KMM stages.
3. Human behavior is a necessary condition for an organization to sustain and improve its KM capabilities while process integration takes organizations to knowledge initiation, technology to knowledge action and finally leadership to KM maturity.

It was also observed that there were some additional factors which seemed to influence the KM in the organization, including customer demands and employee retention. While the former drives the maturity levels of KM and gives the organization its competitive advantage, the latter seems to enable the organization to shorten the learning curve of employees. However, the impact of customer demand was noticed only in REB, while the impact of employee retention was seen in SWE. The other four factors were seen to have an influence on all the three cases studied. Hence, in the context of the current study, it has been decided to focus only on the four key factors, namely leadership, process, technology and human behavior, as the major influencers in the KM journey.

CASE STUDY: KNOWLEDGE MANAGEMENT AT ZENSAR TECHNOLOGIES

A practical application of the Knowledge Management Maturity Model was undertaken at Zensar Technologies Limited and some of the background as well as new findings from the case are presented here.

The development of knowledge management in a two year period, 2001 to 2003, has been chosen to trace the stages and factors and develop new insights.

Case Background—Zensar Technologies

Zensar has been one of the more successful middle tier Information Technology organizations in the Indian software exports industry, growing from its initial days in 2001 as a supplier of people to UK and US to becoming a full fledged offshore solutions company with a reputation for innovation. While it is today successful in multiple geographies and service areas, in the early days when it first embarked on software development from its offshore location in the city of Pune in Western India, it faced multiple problems—a new set of processes to be developed, training of professionals in doing work offshore rather than at customer sites and building confidence among global customers that it would indeed be possible to produce comprehensive software solutions in India.

One of the key initiatives chosen to transform the organization in those early days was KM, since there was a consensus in the team that a well-integrated KM capability could serve to knit the organization together, conserve valuable resources that were currently being frittered away in work and effort duplication, and bring the customer into the fold in terms of knowledge capture, storage, dissemination, sharing and use. The team was very conscious that they needed to do something that would put them in the league of their key competitors with whom they shared major accounts. Hence, there could be no compromises while making Zensar one of the best providers in the industry.

Critical Success Factors for Zensar

The Vision Community that was set up to spearhead the transformation of Zensar in the beginning of July 2001 came up with a five-pronged strategy to restore the firm to profitability and build confidence in key clients, employees and shareholders. They are as follows:

1. To ensure that the business processes for customer acquisition and project execution were fully integrated across the global length and breadth of the organization.
2. To put in good internal systems with judicious use of technology to improve accuracy of process controls, project management, resourcing, invoicing and customer response.

3. To build confidence in the management team members and all sales and delivery team members that the organization was working towards a clear mission and was headed in the right direction.
4. To provide a clear sense of direction to the key stakeholders by 'leading from the front' and quickly responding to all issues and opportunities thrown up by the market.
5. To focus on the management of knowledge, emanating from every stakeholder and external sources, and use this to improve the capability of the organization.

The early phase—July to December 2001

The very first act of the vision community in their mission to transform Zensar was to formulate a new byline for the company. From the original theme of 'Nothing Short of Everything', probably created in an earlier era to signify the company's willingness to tackle any area of Information Technology that the client needed, the team decided that the best approach to success lay in focusing on a few customer segments, becoming partners in identifying business pain points and applying information technology to solve business problems and meet the corporation's goals in their segment. The line chosen was 'Zensar—Your Transformation Partner'.

One of the first major steps taken by the CEO was, unfortunately, a negative one but necessary to restore the organization to profitability. A recruitment spree undertaken in the latter half of 2000, under the mistaken optimism that the markets would pick up and need large manpower numbers, led to the utilization of technical manpower dipping to 52 per cent in the April–June quarter of 2002. A quick look at the performance management data led to the elimination of over a 100 technical resources in July, followed by a more gradual elimination of 20 per cent of the support staff by October of that year. Having been used to many years of benevolence and human resource initiatives aimed more at mollicoddling than asking for performance, this sent shock waves through the organization. One of the first initiatives taken up was communication at all levels, initially with the managers to explain the rationale for the manpower reduction initiative and then through Everybody Meetings (EBMs) in Pune as well as at all major overseas locations. This enabled people to let off steam and understand, if not fully appreciate, the need for drastic action and emphasis on the performance management motive in all future actions.

Process integration across the various locations was the next step, undertaken personally by the CEO and slowly followed by actions taken at the next level of management. The leadership style was to

come down brutally on any delays in recruiting, project execution or response to customer at any level in the organization, thereby slowly giving overseas heads and account managers the confidence that the Pune corporate office was no longer a holy cow but a support group that had to stand up and be counted to provide real services to the customer. Frequent CEO meetings with the five major customers further reinforced their belief that this was a new organization which would spare no efforts to meet the needs of customers and delight them at every opportunity.

A formal financial accounting system planning exercise, overhauling of the quality management system to ensure that project execution glitches were ironed out and a better resource management system for tracking and identifying internal and external candidates for key project roles were initiated. A skunk-works team was set up within a major offshore development center (ODC) to develop K-Zen, a pilot KM system, and K-Vault, a software warehouse, was built to serve as a single knowledge repository and knowledge-sharing system for the 100 plus team members of the ODC. Within six months, the results were already beginning to show in the form of a happier set of customer representatives and more business coming from the organization.

Consolidating the gains—Jan to Sep 2002

Key management processes put in place by the CEO began to get firmly embedded in the system by the Jan–March quarter of 2002. The flow of planning and decision-making was as follows:

1. Core management team consisting of CEO, COO, CFO and heads of marketing and human resources made key assumptions and developed new initiative ideas.
2. These ideas were shared and vetted with delivery and quality heads in India and heads of the American and European operations, who were all members of the company's management committee.
3. Ideas which needed further testing and validation were discussed either at the strategy group meeting, consisting of all key program managers and heads of resourcing, recruiting, accounts and legal functions, or at the pre-board meetings of key shareholder directors.
4. Formal validation and approvals of capital investments, operating expenses and overall company budgets were carried out at the quarterly board meetings.
5. Approved initiatives and decisions were enshrined as policies and communicated throughout the organization.

Regular meetings of all these groups and the active participation of the CEO and COO in management review meetings for quality and internal systems ensured that cross-functional business processes as well as delivery processes were streamlined and individual functions like payroll, accounts, quality, resource management and recruiting got computerized. The fledgling K-Zen initiative was adopted by the internal systems group to create a more robust version using Microsoft Share Point Portal.

As business results started improving quarter on quarter through the period, the company was specifically encouraged by its key customers substantially increasing the volume of business. Over 18 new customers signed up during the period of April 2003. The KM internal initiative having met with good success, the consulting group launched it as a new packaged service titled 'KM in 30 days', which met with an encouraging response from its existing and new customers.

Launching new practices at Zensar—Oct 2002 onwards

Encouraged by the progress on all parameters from June 2001 to Sep 2002 and the spirit of cooperation and optimism that now cut across geographical and functional boundaries, the management committee deliberated on a suggestion by the quality head to move towards practices that developed deeper skills in the delivery teams. Accordingly, while the specific programs for key customers continued, the organization was moulded into a practice-based organization in the period Oct–Dec 2002. Five practice groups—consultancy, package implementation, custom projects, applications management and business process outsourcing—were set up and the company also identified BPO as a new opportunity to research and make an entry.

KM capability, which had initially been strengthened by the integration of business processes and then by the installation of industry strength technology for K-Zen, received a further fillip when the CEO encouraged the use of KM by requiring all presentations and shareable documents to be placed in the knowledge repository for access by concerned people rather than mails with attachments being sent to all concerned.

Several steps were taken to revive and put the company back on a healthy track. In order to win back the loyalty of the staff, a series of one-to-one and group interactions were regularly held, which helped in opening communications channels between the management and employees and also in addressing the concerns people had about retrenchment and future growth prospects. An aggressive and committed

team and suitable systems were put in place to make sure that the quality of deliverables improved substantially, and there was an all-round concern for timely action and support of customers' requirements. A concerted KM initiative was put in place to help people share knowledge, experience and best practices among themselves. This helped avoid repetitive tasks, strengthened the intellectual asset base of the company and assisted in enabling speedy responses to market requirements for proposals and queries. On the management front, periodic reviews of the capabilities of the team and the willingness to restructure and induct right talent and replace deadwood helped build a high-performance team. The creation of an independent technology group which could act as a catalyst to build capabilities in new areas and exploit new markets, led by an experienced CTO, created what the strategy head called a 'specific and unique point of view'. The combinations of these factors saw the company grow in the year 2002–03 by 22 percent in revenues and over 200 percent in operating profits. The entry into the booming BPO business was expected to add a significant dimension to the growth of the firm in the coming years.

With both formal and informal mechanisms of knowledge sharing in place, the organization became much more confident about its charter and unique offerings especially through the solution blueprint technology. The healthy team spirit and bonding that exists among the management teams reflects on the customer satisfaction levels and their positive references of the business delivered to them.

Today Zensar owes much of its success including a marquee list of blue chip clients to its stress on the management of knowledge.

Case Analysis and Identification of Sub-factors

The analysis of this case is more with respect to the identification of sub-factors, since this case has been from one of the companies chosen in Phase 1 to determine the K-stages and K-factors. The stages and factors have been summarized as follows:

Pre-knowledge stage: This was the scenario during August 2000–June 2001 after the previous CEO and his trusted lieutenants had quit the organization, leaving it in a state of flux with divisive forces operating between the overseas operations and the Indian corporate office and delivery centers. While the interim CEO had made it a practice to have regular meetings of the country managers in Pune and also organized everybody meetings (EBMs) to disseminate information,

the real feeling of a single unit was missing. On the process front, manuals and systems had been put in place for the core functions in Pune and after initial billing disasters with some key clients which had almost resulted in the loss of the account, systems for accounting, billing and payroll were also available in all overseas locations. Information was being sought and provided on a regular basis, though not entirely reliable in accuracy. This was the state of affairs right up to June 2001 when the turnaround processes were started.

Moving to knowledge initiation: The first factor that moved the organization to this stage was the initiation of cross-functional business processes by the CEO. During July 2001– March 2002, the sharing of common data across the company, access to customer records and project status by all levels began to make an impact. In addition, this period also saw the formation of the strategy council, with the resultant sharing of data and experiences across key project managers. The implementation of K-Zen in some of the units enabled technology to play a role in capturing explicit and tacit customer-transaction information and knowledge. The maturing of information systems enabled managers to ask and receive data as an aid to decision-making on a regular basis.

From knowledge initiation to knowledge action: The implementation of Zen Apps, the Oracle-based integrated financial accounting system, the streamlining of the resourcing function through the Peoplesoft-based Human Resource Information System and the re-implementation of K-Zen as the company-wide employee knowledge portal using Microsoft Share Point Portal technology—all these and some peripheral systems were the keys to the organization moving into knowledge action by the end of the calendar year 2002.

The other factors too developed during this phase. On the process front, the sharing and use of cross-functional data across accounts, marketing, sales, delivery and quality functions became a practice. With the holding of regular management review meetings and recording of explicit and tacit data, information and knowledge became one step forward in the human behavior factor development. The lack of increment and phasing of the performance bonus threatened to rock the necessary condition of human behavior for some time but the excellent processes and constantly improving business results helped the leadership tide over this crisis. The leadership factor itself took steps to reward knowledge-based actions and the choice of Zensar's primary knowledge champion Prameela Kalive for the 'Best Employee of 2002' award further reinforced the importance of KM.

Towards knowledge maturity: At the time of making this case study (March 2003), the leadership was in the process of defining time-bound action plans to ensure that all actions were driven by the process of acquiring, storing, disseminating and using knowledge in all transactions within and outside the firm. This proactive 'lead-from-the-front' approach by the CEO and members of the management committee was expected to push the organization towards knowledge maturity. On the process front, it was expected that all key customers would be provided access to the collaborative project management effort with access to metrics as the organization's quality processes moved towards CMMI certification. Key suppliers, including manpower contractors, were expected to be embraced by the new K-Zen. Business-to-business collaborations and the extensive use of business intelligence, data warehousing, data mining and virtual team rooms were part of the new technology architecture planned. With the overall motivation levels going up across the length and breadth of Zensar, the maturity goal for human behavior was to see knowledge-enabled actions becoming the norm for all employees as the organization itself scaled higher and higher levels of success.

Identifying Sub-factors for the knowledge maturity journey

In the Zensar case a number of sub-factors were identified, which are mentioned in Table 7.1. The stage mapping has been done based on the chronological progress seen in the organization and is indicated against each sub-factor.

The alphabet preceding each sub-factor shows the K-factor or group to which the sub-factor belongs (P for business process readiness, B for human behavior, L for leadership and T for technology infrastructure). The numbers under stage indicate the stage at which each sub-factor has become apparent. In all cases the stage transition is also indicated.

The organization today is entering the stage of knowledge maturity intelligence with the business processes focusing on innovation and creation of intellectual property in key domains, the role of the chief knowledge officer evolving from technology to the creation of effective knowledge taxonomies, and knowledge indexing mechanisms and knowledge updating and use becoming a norm across the organization.

The very fact that most leaders still believe that there are gaps in system usage is an additional sign of an organization that is entering maturity, where the need to continually focus on human behavior,

Table 7.1**Sub-factors in the knowledge maturity journey**

Sn	Factor	Subfactor Description	Stage
01	P	Systems and processes exist for core functions	1
02	B	Company meetings happen across functions	1
03	L	Managers ask for data and information on a regular basis	1
04	P	Cross-functional processes are institutionalized	1– > 2
05	B	Employees are encouraged to share customer experiences	2
06	T	Computers are used to share data and information	2
07	L	Leaders ask for data for decision-making	2
08	T	Cross-functional processes get computerized	2– > 3
09	B	Recording explicit and tacit knowledge is a practice	3
10	P	Sharing and using cross-functional data is practiced	3
11	L	Leaders reward knowledge based actions and decisions	3
12	L	Leaders practice knowledge retrieval and use it actively	3– > 4
13	P	Customers and suppliers are part of knowledge sharing	4
14	T	Business-to-business and customer interactions are computerized	4
15	B	Knowledge-based action is a religion in the organization	4

improvement and the need for strong leadership support is felt and practiced on an ongoing basis.

Some features of the model are easily validated by the following facts:

- Constant focus on human behavior is a necessary condition to ensure that an organization continues to progress through the stages.
- Cross-functional processes followed by good technology are the two critical factors in the move towards knowledge initiation and knowledge action.
- Active support and participation of leadership is required in the move towards knowledge maturity.
- The leadership cannot ‘let go’ right up to the attainment of knowledge maturity.

The case also demonstrates that the ‘push factors’ are business processes and, specifically, the focus on cross-functional processes for the move from K-Stage 1 to 2, the use of technology and cross-functional computerization from K-Stage 2 to 3 and the presence of

participative, motivating and demonstrative leadership for K-Stage 3 to 4.

This is only an illustrative case but clearly demonstrates how the KMMM can help in analyzing the progress of an organization towards knowledge management maturity.

KNOWLEDGE MANAGEMENT MATURITY MODEL— RELEVANCE FOR THE SOFTWARE INDUSTRY

Software exports organizations are different in their own evolution and the maturity of the products and services they offer to their global customers, but there is normally a similarity in the sense that most have the following attributes:

1. Software companies typically have their core workforce made up of young and highly intelligent technical manpower supported by sales teams who have the ability to articulate concepts and methodologies.
2. In the few cases within the Indian software export sector where the focus is on products rather than services, the task of product engineering and, hence, product design would call for a number of product designers and architects in the higher echelons of the management hierarchy, whereas in most services oriented firms, the senior management would consist of business development heads and practice heads, who have strong consulting and service orientation in one or more business domains.
3. Leadership is a high activity function where all leaders, starting with the CEO, would be capable professionals and role models in their own right, with demonstrated skills in a combination of key areas, including business development, consulting, software development and human resource management and motivation.
4. People management is seen as one of the core activities in the company, because of the high intellectual capability of the workforce and the importance of keeping them motivated through a combination of monetary and non-monetary incentives and rewards.
5. Technology comfort would be high across all echelons of management and employees, though it is not to be assumed that usage of complex technology for managing the business would necessarily have been implemented.
6. The need for having high-quality business processes which are predictable and repeatable is recognized at all levels, though

contract urgencies can lead to the violation of process steps in many cases. Quality reviews and customer satisfaction surveys are a norm in this industry.

7. The key expectations of leadership, business development groups, practice groups and internal systems and quality assurance groups are often not fully aligned, which is one of the factors that often lead to conflict in the organization. The leadership expects all functions within the organization to be focused on customer satisfaction and profit maximization, whereas business development is focused on new business acquisition within the budget of the client, sometimes in conflict with the expectation of practice groups to have enough time and budgets to develop and deliver well-engineered and tested solutions. The internal systems and quality groups expect both business and practice groups to adhere to defined systems and processes and require total support from the leadership in the performance of their tasks. The balancing act that the leadership has to play to reconcile these groups and align them to a common goal is probably the single common factor between all firms in the software industry.

The knowledge management goal

The purpose of knowledge management in the software industry is to harness the knowledge that lies in each resource that the organization uses, be it the software developer, the business development manager or even the software itself, and enable the knowledge to be acquired, stored, disseminated and used for the improvement of capability within the organization. This is done by leadership and personal responsibility taken by organization members and success is achieved by systematic and explicit management of policies, programs, practices and activities involved in the sharing, creating and applying of knowledge.

While active leadership push and personal use of knowledge management tools take the organization from the knowledge action stage to knowledge maturity, leadership ceases to have any role to play in the knowledge mature organization, since processes technology and human motivation become the key drivers, enabling leaders to move into the background and be available more as mentors and coaches to keep the knowledge corporation on the right track. In fact, during those brief periods when the organization, in a particular project or during a period of crisis, threatens to regress from the knowledge

maturity stage, the role of leaders is to guide it back to maturity rather than once more taking the reins and driving it. This will probably be the true test of knowledge maturity for business units, organizations, societies and even whole civilizations.

INTERPLAY OF FACTORS—ADDITIONAL FINDINGS

The K-factors and their roles in various K-stages having been defined and many characteristics of the organization in each K-stage elaborated, it is worth exploring some of the interplays that exist between the factors, in the particular context of the software industry.

The four factors that have been identified and analyzed in this thesis exhibit the following characteristics as concluded through the study of firms in the Indian software exports industry:

1. The four factors are innate and universal, found in small or large measure in all organizations. While it is arguable that the use of technology may be totally absent in some traditional firms, in all software organizations technology will be present along with the other factors. The other three factors are fundamental to the concept of an organization itself which cannot exist without some people exhibiting human behavior under the leadership of one or many others and engaged in some form of business processes.
2. The four factors are independent, in the sense that the existence of one factor is not dependent on the existence of any other although there will be some essential interrelationships which will be discussed later.
3. The four factors are a complete set, in the sense that there no other key factors that could contribute in a major way to hastening or impeding the organization in its progress towards knowledge management maturity.

Having laid out these basic conclusions, some insights gleaned from the analysis of the software exports industry and the exhaustive study of two firms in the second phase of the research are mentioned here:

- The interaction between Technology and Business Processes, which has been alluded to by Leonard-Barton (1995), Teece and Pisano (1997) and Teece (1984), becomes extremely crucial in the movement through knowledge initiation and knowledge action stages as the organization develops an iterative relationship between the two, with technology initially supporting and then transforming the

business processes and enabling higher and higher levels on interaction within and beyond the organization.

- Similarly, the dependence of technology, in the form of Information Systems, on human behavior, which was brought out by Pearce and Bodnar (2000), is seen in the case study of Zensar as well as the arguments that have just been proposed as key to the success of the organization in the knowledge action stage and the retention of the organization in the knowledge maturity stage.
- The role of human behavior in improving business processes, a theme elucidated by Nevis et al. (1995), is seen in the ability of people to renew or revitalize the processes for project team interaction and customer relationships in the case of Infosys and while this relationship is core to the movement from the pre-knowledge stage, it is crucial to sustain the organization in the knowledge maturity stage.
- The 'Knowledge Connection' concept of Van Krogh et al. (1996), which provides the potential for people to convey messages, is embodied in the discussion on the move from the knowledge initiation stage to knowledge action, where the key driver is the installation of collaborative systems like Workflow, and here the dependence on both human behavior and business processes to install and use the 'Knowledge Connection' is crucial to its success.

The relationship of leadership and human behavior is adequately documented and forms the thread in this study as well those ensuring that human behavior fulfills its necessary conditions to keep the knowledge management practices alive and flourishing. As Ekvall and Arvonen (1991, 1994, and 1996) have suggested in their identification of 'change orientation' as a new leadership dimension, new leaders need to formulate, initiate, motivate and drive effective change activities. This is what this study has discovered as the critical push that leadership provides to human behavior in the transition to knowledge maturity. Slater and Narver (1995) and Bass (1985) also bear this out through their research on 'facilitative leaders' and their role in encouraging organizational members to break through learning boundaries.

- The interaction between processes and human behavior has been extensively researched by Nonaka and Teuchi (1995), who have brought out the cycle of knowledge creation through conversion processes between tacit and explicit knowledge and the four phases of socialization, externalization, combination and internalization, and integrated these four phases into a five-phase model of organizational knowledge creation. In this research, these processes have

been seen to have importance primarily in the second and third K-stages where the interactions between functions and project teams have been shown to flower both as a result of better cross-functional processes and due to a more cooperative and collaborative pattern of behavior. The additional elements brought in by this research to the Nonaka and Teuchi (1995) model is the catalytic role played by technology and the push given by leadership through their actions to support and reward knowledge management initiatives through these critical stages.

- The process-behavior interaction has also been researched by Yolles (2000), who propounded the knowledge migration model through three domains—the cognitive, organizing and behavioral domains with an inbuilt control process. The model developed here does not delve into the specific characteristics of human behavior at each stage but recognizes the interplay with processes at each stage.

The findings discussed above show the importance of the knowledge factors and throw further light on the dynamics between them.

COMPARING THE NEW MODEL WITH EARLIER WORK

The Knowledge Management Maturity Model developed in this research expands on the work done by a number of previous researchers and practitioners and fills certain gaps that had been earlier pointed out in the work as an addition to the body of knowledge on the subject. For instance, Agile Corporation's Change Proficiency model which addresses corporate competency building through the five stages of Accidental, Repeatable, Defined, Managed and Mastered, focusing more on active strategies for managing change, is a worthy supplement to the process of moving from K-Stage 2 to K-Stage 3 by using the steps to improve behavior while implementing cross-functional business processes.

Microsoft's Knowledge Management which embodies an eight-stage model for the deployment of technology alone that compares well with the progressive usage of technologies noted in the case studies, and coupled with the appropriate focus on the other K-factors relevant for each stage of maturity, can lead to accelerated progress. Another technology focused model, the work of Gottschalk (2002), with its focus on the use of technology for progressing through the stages of tool usage and dissemination to various forms of knowledge capture, storage, dissemination and use, can be used to enable

organizations to make a better transition from Stage 2 to Stage 3 where effective technology leadership provides the key trigger.

The additions to the existing work done by Cadence in their model of maturity through Ad hoc, Repeatable, Defined, Managed and Optimizing stages, similar to the SEI CMM model which is limited by its focus on processes, supplemented by significant behavioral inputs throughout and specific initiatives in technology followed by leadership push, is seen as a more balanced approach and the changing role of leadership from Managing to Optimizing lead to the final K-stage of knowledge maturity.

The critical review of available models in an earlier chapter had mentioned that KPMG Consulting's identification of four key areas of knowledge management as people, processes, content and technology and the placement of a firm on a five-level model called 'Knowledge Journey' comes close to being a formal model for knowledge management maturity, but the interplay of the key areas in the progress towards maturity is not really explored to any great level of detail. This research has identified leadership to be an equally important K-factor and articulated the interplay between each of the K-factors and their status as necessary and sufficient conditions at all key milestones in the journey towards knowledge management maturity.

INFLUENCE OF K-STAGES ON BUSINESS RESULTS OF ORGANIZATIONS

The qualitative case research of two companies, Infosys and Zensar, in the software exports sector in India, and the further detailed quantitative investigations of Zensar have revealed that in a period of normal industry growth and in the absence of any extreme internal or external influences, there is a clear correlation between the business performance of the company and the extent of knowledge management maturity achieved by it.

Specifically for the software exports sector, the following key conclusions can be drawn:

1. Organizations making the transition from K-Stage 1 to K-Stage 2 are able to improve their revenues by attracting more customers at a faster rate. This is attributable to the fact that cross-functional business processes as well as increase in communications within and across teams produce quicker and better responses to existing customers as well as the ability to reach new prospects quickly.

2. Organizations that focus on offshore business to increase the overall profitability of the enterprise will have to ensure that they attempt to make the transition from K-Stage 2 to K-Stage 3. This will ensure that there is focus on company-wide computerization and adequate use of technology to replace manpower and hence add to the profitability of the firm.
3. Having reached a critical mass in both revenues and profitability, a uniform focus on all the K-factors will be needed to develop a scalable business model. By definition, a company with a scalable model will grow its revenues faster and also improve its profitability faster than peers in its industry segment. This will call for motivated manpower, cross-functional business processes, use of extensive computerization in the enterprise and also for maximizing satisfaction of all stakeholders, and progressive leadership. The prevalence of these also pushes the organization into the K-Stage 4.

Disruptions that can lead to poor business performance in spite of having attained K-Stage 2 or 3 of knowledge management maturity can be many. Specific cases are the change of leadership in Zensar, which resulted in a temporary performance dip, and the collapse of the telecom market segment which affected the fortunes of Hughes Software for a period of over a year. However, in very mature knowledge management companies like Infosys, even business shake-ups have lesser impact than on their peers, which is a strong argument for all organizations in the service sector to accelerate their progress through the stages of knowledge management maturity.

It is clarified here that the linkage of knowledge management maturity and business results is based on a limited analysis of two firms and can be the subject of detailed future research.

DIAGNOSTIC USE OF THE MODEL

The software industry is acquiring a world beater reputation ,and as the roster of global clients for Indian software exporters grows in strength and size every year, and indeed every quarter, in a fiercely competitive business environment, the Knowledge Management Maturity Model elucidated here can serve as a quick and accurate diagnostic tool for any project or decision of the organization that is failing to meet internal benchmarks for quality or timeliness, or indeed for any reported customer problem.

In a holistic sense, the set of attributes identified in the model for each K-factor in each K-stage can be assessed in a dipstick study of the

firm and the assessment used to place the organization at the appropriate K-stage in its KMM journey. In addition, for any specific issue involving customers or project teams, it would be possible to use the checklist to identify areas of weakness. For example, a specific customer complaint of repeating the same mistake in the process of system design could be diagnosed to a problem in sharing processes or human behavior due to interpersonal issues within the team. Also, sub-optimal results in customer satisfaction or quality from one division of the company could be attributed to lack of adequate usage of collaborative technologies by members of the division or weak leadership support for knowledge management initiatives like sharing of best practices in that particular division.

The key to effective diagnosis, either of an organization's K-stage or of an inadequately developed K-factor within a division or function or within the organization as a whole, is unbiased assessment of the K-factors through a detailed analysis of each of the sub-factors. This could serve as useful indicators of weaknesses in the knowledge management process in the organization.

PRESCRIPTIVE USE OF THE MODEL

An industry which searches for newer and newer value propositions every day to satisfy and delight the customer can use the Knowledge Management Maturity Model that has been presented here as an excellent tool to proscribe actions for improvement in each of the K-factors and specific steps to accelerate the organization's path to KMM.

The prescriptive approaches in their most obvious form are the next set of attributes for the concerned factor as laid out in the model. For instance, in the case of one organization studied by the authors, where sub-optimal results have been traced to the absence of strong leadership within a business division, the diagnosis showed that the following symptoms are being exhibited for each of the four K-factors:

1. Processes are extremely well-managed, with flow of explicit and requisite tacit data, information and knowledge between project teams at customer sites as well as the development center.
2. Adequate collaborative technologies are in place to facilitate cross-border team working, and intelligence about new customer expectations is being gleaned from all transactions and fed back to the project leaders.
3. Most team members participate in the sharing of knowledge except for a few bright but erratic domain specialists who refrain from providing key business knowledge till they are asked to do so.

4. The project leader as well as the division head has refrained from taking specific measures to streamline flows of all information for fear of antagonizing the key domain expert on the team.

The prescription becomes obvious when these symptoms are matched against the K-factor attributes. The weakness is in leadership which is ignoring its responsibility of rewarding proper collaborative behavior and, conversely, not taking pre-emptive measures to control errant behavior, hence hampering the knowledge flow in the project.

Counseling or removal of the errant domain experts will not only correct the immediate project situation but also send the right signals to take organizations from a high level of knowledge action to knowledge maturity.

This is a live case taken from one organization where the quick application of the KMM model led to early diagnosis and corrective prescriptions for a potentially explosive situation with a client. In some cases, once the initial diagnosis has been done, it may be necessary to get in specific expertise in the form of technology or behavioral specialists to prescribe the specific interventions or initiatives needed to correct the situation. What the model can provide is a guideline to the next set of attributes that needs to be demonstrated by the organization if it is to succeed in balancing the K-factors and set the organization firmly on the path to higher K-stage in the journey to knowledge management maturity.

The work done in this research has contributed to the body of knowledge in the area of knowledge management and knowledge maturity in three ways:

1. Development of a generalized Knowledge Maturity Model for the software exports industry with clearly defined K-stages for the maturity process and clearly articulated K-factors that serve as necessary and sufficient conditions for moving from stage to stage.
2. Providing a diagnostic and prescriptive framework for assessing the knowledge maturity level of a software organization and prescribing specific initiatives to move it through the stages.
3. Providing useful insights into the differences in perception of key knowledge stakeholders, which should help practitioners in their planning and communication strategies for knowledge management.

The value of the model to practitioners is in the following areas:

- Knowledge management consultants and Chief Knowledge Officers of business organizations would be able to assess the current stage of any organization and identify the status of the organization with

respect to the factors identified through this research. This will enable the planning of initiatives to make the progress through various stages of knowledge management maturity faster and smoother.

- The differences in perceptions and needs of key constituents of any organization, identified by this study, can be used by knowledge management strategy planners to build team consensus for any large implementation by ensuring that the concerns of each constituency are addressed and the move towards knowledge maturity is an irreversible process.
- One of the key shortcomings that has been identified and discussed in the analysis of literature has been the absence of a clear maturity model on the lines of the SEI CMM Software Process Maturity model. The approach that has been developed in this study through the initial qualitative study of three organizations, the validation through detailed study of two software exports firms and the further application of the model to three other software export firms has resulted in a credible model that can guide researchers and practitioners in their understanding of knowledge management maturity in this industry.
- The identification of K-factors through the same process has also provided a balanced approach to all dimensions of knowledge management success. The model developed through this research enables a balanced view of knowledge management to be taken where the view is no longer one of technology or human behavior but approaches it from all the four dimensions defined through the K-factors. While the factors may not be the only valid ones for success in knowledge management, enough validation has been done in this research for these factors to be considered as some of the most significant enablers of progress towards knowledge management maturity.

References

1. Bass, B.M., *Leadership and Performance Beyond Expectations*, New York: Free Press, 1985.
2. Dougherty, V., "Knowledge is about People, Not Databases," *Industrial and Commercial Training*, Vol. 31, No. 7, 1999, pp. 262–266.

3. Ekvall, G., and Arvonen, J., (1991), "Change-centred Leadership: An Extension of the Two-dimensional Model", *Scandinavian Journal of Management*, Vol. 7, pp. 17–26.
4. Ekvall, G. and Arvonen, J., *Leadership Profiles, Situation and Effectiveness, Creativity and Innovation Management*, Vol. 3, 1994, pp. 139–161.
5. Ekvall, G. and Arvonen, J., *Effective Leadership Style—Both Universal and Contingent?* Stockholm University, 1996, p. 819.
6. Gottschalk, P., "A Stages of Growth Model for Knowledge Management Technology in Law Firms", *The Journal of Information, Law and Technology* (JILT), Vol. 2, 1999.
7. Hammer, M. and Champy, J., *Reengineering the Corporation*, Nicholas Brealey Publishing Ltd; 3rd Rev. Ed., 2001.
8. Hull, R., Coombs, R., and Peltu, M., "Knowledge Management Practices for Innovation: An Audit Tool for Improvement", *International Journal of Technology Management*, Vol. 20, No. 5/6/7/8, 2000, pp. 633–656.
9. Leonard-Barton, D., *Wellsprings of Knowledge*, Harvard Business School Press, Boston, 1995.
10. Nevis, E.C., DiBella, A.J., and Gould, J.M., "Understanding Organizations as Learning Systems", *Sloan Management Review*, Winter, 1995, pp. 73–85.
11. Nonaka, I. and Takeuchi, H., *The Knowledge Creating Company*, New York: Oxford University Press, 1995.
12. Pearce, C.M. and Bodnar, A.A., "The Human Dimension in Improved Product Introduction Processes and the Related Implications of Technology Transfer", *Proceedings of the International Symposium on Tools and Methods of Competitive Engineering (TMCE)*, 2000.
13. Sanchez, R., "Quick Connect Technologies of Product Creation: Implications for Competence-based Competition", in Sanchez, R., Heener, A., and Thomas, H., (Eds.), *Theory and Practice in the New Management Strategy*, Pergamon, London, 1996.
14. Slater, S.F. and Narver, J.C., "Market Oriented is Not Enough", in *Developing a Market Orientation*, (Ed.) Rohit Deshpande, Sage Publications, California, pp 237–266.
15. Tapscott, D., *The Digital Economy*, McGraw-Hill, New York, 1996.
16. Teece, D.J., "Economic Analysis and Strategic Management", *California Management Review*, Vol. 26, No. 3, 1984, pp. 87–110.
17. Teece, D.J., Pisano, G., and Shuen, A., "Dynamic Capabilities and Strategic Management", *Strategic Management Journal*, Vol. 18, no. 7, 1997, pp. 509–533.
18. Von Krogh, G., Roos, J., and Slocum, K., "An Essay on Corporate Epistemology", in Von Krogh and G., Roos, J., (Eds), *Managing Knowledge: Perspectives on Cooperation and Competition*, Sage Publications, London, 1996.
19. Yolles, Maurice, "Organizations, Complexity, and Viable Knowledge Management, *Kybernetes*, Vol. 29, Issue 9/10, 2000.

Putting KFF and KMM to Work: Some Practical Insights

VIII

Putting KFF and KMM to Work: Some Practical Insights

ANY FRAMEWORK OR model would be useful for an organization only when there is proper planning and well coordinated implementation. The knowledge harnessing process can be truly rewarding for organizations which recognize the importance of knowledge at all levels and are able to develop a holistic view around what they would like to accomplish in terms of business goals. If you look around, for every organization that has experienced astounding results through their KM processes, there are several others who have failed miserably and are hesitant to undertake the journey anymore. Similarly for very successful start up venture there are hundreds who have not been successful in making effective use of their knowledge force and have failed to take off. Therefore, it would be useful to analyze the factors that would help organizations to get the most out of its knowledge force and reach the ultimate stage of knowledge maturity in the shortest possible time. Organizations who are serious about making knowledge deliver results, create the necessary conditions for people to adopt knowledge management practices and systematically deal with the nuances related to implementation. We will take a look at some of the practical examples from companies who have undertaken the knowledge journey and will examine the key factors that have led to maximizing the value of knowledge processes.

MAXIMIZING KNOWLEDGE FORCE

Every small company fundamentally faces the challenge of growth and acquiring customers. The firms have the task of ensuring the adopted business model works and delivers to its promise. They face the uphill task of convincing the customers from scratch and retaining them. And they also have to address the requirement of recruiting the right

manpower required to build the business. As has been explained in the previous chapters, firms that are successful in leveraging knowledge force effectively are able to grow rapidly and quickly establish themselves in the marketplace. Firms start to recognize the role of knowledge force in business growth and development and consciously create the right environment in which the impact of knowledge force is enhanced. Following are some of the characteristics successful small firms exhibit which have enabled them to maximize knowledge force.

- **Orchestrating the Four Factors**

Typically the CEO is seen as the 'be all and end all' specially in the start up companies as the entire business activity works around him/her. While the entrepreneur is able to found the company on the strength of his/her experience and previous related knowledge of the business, to assume that this experience or education background alone will lead the firm to success is not tenable. Every business develops unique characteristics of its own and manages to shape its destiny based on the impact of the knowledge force which is given shaped by the four factors—entrepreneurial energy, employee capability, customer orientation and industry orientation. So how do firms manage to get the most out of these four factors and how do they channelise the energy in the right direction such that knowledge force is maximized? This is made possible by the CEO's ability to orchestrate the processes that culminate in the interplay of these factors as well as through flexibility and adaptability that the entrepreneur is able to demonstrate as required from time to time. The successful entrepreneur is able to deal with dichotomies in every sphere of activity and is able to effectively balance both ends. While remaining focused on the business goals and objectives, the entrepreneur is able to change and adapt to market reactions to business concepts and approaches; while falling back upon one's own knowledge and experience gained, the entrepreneur also encourages employees to think freely and contribute in the shaping of the business concept; while creating solutions and offerings that meet customer requirements, the entrepreneur also engages with customers actively to collaborate with them to finetune the offerings; while closely monitoring the industry trends and behavior, the entrepreneur also plays a key role in shaping the industry and by being a thought leader and providing new directions that once again being huge rewards to the firm. It is through the interplay of all these factors that the firm is able to unleash the knowledge force.

- **The Importance of Partnerships**

The importance of building right partnerships cannot be more underscored for any other stage of the business as much as it can be for start up firms. Not only it helps is being able to leverage on the partners' strength in terms of customer access, but the enormous opportunity that opens up to leverage partners' knowledge of the customers and the market play as well as the ability that it creates to plough in to the firm energy and new capabilities to build business can impact the knowledge force unleashed substantially.

- **Speed of Action**

Speed is the key to success in today's context. Small firms are naturally poised and nimble footed when it comes to responding to market needs and taking advantage of opportunities. With speedy action, knowledge force gains the necessary momentum and is channelised in the right direction. Speed of action implies the readiness for change at all times, therefore management of change on an ongoing basis becomes crucial for the firm. Even though the number of employees will be small, they need to be ready to change- whether it is to do with processes, product offerings, business approach to customer or the fundamental business model itself. It is a myth that firms that are successful come up with the ideal business model the first time around always. Many of them learn along the way and use the knowledge and experience from mistakes made and insights from dealing with the customers which in turn modifies the course of knowledge force that helps navigate the firm in the right direction. The crux in all this is the speed and agility.

- **Innovative Approach to Business**

Innovation is an essential ingredient for success for a start-up. Unlike the large firms, small firms do not have the luxury of assured customers, customer loyalty and other dependent stakeholders such as distributors or vendors. Therefore the very survival and growth of entrepreneurial small firms depend upon the innovation they bring to the business. As seen earlier innovation need not necessarily mean a great new idea or a concept, it can also do with the method of doing business or solving the problem of the customer. With innovation engrained as the essential character of the business, firms are constantly on the lookout for the drivers for innovation from all sources. Since successful firms

recognize that innovation has to be an ongoing phenomenon, knowledge force unleashed feeds into innovative thinking and in turn is enriched by the impact of innovative approach to business.

ACCELERATING KM MATURITY

In large organizations, in order to get the most out of knowledge resources, organizations need to take stock of where they are and where they want to head in terms of KM maturity. To move from one level of maturity to the other and reach the final lap of KM maturity, there are a number of areas that require the attention of the organization. Listed below are some the key pre-requisites.

- **Define what 'Knowledge' Means**

The starting point for a firm embarking on the knowledge journey is to know what 'knowledge' is. Very often, while there is a general consensus that 'knowledge' is an important resource for the organization and it should be harnessed, there is very little thinking or debate in the first place to decide what constitutes 'knowledge' for the business. Without this clarity, any KM initiative cannot go very far. Even in a seemingly homogeneous business, different functions may have different interpretations and expectations from knowledge resources. This issue becomes more complex when an organization has multiple businesses or markets that it addresses and the demands from knowledge resources can be diverse. In the absence of a coherent understanding of what is 'knowledge', and its role in the business success, KM initiatives have ended up with a false start.

A diversified company dealing with chemicals and fertilizers catering to a number of segments carried out a detailed analysis of their business needs and then came up with the definition of knowledge for each business unit. The company management felt that a common definition of knowledge will not work for them as the business of each business division was unique and given the maturity of business and complexities of their respective markets had different expectations from knowledge. Here is how therefore each business unit decided to define 'knowledge' which helped them to position the knowledge management initiative in the right context and assess the right stage each business was in its KM maturity.

***Chemicals Business:** Knowledge lies in delivering product using the most cost effective means.*

***Fertilizers Business:** Knowledge lies in delivering the product at the right time and the right place where the customer needs it.*

***Farm Management Solutions:** Knowledge is in helping customer maximize his returns.*

It is interesting to understand why each business unit looked at the definition of knowledge in different ways. The Chemicals Business Unit was operating in an extremely crowded market with hardly any differentiation in the products being offered. As the product had been reduced to a 'commodity', the only possibility that remained with the key players was to bring in advantage to the customer by lowering the costs as much as possible. Therefore taking a close look at the entire operations chain and examining closely processes and costs involved at every stage, namely raw materials procurement, logistics, production, inventory, packaging, distribution and so on became crucial for the organization. New knowledge related to these areas that could be made available and shared quickly with the relevant stakeholders was identified as the key to the success of the business.

Fertilizers Business on the other hand, is somewhat constrained in terms of which parts of the country can it be sold to and how much could be sold. Further, fertilizers are required to be sold at the time of sowing seasons which largely depends upon the rainfall a particular region receives during the season. If in a particular year or a season, a region receives scanty rainfall and as a result the demand for fertilizers goes down, the manufacturer needs to quickly shift the inventory to another location where it could be sold. Since the stocking location and distribution arrangements are more or less fixed, it becomes a major challenge for the business to anticipate changes and remain vigilant to serve the market in a timely manner. As compared to distribution issues, production and raw material related areas were fairly under control with the processes having been standardized and predictable. Therefore, knowledge in the context of Fertilizers Business meant getting deep and regular insights on how to reach the product at the right time, at the right place to the right customer.

As compared to the fertilizers business and chemicals business, Farm Management Solutions was a unique business as it focused around providing turnkey services to the customer. Whether it was to do with contract farming to medium scale farmers or advisory services to small farmers, the challenge lay in providing the right guidance which enabled the customers to maximize returns given the context and the constraints they had to contend with. This involved bringing together knowledge about the customer, the market, the weather

conditions, agriculture and soil and even culture and socio-economic factors. Thus the Farm Management Solutions Group defined knowledge in the context of support system that is required to serve the customers effectively and enabled them to focus on various dimensions carefully.

Thus we see from the above examples how important it is to think about the definition of knowledge and link it with the maturity of the business and context of business operations rather than making it a general purpose exercise.

- **Alignment of KM Initiative with Business Goals**

It has been observed that at times KM is seen as a 'nice to have' project and therefore it is left to an enthusiast or a volunteer to steer the initiative. When this happens, while initially there is management attention and support, since it does not feature as a compelling agenda for management review, in due course such initiatives fade away. The starting point for the KM journey is to recognize that it has to support the overall business goals of the organization as well as the specific goals of business units and therefore will have to be very closely integrated with the business strategy of the organization.

A leading BPO company which was in the throes of rethinking its own business strategy having decided to divest and become a company that would service external customers from being an exclusive internal group customer focused firm. While launching its KM initiative, the management focus was how to expeditiously present its expertise in operational efficiencies driven by six sigma practice to its new customers and create knowledge repositories which would help the firm to strengthen this advantage. Therefore the company decided to focus its energies on knowledge associated with operational excellence and use this knowledge to drive its business. With this decision, the company embarked upon the KM initiative ensuring all activities related to product development, delivery, marketing and quality were aligned with the goal to enhance and strengthen operational efficiency that would give the firm a competitive edge in the marketplace.

- **Defining KM Metrics**

Many organizations take pride in organizing 'knowledge sharing sessions', online knowledge portals for employees to contribute etc. and feel good about the information that is presumably being 'shared'. The evaluation of a KM exercise is made possible through the ability to pinpoint clearly where and how knowledge resources have been able

to make an impact and not just by the 'happiness' factor created because of sharing of information. Without tangible metrics that convey the effectiveness of efforts and methods deployed, it is not possible to motivate and give direction to employees.

A leading Electrical manufacturing company decided to use KM metrics innovatively to drive home the significance of cost of quality. The company which maintains a large inventory of over 10,000 items had been trying to impress upon its vendors to enhance quality of components supplied by them. The company decided to extend the know-how and expertise it had developed internally by diligently implementing six sigma in its production processes over the years to its key vendors as well. Apart from providing the necessary training to its vendors, the firm decided to create an online quality measurement tool which the vendors could use before dispatching the components to the manufacturer's factory. The manufacturer used a variety of quantitative measures to study and report on the quality of components, provide real time feedback to vendors and also to the operations teams at the manufacturing end. Thus the firm could push up the quality of its products significantly by metrics driven knowledge system by innovatively bringing together the necessary tools and metrics, thus making the knowledge system relevant and meaningful not only its own employees but also the vendors.

• **Putting People and Processes before Technology**

Technology undoubtedly plays a very important role in harnessing and distributing knowledge as required to different users. However, often technology assumes centre stage in a KM initiative even before questions on what benefits are expected and how would the business get the necessary impetus. We find the technology champions in organizations identifying a 'KM tool' and rolling it out to the users and expect them to use it. When the users are reluctant to make use of the tool or populate content, the blame game begins and very soon the initiative is branded a 'failed experiment' and relegated as the last priority of the organization. A KM initiative can never take off if it is seen as one more technology initiative, it has to be clearly owned by business leaders if it has to succeed.

• **Overcoming Anxieties Over Security**

KM initiative calls for transparency and openness. This objective may clash with the interest of the firm to safeguard the intellectual property

and protect its knowledge assets. Firms will have to find effective means of meeting both the objectives. With technology offering effective solutions, security and safety are possible to be created and such solutions should be woven into the KM systems right at the start so the concerns of theft, loss and copying are mitigated.

- **Motivating and Rewarding People**

Larger the organization, more challenging it is to ensure people are involved, they remain committed to the cause and build a sense of ownership in them. While such a challenge is faced by organizations whenever new initiatives are put in place, what is unique about KM journey is that it is not a one time exercise and its success depends upon the organization's ability to engage with all its stakeholders on an ongoing basis. It is only with their active and regular contribution that KM systems continue to function. Therefore, organizations have to keep thinking ahead, for motivating and rewarding employees such that knowledge practices become a 'way of life'. No organization can assume the momentum once built will last forever by itself and therefore have to be on the lookout for innovative ways of rejuvenating and rekindling interest.

The practice of using 'K' currency units by some of the software services companies for rewarding employee contribution is well known. But even this practice, becomes jaded after some time as some of the firms realized. Lately gaming is being used as a tool to not only create enthusiasm amongst employees and drive them towards knowledge portals to increase stickiness, but it is also used as an effective tool to collect feedback, give feedback, act upon the feedback and thus actively engage with them in the value creation process. A large financial services firm with over 3500 employees engaged in providing back office services to the parent firm used gaming as a tool to communicate its vision, share company philosophy and mission to its employees. Gaming which had key concepts embedded, led to competitiveness amongst teams, excitement about winning and team bonding. Such innovative methods have to be constantly thought of to keep KM top of the mind and generate continuous involvement.

The underlying altruism of Knowledge Management in organizations, irrespective of whether the firm is part of the knowledge industry or the services industry or indeed any other industry dealing with multiple stakeholders is that the knowledge force is one of the critical determinants of success—in customer identification and service

delivery, in employee motivation and in eventually providing shareholder value. The harnessing of this force and the establishment of processes to manage the knowledge that is gleaned from every transaction is what good management practice is all about. Finally, the ability to manage the four factors and take the organization on the journey to knowledge management maturity is the true differentiator between good and great organizations and determines the sustainability and long term success of any organization in any industry.

EXTENSION OF KFF AND KMM TO OTHER SERVICE INDUSTRIES

Knowledge is today being recognized as the key lever for competitive advantage and, as we have seen, both academicians and practitioners have contributed more to the field of knowledge management in recent years than to any other field of management. Hence, there is no doubt that while the software industry has been one of the early adopters of knowledge management and the nature of the knowledge management process in this industry has led to faster progress towards knowledge maturity, there will be tremendous scope for building sustainable knowledge management capability in a variety of other industries, like pharmaceuticals, aerospace, contract manufacturing, advertising, financial services and most other sectors where a closer understanding of customer preferences is crucial to the process of customer acquisition and customer retention. Knowledge Maturity models similar to the one that has been researched and presented here for the software industry can be of tremendous value to practitioners in these industry segments to use knowledge management for competitive advantage.

Knowledge management processes in a broader sense are as relevant for the manufacturing industry as they are for services. In every cross functional process that enables manufacturing firms to be truly successful, from product conceptualization to realization, the 'quote to cash' order fulfillment cycle and every supporting logistics process, the efficient capture of knowledge and the usage of knowledge across the value chain determines the predictability of product and process quality and ensures that the same mistakes are not repeated as the organization learns from each transaction, converts individual intelligence into collective and reusable corporate knowledge and becomes truly wise in its ability to anticipate problems and address customer needs almost before they are articulated.

The challenge that faces all evangelists and practitioners of knowledge management has always been that this is one discipline that can neither be categorized as an art or a science. It would probably be appropriate here to quote the old cliché, “*Strange how much one has to know to know how little one really knows*” and modify it to add “*and how much there is still to know*”. The ability to manage knowledge is what makes us human beings responsible for our planet and the success of future generations will surely be determined by the way we manage our knowledge today and tomorrow.

In India we are in the middle of one of the most successful phases of growth and entrepreneurial endeavour that we could hardly have imagined a few years ago. The time in front of us presents opportunities for all sectors to emulate the singular success of the Indian Software Exports industry and take the country towards a tryst to a truly global destiny. We believe that the management of knowledge will be a key contributor to our future success. We hope that this book has opened your eyes just a little wider to the vast vistas of knowledge management and that we will see better practitioners embracing some of the ideas we have provided and contributing to the success of many Indian sectors on the global stage in the years to come.

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