

Chapter 10

THE VALUE OF KNOWLEDGE FOR EXTENDED ENTERPRISES

Shung Yar Lim

Introduction

Like the wave of the future, the ‘knowledge movement’ in commercial enterprises has been inexorably gaining in momentum and pervasiveness. The knowledge-based economy, knowledge management, knowledge networks, knowledge workers, knowledge markets, knowledge commodities, knowledge assets, knowledge stocks and flows, and knowledge infrastructures are recent conceptions that all carry the ‘knowledge’ tag. Indeed, the knowledge factor is very much at the heart of how organizations are run in the 21st century. The need for mechanisms to capture the value of knowledge points to the urgency of knowledge requirements today, and is made ever more intensive by rapid advancements in information and communications technology.

Simply put, the tolerance for error and slowness in decision-making in business can carry potentially tremendous penalties in an environment where the fickleness of consumer preferences and fluctuations in national economies make for increasingly volatile market environments. For enterprises that operate on a global scale, the multi-dimensional complexities that must be managed within ever-decreasing time horizons mean that the knowledge requirements by managers are ever-more demanding. Alliances of enterprises – value networks of independent enterprises that seek alliances to mutually leverage synergies and core competencies – are increasingly common and multifarious, increasing that level of complexity and raising the bar that must be overcome so that the right knowledge can be leveraged at the right time. One mechanism to solve such problems is that of knowledge networking.

This chapter addresses the use of knowledge networking strategies to meet the challenges of knowledge acquisition, creation and leverage on a global basis, focusing specifically extended business enterprises and multinational enterprise networks. Specifically, we focus on the importance of knowledge,

the enterprises' own view or perspective on knowledge, the role of knowledge networks in global companies and the characteristic features of e-networking for extended enterprises – in that order.

Knowledge networking, a relatively recent term, is conceptually mature. Knowledge networking in its simplest form refers to the coming together of different people to achieve a common purpose. In order to achieve that common purpose, these different people collaborate and leverage the knowledge of each other. A successful knowledge networking strategy is one that leads to better knowledge creation and improved knowledge sharing. This chapter reviews the fundamentals of knowledge and knowledge networking in the context of global business.

10.1 Salience of Knowledge

Knowledge has always been an indispensable and critical component in effective management and business leadership. Philosophers and thinkers from Aristotle to Foucault have mused about the nature of knowledge, and indeed, few are unfamiliar with Francis Bacon's assertion that "knowledge is power." "Knowledge-creating companies" represent an example of the vanguard of intellectual input in the creation of knowledge management – a relatively young discipline of management practices thematically linked by their key emphasis on knowledge as a key driver of value creation (Nonaka and Takeuchi, 1995).

In retrospect, we now appreciate that the interest in knowledge and its management is founded on several distinct factors: (i) the experiences of networked knowledge-intensive enterprises that leverage the synergy between its employees to drive innovation, (ii) the development of business transformation strategies (as manifested in Total Quality Management and Business Process re-engineering initiatives in large corporations), (iii) the evolution of management information systems in enterprise modeling, expert systems, enterprise resource planning initiatives and relationship software, and (iv) the emergence of the learning organization which emphasizes the links between learning, knowledge and value-creation.

Knowledge in for-profit organizations is vital for two functions – that of being a fundamental resource for effective execution of its mission, and that of being a valuable asset for sale or exchange (Stewart, 1998; 2001). Knowledge is hence critical for the sustenance and strengthening of a business enterprise's viability. And in many ways, it has become the foundation for forging and retaining competitive advantage.

10.2 Knowledge in 21st Century Markets

The vision of a “knowledge-based economy” inhabited by “knowledge-intensive firms” and “knowledge workers” reflects the stark differences that separate the world economy today from that of a century ago. The knowledge revolution, the criticality of information and communications technology and the globalization of business offer a framework for capturing the value of knowledge in pursuing organizational objectives. In the past decade, there has been an especially strong shift to knowledge-based thinking.

These initiatives have had a considerable impact on existing schools of thought pertaining to strategy, innovation, organizational design, and information systems in business and industry. For example, ‘knowledge-centric’ thinking in business management has led to the theory that knowledge is the primary factor of production in the new economy, displacing capital in the industrial economy and land in the agricultural economy, in which non-tangible intellectual assets continue to displace physical and financial capital in relative importance.

In this context, developed nations have been shifting from a heavy reliance on traditional industries like textiles and steel to an economy built on knowledge-intensive industries. Such industries concentrate knowledge capital both in terms of the workers (deemed ‘knowledge workers’ for their skills, knowledge, and expertise) and the complex processes that require the former. As a result, these industries are responsible for producing most of the value in the final product, and this value is hence attributed to the knowledge capital that had been invested in creating the product or in delivering the service (Stewart, 1998, 2001).

Digitalization, the adoption of digital technology resulting in the enhancement of the capacity for transferring, storing and processing information, has driven innovations in networking practice and technology (Tapscott, 1997; Castells, 1999). Together, these developments have made the virtualization of work possible by eliminating the physical barriers of distance and time in organizing global business (Hagel and Singer, 1999). The increasing ‘interconnectedness’ of the globe is one factor that has resulted in market environments that are principally characterized by rapid change. The rapid pace of innovation and the efficiency of communications have compressed product life cycles at all stages while ramping up the urgency in time-to-market and research and development.

The explosion in the number of channels for information acquisition – as a result of the Internet and advancements in affordable means of high-speed of communication, and the rapidity of innovation in processes, product design, and ICT technologies – have outstripped innovation in the methods and techniques of managing knowledge in the enterprise. The obsession with

meeting short-term targets, benchmarking and speed has obscured the need to innovate intellectually and to put new management concepts, systems and structures into practice.

10.3 The Value of Knowledge

The value of knowledge is a salient feature of the contemporary global system.¹ It is evident that knowledge has value in every function of the business enterprise that can be deemed core to the enterprise's operation. Knowledge is a key input to the identification and creation of new business opportunities, and the quality of decision-making is almost entirely premised on the presence of the required knowledge. Knowledge within the enterprise (the collective) as well as the employee (the individual) has an impact on productivity, efficiency, and effectiveness. These impacts are reflected in revenues and costs at every level, from decision-making to problem solving to innovation in processes, products and services. Paradoxically, however, despite the significance of knowledge to business enterprises, little attention has been paid explicitly to the creation and management of knowledge.

Just as flexibility and adaptability have been identified as strategic capabilities that modern enterprises cannot do without, knowledge is the necessary ingredient to achieve these and other strategic capabilities for enterprises. As such, knowledge is now widely regarded as a key tool for competitive advantage for all enterprises in the knowledge-based economy. This descriptor competition in multifarious countries in differing markets characterized by disparate cultures, politics and economics.

With good knowledge management, enterprise profitability increases along with the viability and market image of the enterprise, as the relationship between and among employees, partner enterprises, and customer are enhanced. The value of knowledge for the enterprise is shown in Table 10.1 in key areas in which a generic enterprise operates. Ultimately, knowledge is valuable to the enterprise to the extent that it is relevant and helpful in enhancing or expediting a business process that ultimately delivers real economic value to the enterprise.

For global enterprises, the diversity encountered in extending operations mean that the role of knowledge will be even greater as a result of the complexity of forming coherent aligned global and local strategies for managing activities in different environments in which different conditions prevail. These complexities arise from the presence of diversity in terms of the enterprise's

¹ Of special relevance here is the Alliance for Global Sustainability (AGS) Project on the Value of Knowledge that provided the basis for several chapters in this book.

Table 10.1 Enterprise knowledge domain and the value of knowledge.

Enterprise Knowledge Domain	Characteristic Features in the Value of Knowledge
General Operations	Learning from mistakes of own and other companies, avoiding the costs incurred in ‘reinventing the wheel’ by knowing where the right information and/or knowledge can be obtained, faster problem-solving via ICTs that allow sharing of expertise and seeking of advice from other sections of the enterprise to minimize downtime, experience gained from operations is codified and stored to provide a repository of organizational memory that can advise and guide future operations, process innovations reduce administrative costs.
Products and Services, Research and Developmen	Shortened development times, increased rate of innovation, avoiding ‘reinventing the wheel’ reduces the costs incurred due to redundancies while refining product quality, mechanisms that permit free flow of ideas via discussion forums etc. allow refinement of ideas that can improve process efficiency and end-product quality.
Customers	Intimate knowledge of customers allows development of products that are more oriented to the needs of customers, improved customer services and hence increased customer satisfaction in the near-term and loyalty in the long-term.
New Business Opportunities	Acquisition and synthesis of new and existing knowledge in databases and people aid in a more timely and accurate analysis of new business ventures that can reduce potential losses and identify the most profitable opportunities, while allowing a better understanding of the risks involved.
Human Resources	Recruiting, assigning and motivating the right people to the right tasks results in higher quality work, lower costs due to errors, and greater efficiency in completing the task. Retaining talent within the organization ensures that the keepers of the uncodifiable component of organizational memory remains with the organization and can hence be tapped at a later stage.

operations and operating environments. This diversity represents both a strategic challenge as well as a strategic opportunity. The challenge arises from the need to manage the additional dimensions of complexity associated with maintaining semantic equivalence across cultures, varying time zones, differing regulatory regimes and political environments, and cultural distinctions. For the most part, the strategic opportunity that diversity offers arises from local differences that demand at least some local innovation to adapt products designed in the headquarters of the enterprise to the preferences of

the local market. The knowledge that is created in the design and manufacturing of a product for local markets can be indirectly transplanted to other markets.

10.4 Sources of Value

The value of knowledge to enterprises and multinational corporations results from the convergence of three factors: globalization, emergent responses, and complexity of competition. The first factor, *globalization*, is that international competition has increased as a result of an increasing number of substitutes in most product markets, and production and service capabilities that were hitherto available only in industrial nations are now frequently located in developing countries. Knowing how to be effective in operations, marketing, and product/service innovation is therefore critical.

The second involves *emergent responses* to changes in supply and demand in the market: Knowledge about customers will be crucial: enterprises need to be both better and faster than competition in delivering products and services. To harness the value of innovations (product, operational or otherwise) by suppliers, enterprises themselves must know how to integrate suppliers into their own business model.

The third factor is the *complexity of competition*. There is the possibility of innovation by competitors themselves. Competing organizations are constantly innovating in terms of products, services, and business processes. As new technologies emerge, enterprises face competition both from existing rivals and from entrants who are unburdened by legacy systems and can hence leverage new technology and practices for competitive advantage. Knowing how to innovate and implement change at all levels is therefore necessary. Then there is the matter of operational effectiveness. The enterprise must perform both efficiently and effectively, to remove bottlenecks in operations. Hence, knowing where to look for the bottlenecks must be coupled with how to solve them. Since speed is the key with the emergence of the 'real-time' economy there is also a need to know how to resolve bottlenecks quickly. In addition there is competition for talent, embodied in knowledge workers. Among corporations and enterprises, there are analogous movements of expertise driven by the attraction of better opportunities and incentives.

10.5 Knowledge from the Enterprise Perspective

Knowledge as a term defies any one single specific definition and indeed there are varieties of views about the fundamental features of knowledge as offered by philosophy, sociology and organizational-behavioral studies.

10.5.1 Knowledge in for-Profit Entities

In the business context, the categorization of knowledge provided by Charles Savage is especially relevant (1996). He frames knowledge as a set of six fundamental components that have powerful synergism when occurring in concert. Savage's components are:

- *Know-who* – Identifying the right people for a task;
- *Know-what* – An understanding of the knowledge needed, and where to look for it, for a task;
- *Know-how* – In terms of skills, processes, and procedures;
- *Know-why* – Understanding of the underpinnings and context for the task and its relevance for the enterprise as a whole;
- *Know-when* – A sense of timeliness – when to act; and
- *Know-where* – A sense of place – where to act.

The best way to capture the value of knowledge is to make sure that all six elements are in place concurrently – in any particular situation of interest. Three key perspectives of knowledge can be derived from the Savage components namely: (i) knowledge vs. information, (ii) knowledge-as-a-process vs. knowledge-as-a-commodity, and (iii) 'explicit knowledge vs. tacit knowledge. All three perspectives address knowledge in conceptual terms as well as in practical applications.

10.5.1.1 Knowledge vs. Information

Information is the medium through which knowledge can be transmitted, but the two have fundamental differences that there have been frequently overlooked by enterprises engaged in knowledge management initiatives (Wiig, 2000). Information is distinct from knowledge in that it includes facts and data with context while knowledge is the meaning of the information (Amidon, 1997).² In essence, knowledge methodologies in the form of mental models, scripts, and schemata, must provide the capability to work with novel situations by synthesizing disparate concepts and predefined methods. Hence, Savage's

² More precisely, the operational definition of information is that it consists of facts and other data organized to characterize a particular situation, condition, challenge or opportunity. Knowledge is instead found in humans or inanimate agents as truths and beliefs, perspectives, concepts, judgments and expectations, methodologies and know-how. Reality dictates that knowledge is not comprised, however, of clearly specified guides to deal with routine situations, since few situations are repeated and details and contexts are often, and critically, different. Practically speaking, a person who possesses knowledge in a certain field therefore must therefore have the understanding that permits him or her to envisage possible different ways of handling different situations and to anticipate their implications and effects.

analysis of knowledge describes the practical applications of knowledge with not so much concern for what knowledge is, as opposed to what it does for the enterprise.

The conversion of information into knowledge is a complex process that reflects the fundamental differences between the two concepts – new information and insights are internalized by the establishment of links with prior knowledge and these links vary from firmly characterized relationships to vague associations, hence resulting in the creation of new knowledge. The latter is hence a synthesis of prior knowledge and new information resulting in updated and modified mental models that permit reasoning, decision-making and action. Karl Wiig (1995) observes that while information and rudimentary knowledge can be codifiable in a form external to the human, understanding, based on knowledge in determining what a specific situation means and how to handle it, is more difficult to codify and hence primarily people-based.

Enterprises in the past equated information with knowledge, simply because without the former, the latter was ineffective and sub-optimal in effect. Enterprise managers have made the assumption that given a repository of enterprise information, employees would be able to find the right information, and hence gain the right knowledge to make the right decisions. This logic follows a linear line of thought that assumes information can directly map into knowledge by providing more detail, and ignores the complex cognitive processes in the human mind that bridge the discontinuity between information and knowledge. Information is therefore a necessary requisite of – but not sufficient for – the formation of knowledge.

The failure of information systems – the vehicle of information processing and storage – to cure the enterprise's knowledge requirements as manifested in costly deployment with in-apparent returns, flawed decision-making and process sub-optimizations, is not an indictment on the uselessness of an enterprise-architecture. The backlash against information systems is not so much against the effectiveness of information systems in doing what they are truly supposed to do, but against the hype and inflated expectations that surrounded their deployment. Management information systems process information, and provide decision-support via the provision of information and processed data.

The codification of knowledge has been of great concern to managers who intended to make knowledge mobile. The codifiability of knowledge spans the continuum from 'codified knowledge' – a more sophisticated and elaborate physical codification of knowledge that attempts to directly communicate insights and know-how – to 'uncodifiable' knowledge, which is knowledge that defies easy codification.

10.5.1.2 *Explicit and Tacit Knowledge*

Delving deeper into the nature of knowledge, one can distinguish between two types of knowledge – explicit and tacit. In an organization, knowledge is found in the form of corporate policies, market analyses, products, organizational processes, technologies, and the skills, know-how and expertise of employees. A model for knowledge creation and acquisition, called SECI (Socialization, Externalization, Combination, and Internalization), was developed by Nonaka and Takeuchi (1995) to describe the ways in which knowledge is generated, transferred, and re-created in organizations at three levels of abstraction or social aggregation. This model distinguishes between two types of knowledge – explicit and tacit – where: (1) explicit knowledge is formal and systematic – can be codified in the form of documents and reports, and has been referred to as ‘migratory’ knowledge because it can be easily shared and transferred, and (2) tacit knowledge is personal knowledge that is difficult to transmit or capture in codified form – it encompasses skills, ways of working, rules-of-thumbs, mindsets, values, and beliefs that is difficult to change or communicate.

Tacit knowledge, however, must be made explicit, more so for the enterprise so that it can be easily transferred and leveraged. A SECI knowledge cycle includes (i) the identification of tacit knowledge, (ii) making the tacit knowledge explicit so that it can be formalized, captured, and leveraged, and (iii) allowing the explicit knowledge to be individually processed, absorbed and contextually applied by employees in a process that makes it tacit again.

The SECI model examines the interaction dynamics and interplay between these knowledge types at three levels of social aggregation – individual, group, and organizational – and describes a sequence of four processes of knowledge creation. Defined by Nonaka and Takeuchi (1995), these consist of the following:

Socialization: Sharing of tacit knowledge between individuals through joint activities like brainstorming, discussions and debate.

Externalization: Expression of tacit knowledge in publicly comprehensible forms, i.e. when knowledge is applied or when goals and frameworks are set.

Combination: Conversion of diverse sets of explicit knowledge into more complex, better integrated sets of explicit knowledge: communication, dissemination, and systematization of explicit knowledge.

Internalization: Conversion of externalized knowledge into tacit knowledge on an individual or organizational scale; the embodiment of explicit knowledge into actions, practices, processes, and strategic initiatives.

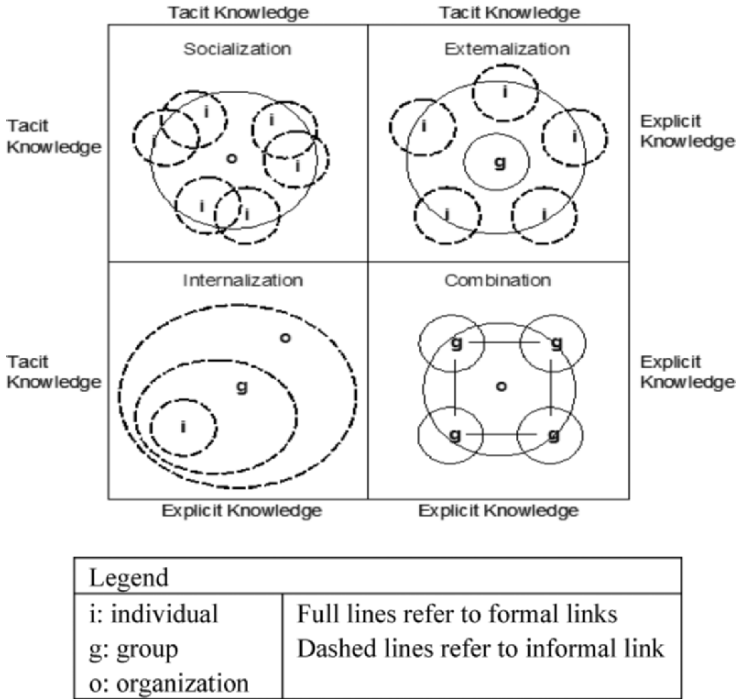


Figure 10.1 SECI processes. Source: Nonaka and Takeuchi, 1995.

The overlap of units between the inside and the outside of the organization reflects the key influence of factors from the external environment that affect the knowledge process within the organization. In this connection, Nonaka and Takeuchi (1995) identify the *knowledge spiral*, which they define as a process of organizational knowledge creation that ideally culminates in the internalization of knowledge on an organizational scale. More than that, however, the SECI processes presented in Figure 10.1 illustrate knowledge acquisition, diffusion and sharing, creation, and re-use – all of which are processes in the enterprise knowledge life-cycle that will be discussed further in this chapter.

10.5.1.3 Knowledge-as-a-Process vs. Knowledge-as-a-Commodity

The tacit–explicit nature and SECI processes provide a lens to scrutinize the nature of knowledge and the processes by which explicit forms are converted into tacit forms. Here, enterprise perspectives of knowledge are identified that are conceptual offshoots of tacit and explicit knowledge, and these are respectively: knowledge-as-a-process and knowledge-as-a-commodity. This distinction is now common in the area of knowledge management, and its

relevance has been largely internalized as part of the common understanding, in theory as well as in practice. Both views of knowledge begin by analyzing the nature of knowledge and then deriving its applications. Generally, the modern enterprise usually encompasses both types in managing knowledge. On balance, however, the process approach lends itself more easily to tacit knowledge while the commodity approach would do so more easily for explicit knowledge.

Knowledge as a process is also known as the ‘collaboration’ or ‘personalization’ approach. *Knowledge as a process* emphasizes ways to promote, motivate, nurture, and guide the process of knowledge creation by individuals working alone or in groups, in order to leverage the knowledge in the community. A process-oriented view of knowledge recognizes that knowledge is often unique to individuals and irreplaceable and as such, mechanisms such as incentive systems and greater flexibility in the allocation of responsibilities are used to ensure that creativity is not stifled and that talent is retained and used in the most optimal way. The focus is therefore on collaboration support technologies that can assist the social communication processes between individuals that is necessary for knowledge creation to take place. Hence, knowledge is deemed to be closely tied to the user or the creator and knowledge is shared effectively only via person-to-person contact (physical or virtual). IT-based tools are then developed not to store knowledge, but to facilitate communications, and examples of these include e-mail, video conferencing, workflow management systems, and group-decision support systems.

Knowledge as a commodity is also known as the ‘content-centered’ or the ‘codification’ approach, treats knowledge as an object that is separated from its creators and users – a thing that can be located, manipulated and hence, captured, measured and managed as one would with tangible artifact. Indeed, the focus of such a perspective is on products that contain or represent knowledge, and such products are typically concerned with managing documents and databases in the processes of their creation, storage and re-use in computer-based corporate memories. Further examples are best-practice databases and lessons-learned archives, case-bases that record in detail older business-case experiences, and knowledge taxonomies. The goal is to store documents with explicit knowledge in them (memos, reports, articles, etc.) in a repository where mechanisms are put in place to allow users to access them and hence reuse existing knowledge in creating new knowledge that is specific to the user’s context.

10.6 Knowledge within the Enterprise

Knowledge in an enterprise is that which is found within its own bounds (as embedded in people, processes, and organizational memories), as well as knowledge about the external environment (in terms of understanding market fluctuations, regulatory changes and technological innovation and the like). Within the enterprise, knowledge has been called *intellectual capital*, while knowledge that pertains to events and entities external to the enterprise is called *competitive intelligence*. Most generally, intellectual capital consists of three components – human capital, structural capital, and relationships capital. The first two refer to the human talent and the technological infrastructure of the firm, while the third is concerned with knowledge about the customer, and knowledge about other enterprises that are allied to the firm – for example, suppliers, buyers, and service providers. By contrast, competitive intelligence refers to knowledge on the environment outside of the enterprise and on competitors to the enterprise and is therefore closely associated with relationships capital.

10.6.1 Intellectual Capital (IC)

In enterprise parlance, intellectual capital usually refers to the knowledge assets of the enterprise and the value network to which the enterprise belongs. Intellectual capital is found in the organization's patents, process methodologies, employees' skills and experience, technologies, and information about customers and suppliers. Intellectual capital is explicit as well as tacit: the former can be codified or captured, and the latter, which is contained in the heads of employees, defies easy documentation. Therefore intellectual capital is created only when intelligence is given coherent form, whether in a database, report or process methodology document, and encapsulated in a form that can be described, shared, and exploited. The more tacit form of intellectual capital is understood to be 'soft' knowledge, and consists of the expertise (a semi-permanent body of knowledge) of personnel with respect to executing a certain task, as well as to the tools that can augment this expertise by acquiring facts, data and information, and that deliver expertise to employees who needs it in a timely and accessible fashion. In sum, intellectual capital spans the knowledge assets of the enterprise and its allies, and is hence internally focused and introspective in its perspective.

In an enterprise context, intellectual capital is generally viewed as the synthesis of three components – human capital, structural capital, and relationship capital. This is a well recognized view of overall intellectual capital, but there remains considerable disagreement regarding the particular mix or relative salience of each factor. *Human capital* refers to the skills, talents and capabilities of employees. Human capital is also the source of innovation in

terms of organizational design, product design, technologies, and organizational culture. *Structural capital* refers to the key enabling infrastructure like information systems, intelligence-gathering units, and research and development laboratories that allow sharing and leveraging of knowledge. Techniques and technologies that can be identified as easily transplantable, customizable, and reusable, and the ICT infrastructure that facilitate knowledge transfers are therefore the twin pillars of structural capital. *Relationship capital*, also known as *customer capital*, is the value of the knowledge embedded in managing the relationships between the enterprise and other entities with which it conducts business, and recognizes the emerging salience of strategic partnerships between suppliers, buyers, customers and service providers in the value chain of a product or service.

At the interface between the enterprise and the customer is the point at which intellectual capital is ultimately converted into monetary form, and the effectiveness of this conversion mechanism is determined by the enterprise's knowledge of the customer – preferences, habits and spending patterns as manifest in complaint letters, renewal rates, cross-selling, and referrals – and how it leverages this knowledge of the customer in terms of branding, marketing, and advertising.

10.6.2 Competitive Intelligence (CI)

Competitive intelligence comprises knowledge of competitors and rivals that critically determines successful decision-making in an enterprise. It is therefore externally focused and concerns the enterprise's competitors, some of which may be allied to the enterprise in other related markets. CI thus spans knowledge about competitors that is formally derived from analyzing and understanding information on competitors, market trends and other industry-related materials collected from sources that include media like radio/television interviews/analyses, published journals, newspapers and annual reports, and employee contributions from the routine conduct of their jobs and customer inputs. This glut of information is scrutinized from the disparate sources and meaningful material is extracted (via increasingly sophisticated technologies that assist the human reviewer) for further analysis. The output analyses that reviewers put together will give insights into the intentions of competitors, governments and other organizations that can impact the enterprise's bottom-line and operations.

The deployment of competitive intelligence allows management to anticipate (as opposed to merely reacting to): (i) changes in the market and industry for the enterprise's products and services, (ii) initiatives and actions taken by competitors, and (iii) changes in political power and government regulations that will affect an enterprise's strategy and activities. In

general, enterprises face challenges in two aspects: in acquiring competitive intelligence and in utilizing it.

The second set of key challenges pertains to *utilization* of competitive intelligence. Generally, enterprises leverage competitive intelligence in the major domains of activity. These include discovering potential newcomers into the market; learning from the successes and failures of competitors and their strategic intentions; learning about the state of technological advancements in the industry and how they can be applied to its own context; identifying potential strategic partners and acquisition targets; learning and understanding the implications of innovations in product design and manufacturing processes; and recognizing and adapting to changes in the political or regulatory climate of the nations in which they operate.

Overall, the acquisition of competitive intelligence for the extended enterprise is considerably more difficult than for the domestic enterprise. The latter needs to gather competitive intelligence on the political, economic, regulatory, and social developments of a single nation as well as on local competitors, but the former must do so for the myriad countries in which it is active. Gathering competitive intelligence therefore becomes a task for intelligence units within the enterprise. Beyond gathering intelligence, clearly the challenges of effective utilization are critical. To utilize knowledge effectively, an enterprise must leverage intellectual capital as well as competitive capital – in other words, it must leverage its access to all *intelligence*.

10.6.3 Leveraging Intelligence for the Enterprises: IC + CI

While knowledge can be seen as a combination of IC that is internal to the enterprise or to the value web of allied enterprises, and CI that pertains to its competitors, an enterprise leverages this knowledge to generate tangible value via the knowledge life-cycle that consists of two main processes: first is the creation of new knowledge via innovation in management practices, product development and process improvements, and second is the management of current enterprise knowledge in its six fundamental components identified by Savage (1996). Figure 10.2 shows key dynamics associated with knowledge creation and knowledge management.

Both processes highlighted in Figure 10.2, encompass the SECI processes as proposed by Nonaka and Takeuchi (1995) from Figure 10.1. Indeed, the SECI knowledge cycle addresses processes that do take place within the enterprise but an added feature is needed to tie the creation and management of enterprise knowledge to the fulfillment of the enterprise's strategic goals. This feature performs something of connectivity function, and it best provided by the formulation and implementation of the knowledge life-cycle that involve the SECI processes *at every stage*.

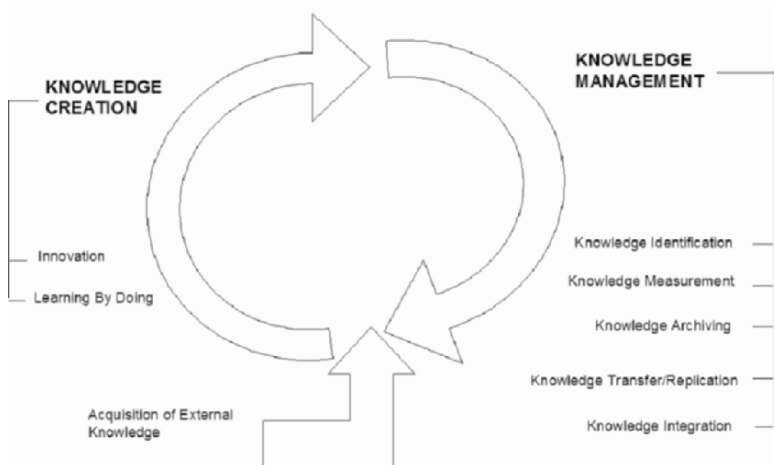


Figure 10.2 The knowledge life-cycle processes.

Clearly, the goal of leveraging knowledge is to create value for the enterprise. It is to ensure that the people in the enterprise – the decision-maker, the designer, the customer-services personnel, etc. – can access the right knowledge in the fastest possible time. This means that linkages must be formed for people to access people with expertise, information in a database, and tools and software that can support decision-making with analysis of data and information.

10.7 Knowledge Networks in Enterprises

In retrospect, advances in information technology during the last decade of the 20th century can best be characterized by two notable trends. First is the continual and rapid improvement in functionality and performance of ICT (for example, the prescience of Moore’s Law on the doubling of a micro-chip’s capabilities in memory size, processing speed and other performance attributes every 18 months). Second is the increasingly tight interconnectedness and interdependence of business enterprises, organizations, governments and individuals resulting from the increasing pervasiveness of communications and computer networks, the most universal of which being the Internet. This is the context within which we need to consider the role of knowledge networking in extended enterprises.

The emerging salience of the ‘knowledge network’ has its roots in innovation networks, information networks, and other associated networked organizational variants that encompassed networking processes in which knowledge was acquired, shared and created by members. As its title suggests,

the knowledge network consists of ‘knowledge’ and ‘network.’ The first of these terms has been addressed earlier and requires no added descriptors. In the business context, the term network refers to an organizational form, one that is associated with the characteristics of flexibility and adaptability, both of which are increasingly recognized as features that are very appropriate for the volatile market environment of today, where dynamic market conditions demand high-speed responsiveness.

The knowledge network hence possesses fundamental features of the network organization, in terms of its structural and cultural configurations, and is shaped by the organization’s purposes of leveraging knowledge to achieve competitive advantage. As an example of knowledge networks, the clusters of interdependent high-tech industries in regions like Silicon Valley and Route 128 in the USA and Hsin-chu in Taiwan, with links to universities and research institutions have led by example in terms of what collaboration and synergy between ‘knowledge workers’ (the innovators, academia, and professionals) and business (the entrepreneurs and MNEs) can produce. Fittingly, ‘knowledge network’ has been a name that has been ascribed to a multiplicity of technology-based organizational forms that connect knowledge-creating entities in to leverage the value of synergistic knowledge sharing.

In an earlier chapter of this book, the term ‘knowledge network’ was defined from the perspective of the of not-for-profit knowledge producing entities. In this chapter, we focus on knowledge networks that cross the boundaries of language, culture, distance, and regulatory regimes in the course of pursuing for-profit activities. In commercial contexts, three sets of elements jointly define the knowledge network, namely strategy, people, and technology. While strategy defines a direction and a framework for action to achieve organizational objectives, the people and technology factors, and the interfacing between them, are determinants of the efficiency and effectiveness of the knowledge network. (It may well be that these same features are relevant to the not-for-profit knowledge networks, however, addressing this issue is beyond the scope of this chapter.)

From a related perspective, people-centric networks fit well into management cultures that belong to the “knowledge-as-a-process,” competence-driven school of thought, while technology-centric networks fit nicely into management cultures that adhere to the “knowledge-as-a-commodity,” infrastructure-driven school of thought. An enterprise that adopts only one of these models of knowledge network will be not able to both successfully compete globally at the same time leveraging global opportunities. In this chapter and the next two chapter, we will be arguing that that for a knowledge networking strategy to be successful globally, both elements – people and technology – must be holistically synthesized and integrated in a coherent strategy, and that coherence is essential in order to facilitate enterprise-wide innovation and learning processes.

10.8 Knowledge Networks for Decision Making

As observed earlier, the quality of decision-making and ‘knowledge work’ – non-repetitive, novel tasks that require know-how and knowledge – depends on the quality of knowledge embodied in the decision-maker, and more generally, it depends on the extent to which decision-making is co-located with the requisite knowledge. This sort of co-location can be achieved either by devolving decision-making authority to the source of knowledge, or by concentrating knowledge at the source of decision-making. The latter crucially depends on the mobility of knowledge and the degree of error in decision-making that is tolerated.

Market tolerance of flawed decision-making is shrinking with increased competition from rivals both global and local, the lowering of barriers-to-entry to many markets, and the increasing adoption of free-market policies in most countries of the world that had hitherto maintained close markets. Market volatility, as well as pressures for the enterprise to be flexible and adaptable, point to the increasing salience of distributed decision-making. In relatively stable market environments like those of the industrial era, centralized decision-making traded off speed, responsiveness, and creativity for efficiency, quick response, unvaried products, and an unambiguous command-and-control mechanism.

Today’s markets demand both efficiency as well as creativity in products and services, on top of responsiveness to a market in which customer preferences – market demand is rapidly changing and market leadership is hinged on providing better and better products/services in the absence of high barriers-to-entry. A mechanism is hence needed to coordinate distributed decision-making as a result of the need to devolve decision-making to the sources of knowledge, while centralizing codifiable knowledge since it is not always possible or practicable to completely devolve decision-making powers throughout a large organization due to coordination problems or to concentrate responsibilities on the best qualified.

In order to provide a structure that facilitates decision-making, an organizational structure that facilitates the free-flow of knowledge in its forms – tacit and explicit – needs to be built. This mechanism needs to: (i) connect people with other knowledgeable people, (ii) connect people to information, (iii) enable the SECI processes as well as the conversion of information into knowledge, and (iv) provide a vehicle to mobilize knowledge so that knowledge sharing and organizational learning can be enhanced. The knowledge network provides the integrated mechanisms that enable all of these functionalities to take place.

10.8.1 Structural Imperatives of Networks

The knowledge network is a structure born of an environment marked by increasing market volatility and its demands on the enterprise – demands for rapid responsiveness, increasing costs of innovation, flexibility in shifting the scope and scale of production, and adaptability in implementing new technologies. It is the result of increasing recognition that knowledge, embedded in humans, processes and products are critical determinants of an enterprise's abilities to compete in market conditions that punish inefficiency and flawed decisions. In the past, a network of inter-dependent agents as an enterprise organizational structure was rendered unfeasible by high coordination costs and the efficiencies associated with hierarchy and control amidst market conditions that changed slowly in the near-term. Indeed, the necessary mechanisms for coordinating multiple tasks and projects, and that could permit high-speed and cost-feasible communications in a network of inter-dependent agents were absent, hence precluding the formation of large-scale networks.

With the dramatic advances in information and communication technologies over the past three decades, the situation has changed substantially. Tight centralized control has been rendered impractical and too costly as a result of the myriad temporally-varying complexities engendered by a rapidly changing market environment, while the emergence of affordable information infrastructure has rendered communications, computers and enterprise information infrastructures de rigueur enterprise coordination mechanisms. Cisco, which largely adopts a network organizational structure, has proven the feasibility of a network organization on a global scale (Castells, 1999).

Choucri et al. (1999) define the knowledge e-network by synthesizing elements of people, technology and structure, as: "The knowledge network is a computer-assisted organized system of discrete actors, with (a) knowledge producing capacity, (b) combined via common operating principles, (c) relating their individual autonomy, such that (d) networking enhances the value of knowledge to the actors, and (e) knowledge is further expanded." Nothing in this expressed view refers to the uses of knowledge or to the purposes for which new knowledge and increased value will be deployed. Nor does this definition imply any particular organizational or institutional arrangements. For all enterprises – national or international, limited or extended – the organizational features of a network are important in shaping, even defining, its potentials and performance.

10.8.1.1 The Basic Network Features

In a structural sense, the network structure consists of nodes that are interconnected by links, where nodes can consist of individuals, groups, or organizations, which serve as hubs of activity or organizational processes, while links refer to the various connecting and coordinating mechanisms that provide paths for communications, team-working and knowledge flows, tangible or otherwise (Skyrme, 1999).

Organizationally, the knowledge network is characterized by specialized knowledge assets under the joint control of its members – in the network, knowledge assets in the form of intellectual capital and competitive intelligence are shared in the form of collaboration (possibly cross-departmental) between network agents, information from knowledge-bases and personal interactions is made readily accessible to authorized agents, and informal virtual communities of practice can form within the enterprise from these networks. Also, the network is governed by flexible coordination mechanisms – the boundaries within the enterprise are flexibly defined with the formation of temporary teams to handle specific projects, and this means that associative ties between agents are often dynamic. Decision-making is largely decentralized and locally defined, such that executive management will provide the goals and a broad strategic framework while empowering network agents with decision-making capabilities within clearly defined bounds.

When viewed through the *interaction lens*, linkages within the knowledge network have a social component in addition to commercial contract – relations that bind together a group of individuals, teams or organizations in collaboration to achieve some collective purpose. Trust, commitment and loyalty have been touted as key elements of an enterprise human resource policy, and act as the glue that will retain talent within the organization. Indeed, the nature of team formation-and-dissolution in a network whose linkage configurations are intentionally dynamic mean that individual loyalty to the enterprise must be cultivated by the right people policies and incentive systems. The case of the multi-enterprise knowledge network introduces additional complexity and will be discussed later, since it represents a case in which loyalty to the node – which, in this case, is the enterprise – supersedes loyalty to the network as a whole, and as such, introduces a host of challenges that must be met with policy responses.

Technologically, the knowledge network refers to an organization in which individuals or teams are connected together by a network of computers that acts both as a coordination mechanism of enterprise activities, or as gateways of shared access to a common database of virtual resources on a corporate intranet and/or on the Internet. Communications backbones like broadband access and management information systems are front-runners of today's

knowledge management systems that offer virtual collaborative capabilities to eliminate physical barriers to collaboration.

10.8.1.2 Some Extensions

Having failed at living up to the fog of hype that proclaimed management information systems (MIS) as a silver bullet to solve the enterprise's needs, the true value-added of MIS has too often been missed – MIS applications, today best known as enterprise integration (EI) systems, automate repetitive financial reporting and accounting processes, while organizing information and data into data-warehouses from which they can be extracted for analysis in strategic planning. Today, EI applications assist in decision-support in a wide range of areas from supply chain management to customer relationships management. While EI provides a computationally effective toolbox for optimizing routine enterprise processes, knowledge management systems (KMS) provide virtual environments that permit real-time multi-party, multi-directional communications and virtual collaboration via instant messaging, chat forums and message boards that are also enhanced by modeling and analytic software packages that can mine data and information for un-obvious patterns that could be of potential value to the enterprise.

In sum, the knowledge networking process that occurs within the knowledge network itself builds on the collaboration between people and the connections between computers, and reflects the joint control and shared ownership of knowledge assets through collaboration and dynamic partnerships within the network.

10.8.2 Network-Elements

The essence of the knowledge network is built around a triad of elements – strategy, people, and technology.

10.8.2.1 Strategy

The *strategy* of a knowledge network describes the organization's vision, mission, and plan to leverage knowledge from the synergies of collaboration between network agents in the pursuit of organizational goals. This framework for action considers people policy and technology management in seeking to drive innovation and learning in the enterprise and must ensure that both elements are harmoniously aligned. It involves promoting a culture of ICT-supported knowledge-sharing between physically distant agents, while installing incompatible software systems that prevent electronic data-sharing, is one example of non-aligned strategy, or in many cases, a non-existent strategy for optimizing the interactions between technology and people.

The barriers that prevent the formulation of coherent strategy are largely people-based. These include the fear of change, the fear of losing organizational control, an inability to communicate the underlying value proposition supporting knowledge networking processes in the enterprise, mismatches and disconnects between the perceptions of executive managers and line managers. In addition, the lack of buy-in from managers tasked to coordinate knowledge networking initiatives, the misunderstanding of the scale of change required, the misconception and subsequent sub-optimization of the collaboration process, and the resultant demoralization of employees are all factors that cause knowledge networking to fail from the planning stage to the execution stage.

10.8.2.2 People

People – the knowledge workers in the organization – are the *raison d'être* of the knowledge network, and form the basis of organizational competence. The barriers that prevent the formulation of coherent strategy are largely people-based – the fear of change, the fear of losing organizational control, an inability to communicate the underlying value proposition supporting knowledge networking processes in the enterprise, mismatches and disconnects between the perceptions of executive managers and line managers, the lack of buy-in from managers tasked to coordinate knowledge networking initiatives, the misunderstanding of the scale of change required, the misconception and subsequent sub-optimization of the collaboration process, and the resultant demoralization of employees are all factors that cause knowledge networking to fail from the planning stage to the execution stage.

10.8.2.3 Technology

Technology – in the form of ICT infrastructure and the information systems within the enterprise – provides the infrastructure for knowledge networking. While the adage goes that power without control is nothing, the global enterprise requires technology for knowledge networking to take place on a global scale. Technological issues like harmonization of protocols and standards, systems scalability and upgradeability, and enterprise-wide compatibility are considerations that must be resolved at the planning stage to avoid the immense costs suffered by firms that stumbled in implementing large-scale enterprise resource planning projects in the late nineties.

This broad accounting of networking factors provides the context for focusing on operations of knowledge networks in extended enterprises globally, those for-profit entities that cross boundaries, span jurisdictions, and engage in complex products and processes, generating added value through the deployment of material as well as virtual means.

10.8.3 Knowledge Networks in Expanding Enterprises

Conceptually, knowledge networks are subsets of the enterprise. When the enterprise is small, as in the case of the start-up operation, the enterprise can itself be the knowledge network, within which enterprise employees form teams to handle different projects. As the enterprise grows in size, enterprise functions are increasingly specialized into business units that handle areas like finance, human resource, product development, research and development, and manufacturing. Knowledge-intensive functions of the enterprise – strategic planning, research and development, or human-resource, for example – are commonly the sources of the enterprise’s competitive advantages, and it is in these areas that knowledge networking will be most effective. Knowledge networks within each of these business units can be coordinated by an organizational meta-network structure that loosely coordinates the activities of the business units as a whole.

In terms of the enterprises that knowledge networking can describe, scale is a possible axis of variance – knowledge networks can describe the organization of entities within an organization, the organizational design of the whole enterprise itself, or the organizational structure of an alliance of enterprises. Single enterprises may be an entire knowledge network unto itself – as are many small and medium enterprises – with dynamic network associations of assets and human resource (knowledge-workers) that form in order to perform certain knowledge-intensive projects that require different areas of expertise. The meta-network model, where the entire organization is a network of networks of knowledge workers working on disparate projects, has a central governance node that performs administrative duties and financial accounting activities, and which acts as a coordinating, ‘leader’ node.

10.8.4 Characteristic Parameters of Knowledge Networks

There are several ways of characterizing the knowledge network – by function, node-size, linkage strength, centralization of authority, and boundary-crossing complexity. Knowledge functions center mainly on knowledge sharing and access, and knowledge creation. The knowledge life-cycle noted earlier comprises two principle elements of ‘knowledge management’ – in this context, referring to knowledge sharing and access – and ‘knowledge creation’ – the creation of new knowledge via collaborative research and development between agents seeking to leverage the synergies of cooperation. The former gives rise to ‘knowledge sharing’ networks and involves shared access to archived information that is separately supplied by network members, and open channels through which advice may be sought from other members of the network. The latter gives rise to ‘knowledge creation’ networks that are more active in the use of knowledge resources – it is

concerned with innovation and the application of knowledge arising from synergistic collaboration between members – and new knowledge that is created in this innovation process is fed back into the knowledge creation process.

Some knowledge networks are naturally involved in both the provision of access to shared knowledge as well as providing the organizational mechanisms for collaborative innovation initiatives. ‘Knowledge creation’ networks result in the creation of new knowledge though the main objective for such organizations is to apply the knowledge of network members in pursuing goals that are coincident with the organization’s mission, and knowledge creation is a by-product of this process. The talent of the members of the network, and the policies that encourage and constrain creativity affects the quality of knowledge created and hence applied by these networks.

Examples of knowledge creation networks are found in the cross-company, non-business-affiliated communities of practice founded by professionals working in the similar trade, non-profit organizations like IISD (International Institute of Sustainable Development) and TiE (the Indus Entrepreneurs – a club of Indian entrepreneurs that hosts networking events to facilitate joint-ventures and collaboration). Knowledge sharing networks are operated around the technologies of databases and policies of knowledge sharing. Network member entities pool their stock of codifiable and explicit knowledge into an archive that is accessible by other members and that is updated frequently. Examples of knowledge sharing networks include the sustainable development gateway built and maintained by Indian organizations engaged in sustainable development and online reference sites on specific interests.³ Hybrid networks that execute both functions naturally exist, though with varying degrees of efficiency and success. Examples of such hybrid networks that combine both core knowledge processes are Skandia and Cisco.

10.8.4.1 Node-Size

This feature refers to the scale and scope of networking between individuals, teams, departments/divisions, and enterprises. The size of nodes in the knowledge network depends on several parameters, the most important of which is the size of the enterprise in which the knowledge network is contained. Hence when the enterprise is viewed as a knowledge network – a startup conceivably will have the smallest node size where each node consist of individuals, while the largest MNEs have nodes the size of whole divisions and within each node, sub-networks with sub-nodes the sizes of teams or sub-divisions.

³ For an example, visit www.china.eastview.com, which bills itself as “the knowledge infrastructure” of China.

MNEs therefore can be considered to be knowledge meta-networks operating on a global network consisting of knowledge networks of varying node sizes, with each node consisting of smaller networks and smaller nodes, where node size decreases with network size to the point where a node consists of an individual. Hence there is a continuum in node size and network complexity (number of links and nodes) from the smallest node size of the individual (in the start-up) to medium node sizes of teams and departments in small-and-medium enterprises to very large node sizes of divisions and departments in MNEs and large corporations.

10.8.4.2 Linkage Strength

This factor refers to the pattern and constitution of linkages and nodes are dynamic and evolve to adapt to events and projects, hence links strengthen and weaken while density of connections change. Linkages tend to be strong when they are established over time and augmented by tradition and history. Such that ties gradually obtain a greater social component – with factors like reputation, trust, and loyalty that reinforce the bond.

If linkages are weak change dynamically, then the ties that bind network actors together are purely commercial and too short-term for trust and loyalty to develop. Within the network organization, because of the project-driven nature of work, team compositions are in constant flux – these are very apparent in consultancies, in which teams form and dissolve as dictated by the projects' need for specific expertise and experience. Hence while link dynamicity provides organizational flexibility and efficiency – permitting the deployment of the most suitable person for the task – the trade-off could count against the establishment of trust in the relationship.

10.8.4.3 Authority Strategy

The conventional view is that centralization minimizes coordination costs and delays, while permitting greater coherence in execution of activities that concern network sustenance and expansion. Accordingly, so the argument proceeds, global optimization, across the entire network, is more easily accomplished when authority is more centralized, than in a decentralized network where there exists the danger that local optimization may not be coincident with policies that allow for a more beneficial global optimization. At the same time, however, some skepticism is in order.

Increasingly, we recognize that decentralization reduces the bottlenecks in decision-making processes – since the central 'leader' node need not be consulted for every operation or decision – and hence decentralization reduces delays and associated costs, allowing enhanced responsiveness and flexibility of the network. In permitting greater freedom to individual nodes,

decentralization encourages creativity and innovation, and allows opportunistic responses to environmental changes by individual nodes. The downside would be that, as a result of less coordination from the center, decentralized decisions might be inconsistent with the overall strategy of the network, hence the danger of local optimization taking precedence over global optimization. It is fair to say that, in the last analysis, the relative efficiencies of centralization vs. decentralization may be enterprise and/or context specific.

10.8.4.4 Boundary-Crossing Complexity

This delineating factor refers to global enterprises and the additional dimensions of complexity that must be considered when activities are spread across multiple disparate environments. A knowledge network can also be viewed in terms of the boundaries that it crosses. The larger the spread of the knowledge network, the greater the complexity of governing the network and the need for ensuring network effectiveness as well as the coherence required to transcend operational differences between each node.

10.8.4.5 Cross-Jurisdiction Spread

The matter of jurisdiction is a fundamental feature of the global economy. The complexities of jurisdictions – intra-state (national), inter-state (national), regional (international), and trans-regional (international) – can often pose powerful challenges for enterprise networking. Political and regulatory changes are most apparent when one considers the boundaries across which the knowledge network operates. Local knowledge networks operate intra-state, with activities and network membership confined to a single homogeneous set of regulations and political considerations. Inter-state or regional knowledge networks deal with a more complex mix of regulatory and political considerations while trans-regional or international networks have to deal with a large set of differing political and regulatory considerations.

10.8.4.6 Cross-Cultural Spread

While everyone agrees that culture matters, there remains little consensus as to how, when, or why. Differences in intra-region, inter-regional, global (trans-cultural) can often be accompanied by powerful similarities, even synergies. However, as the geographic spread of the knowledge network increases across states and regions, there will invariably also be differences, of varying intensity, in culture (for example, China vs. the US, Southern US vs. Northeastern US). Factors like exchange rate differences and language differences must also be considered in managing virtual collaborative ventures to ensure semantic equivalence under different contexts.

10.9 Knowledge Networks for Extended Enterprises

Extended enterprises – operating across boundaries of time, distance, language (semantics as well as syntax), culture, and regulatory environments – recognize that dominating global markets is founded on the need to achieve both global efficiency and local responsiveness, which in turn are driven by the organizational capability to develop, acquire and leverage knowledge on a worldwide basis. In globalizing, an enterprise needs to make decisions in addressing six issues (Govindarajan and Gupta, 2001): product choice, choice of strategic markets,⁴ mode of entry,⁵ transplanting organizational culture, achieving dominance in the local market,⁶ and speed of global expansion. All six require knowledge inputs to inform decision-making, and all are vital in ensuring the viability and success of the global enterprise.

The record to date shows us that hierarchical organizational structures performed well in an earlier era of bulk-processing industrial economy under conditions of market stability when a bureaucracy of enterprise planners could adequately respond to an environment marked by low complexity, a low rate of technological obsolescence and low demand uncertainty. If, or rather when, operational complexity in worldwide enterprise activities increases, technologies become rapidly obsolescent and markets are characterized by volatility, then hierarchically organized enterprises that were strong in corporate command-and-control were too slow in responding – as IBM who found heavy cost in the 1980s, relative to more flexible and adaptive competitors like Digital Equipment – the need to experiment with flatter hierarchies and more ‘organic’ organizational structures emerged. As a result, at three modes of organizational responses emerged among the many new efforts and pioneering institutional initiatives.

10.9.1 Modals Forms of Extended Enterprise Networks

Over time, the adoption of some features of the basic network organization, led extended enterprises to develop and adopt hybrid network structures.

⁴ The strategic importance of a market is determined by the current and future market size as well as the learning opportunities offered by that market. Indicators of the former two factors are the size of the country’s economy as well as the country’s GDP, and indeed also, the wealth of its citizens and their predilections with respect to the product or service. Learning opportunities are determined in turn by the level of sophistication and exactitude of the customer base.

⁵ Mode of entry refers to two factors: the reliance on exports versus local production in the target market as expressed in a continuum of forms, and the extent of ownership control over activities that are performed locally in the target market.

⁶ Dominating the local market requires both the winning of customers as well as beating off competition from competitors established in the host country.

Table 10.2 Multinational enterprise networks.

Organizational Characteristics	Modal I – Local Specificity	Modal II – Global Efficiency	Modal III – Internationalized
Node Description	High level of decentralization with decision power. HQ and subsidiary nodes share assets and responsibilities. Subsidiaries have high degree of independence from HQ.	Low level of decentralization. Assets, decision power, and responsibility are highly centralized at HQ. Subsidiaries implement plans developed at HQ with no flexibility to develop local strategies.	Medium level of decentralization. HQ delegates decision power to subsidiaries which adapt products and marketing to local conditions, but are dependent on HQ for overall strategy and innovation.
Network Linkages	HQ-Subsidiary linkages are not formalized. Formal governance tools (like simple financial controls and reporting mechanisms) are supplementary.	Very strong linkages result in tight control of strategies and operations. Highly developed channels of communications, reinforce command-and-control by HQ.	HQ-Subsidiary linkages are very formal. Enterprise planning and management facilitate command-and-control by HQ.
Learning and Innovation	The high degree of decentralization retains learning and innovation within each unit.	Innovation and learning are highly centralized in HQ, and subsidiaries are considered mechanisms to execute HQ’s plans.	Innovation and overall strategies directed by HQ and diffused to subsidiaries.
Strategic Capabilities	High level of sensitivity and responsiveness to local differences.	Highly coordinated global strategies that capture global scale efficiencies.	Well-developed mechanisms and infrastructure for worldwide knowledge sharing.
Challenges	High degree of decentralization and subsidiary-autonomy creates independent ‘fiefdoms.’ Silos around subsidiaries impede knowledge networking. Subsidiary loyalty restricts exchange of ideas and advice, leading to strategic misalignment, inefficiencies, and opportunity costs.	High degree of centralization of decision reduces sensitivity to local conditions and create sub-optimal performance. Competitiveness in local markets is threatened by rivals with better adaptive mechanisms.	High level of formal relations between HQ and subsidiaries lead to sub-optimal worker performance. Control of innovation at HQ. Lack of attention to local conditions lead to potential loss of ideas and wasted opportunities to mobilize the global talent base.

These consisted of mixed network-hierarchy organizational forms that attempted to reconcile command-and-control efficiency with responsiveness, flexibility and adaptability. These network forms are distinguished by the configuration and characteristics of the nodes and linkages within the network, and the strategies and policies that direct and guide enterprise operations. In a survey of twenty one multinational enterprises, Bartlett and Ghoshal (1989) identified three modal forms. These are presented in Table 10.2 as three modal forms, which jointly can be seen precursors for a fourth which is especially relevant to any discourse about knowledge networks for extended enterprises.

The fourth modality, defined by Bartlett and Ghoshal (1989), consists of an emergent form that could integrate the strategic capabilities of the three while resolving the fundamental challenges that faced each. They have dubbed this emergent model the trans-national network MNE. This organizational form is characterized by inter-dependent and specialized regional subsidiary business units capable of aligning targeted local initiatives with global strategies. To do so, knowledge creation and sharing are effected via inter-subsidiary unit collaboration in knowledge-intensive work, and via worldwide technology-and-human-policy enabled knowledge sharing mechanisms.

There are other characteristics in addition to inter-dependence, collaboration and knowledge diffusion. The transnational network organization is also recognized for its flexibility, decentralization and synergistic opportunities, and these characteristics both augment, and are augmented by, knowledge sharing and knowledge creation processes.

The main challenges that the network structure had to resolve were those of coordination, communications, culture, misalignment of collective interest in favor of individual self-interest. Because the network organizational paradigm encompassed thinking that had multiple dimensions – strategic, social and enterprise processes – the shift is not exclusively confined to just formal organizational structure. The organizational changes that were occurring also impacted the core decision-making systems and management processes – the administrative systems, communications channels and inter-personal or inter-divisional relationships. In other words, they were all-pervasive.

10.9.2 Network Value Chain for Extended Enterprises

Value network concepts are not new, and have evolved into different variants, but are united in their emphasis on the external economies of the firm and its interactions with other entities, as opposed to the traditional focus on

the internal structure of the corporation. The value network perspective hence describes how value networks are concerned with aim to realize external economies of scale and of scope by relying on fragmented rather than on vertically integrated forms of industry organization.

Most generally, a value network refers to added value accrued through connections among enterprises – irrespective of the specific nature of the connection or the participating entities. Though applicable to both the private and public sector, the focus of discussion here will be on value networks of private sector organizations, or group of organizations, that engage in both tangible and intangible value exchanges.

In the value network, unlike the traditional variant where boundaries between allied enterprises were clear, well-defined and cross-boundary interaction was minimized, the boundaries between the enterprise and its suppliers, service providers, and buyers are becoming increasingly blurred as companies shed non-core competencies by outsourcing them to other specialist companies and focusing intensely on their own core competencies. Functions that were formerly executed in-house within a single player in the value chain would now be performed by electronically networked multiple companies behaving as a single enterprise – the virtual extended corporation (VEC), with inter-enterprise value exchanges taking place within this network of enterprises. In this context, “value exchanges” describe the interactions and transactions between enterprises, and can be intangible or tangible.⁷

10.9.2.1 Virtual Extended Corporations (VECs)

The formation of VECs has resulted in increasing integration of allied enterprises to enable coordination of the necessarily precise and timely execution of business processes. Indeed, for a VEC to be viable and successful, a considerable amount of information must be integrated across the enterprises’ value chain in real time. The VEC is thus seen as a network of companies that are inter-dependent and engaged in the pursuit of common commercial objectives in the production and/or delivery of goods and services within a value chain. Both the technological infrastructure and human-related policies like enterprise cultures and norms must be ready for such networking.

Indeed, these elements must be ready for the implementation of knowledge networking practices. More than just a flow of data in the form of

⁷ Tangible value exchanges refer to exchanges of products or services and financial transactions, and include tangible knowledge products and services like reports, documents and consulting. Intangible value exchanges refer to knowledge transfers that can result from tangible exchanges of knowledge products and services – as manifested in know-how, strategic planning information, joint product or process developments etc. – and benefits like informal benefits that arise from the formation of more intimate relationships between enterprises and their personnel.

customer details and inventory figures, the network is a necessary common platform on which to support the crucial innovation and knowledge management processes that must take place across enterprises in order for the VEC to be able to compete in an ever-changing market. Where e-commerce was about trading – buying and selling – over the Internet, e-business encompasses the full range of business interactions between enterprises – from supply chain management to customer relationship management, to enterprise resource planning and e-commerce – and has enhanced the effectiveness and indeed, the necessity, of the VEC network.

10.9.2.2 Cross-Value Chain Networks

The evolution of such cross-enterprise networks have given way to cross-industry-segment networks – VECs have pointed to the formation of an even broader, but often no less tightly connected, network of allied VECs that operate across value chains. As in the VEC, enterprises within the value network are electronically integrated in a common system that enables real-time cross-enterprise flows of information, transactions and processes. The differences between the VEC and the value network are those of scale – value networks cover a larger industry segment encompassing more value chains than the VEC – and scope – value networks are more complex in terms of their end-products and services than VECs. The key drivers shaping the formation of VECs and value networks are shown in Table 10.3.

Table 10.3 Drivers of trans-enterprise knowledge networking in value networks.

Key Drivers	General Network Advantages
Market volatility requiring faster time-to-market and greater flexibility and responsiveness	Reduced costs through economies of scale from resource-sharing; broadening of product portfolio and greater product customization, leveraging of core competencies; flexibility in resource allocations throughout network, access to specific expertise and a more diverse pool of technical resources, access to more channels into different markets; spreading out of risk for investment
Greater cost efficiencies in producing products of high complexity	
Innovation as increasingly important to competitiveness	
Expansion into different markets; creation of new markets	

Most generally, the objectives of the enterprise and the value network of which it is a member, the internal tensions of cooperation to advance common interests and competition to secure individual advantage that does not necessarily benefit the collective, and the asymmetries in relationships between enterprise partners, add new dimensions of complexity to the

formulation of a coherent knowledge networking strategies for a value network. The parameters of power and interdependence, and the degree of their asymmetry across the network members, can be used to analyze the internal power structure of the value network.

10.10 Conclusion

This chapter focused on the value of knowledge in for-profit entities, with specific reference of extended enterprises operating on global scale and scope. Partly a review of dominant themes shaping this domain of activity, partly reviewing key elements and characteristic features, and partly as foundation for framing new modes of knowledge networking for increasingly competitive, diverse, and extended enterprises. While knowledge is a privately produced public good, the fact remains that its value for business lies in the implications of its implementation. Some knowledge-creation, deployment, diffusion and sharing features are generic, in that they are essential for non-profit as well as for-profit entities. Others are distinctive, and key, to the operations of extended enterprises, whose motivations are framed by the ‘bottom-line’ and the latter defined in monetary terms.

10.10.1 Structures and Functions

From each of the divergent characteristics of knowledge networks addressed in this chapter, some shared elements are apparent. Of the most significant common elements in all knowledge networks pertains to the roles of human agents, technology, and the interplay between these. In the following chapters we will focus on two different models of knowledge networks that have been observed in organizations to date, and then put forth the design elements for two emergent modalities. These include the conventional, or past-to-present, models consist of human-centric (Type I) and IT-centric (Type II). The emergent modalities consist of partially-integrated (Type III) and Fully-Integrated (Type IV).

Each of these models is predicated on different structural configurations within the more general ‘network’ pattern, and each is characterized by different processes and operational codes. Addressing each of these modalities, we will seek in the following chapter to show their structural, behavioral and knowledge requisites and, in so doing, provide a framework-based comparative analysis across all types.

10.10.2 Toward Emergent Value Networks

This chapter is essentially foundational in that it highlights the value of knowledge and of e-networking in for-profit contexts. Extending this analysis, the following chapter seeks to demonstrate the adaptation of GSSD, which was initially designed for, and implemented in, a not-for-profit context – can be valuably adapted, and extended considerably for knowledge e-networking technology and strategy to the realities and imperatives of for-profit extended enterprise. The following chapter will demonstrate – via proposed designs and a brief case study of conceptual implementation in a real MNE – how the basic GSSD framework is one whose structure and operation in a research context can be adapted to enhance the value propositions of global business.

References

- Amidon, D. M. (1997). *Innovation strategy for the knowledge economy: the Ken awakening*. (Newton, MA: Butterworth-Heinemann)
- Bartlett, C. A. and Ghoshal, S. (1989). *Managing across borders*. (Cambridge, MA: Harvard Business School Press)
- Castells, M. (1999). *The information age: economy, society, and culture. Vol. III: end of millennium*. (New York: Oxford University Press)
- Choucri, N., McHugh, G. and Millman, S. R. L. (1999). Defining knowledge networking. GSSD-MIT Working Papers Series.
- Drucker, P. (November 1, 1999). The next society. *The Economist*.
- Govindarajan, V. and Gupta, A. K. (2001). *The quest for global dominance*. (San Francisco, CA: Jossey-Bass Publishers).
- Hagel, III, J. and Singer, M. (Mar–April 1999). Unbundling the corporation. *Harvard Business Review*.
- Nonaka, I. and Takeuchi, H. (1995). *The knowledge-creating company: how Japanese companies create the dynamics of innovation*. (New York: Oxford University Press)
- Quinn, J. B. (1999). Strategic outsourcing: leveraging knowledge capabilities. *Sloan Management Review* 40(4):9–21.
- Reich, R. (1992). *The work of nations: preparing ourselves for twenty-first century capitalism*. (New York: Vintage Books)
- Savage, C. (1996). *Fifth generation management*. (Newton, MA: Butterworth-Heinemann)
- Skyrme, D. (1999). *Knowledge networking*. (Newton, MA: Butterworth-Heinemann)
- Stewart, T. (1998). *Intellectual capital: the new wealth of organizations*. (New York: Bantam Books)
- Stewart, T. (2001). *The wealth of knowledge: intellectual capital and the twenty-first century organization*. (New York: Doubleday)
- Tapscott, D. (1997). *The digital economy: promise and peril in the age of networked intelligence*. (New York: McGraw-Hill)
- Wiig, K. M. (1995). *Knowledge management methods: practical approaches to managing knowledge*. (Burlington, MA: Schema Press)
- Wiig, K. M. (2000). *Knowledge management: an emerging discipline rooted in a long history*. (Newton, MA: Butterworth-Heinemann)