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Part One

Intellectual Capital Management

Part One introduces the reader to the world of intellectual capital by first examining the main dynamics that affect competition in the knowledge economy. Exploring these dynamics from multiple perspectives, intellectual capital is uncovered as the driving force behind competition in the knowledge economy. Chapter 1 demonstrates that intellectual capital is the main driver behind mergers, start-ups, innovation, and hence business performance. As such, developing intellectual capital management as the core organizational competency is the formula of success. This, however, is a very general statement, and therefore Chapter 1 breaks this into a number of organizational competencies comprising knowledge, innovation and intellectual property management, creating the right culture for intellectual capital management, and synchronizing different programs into a comprehensive intellectual capital management system.

Before this part proceeds with the "how," it examines the classifications and models that emerged to define, recognize, and measure intellectual capital. Despite the great insight provided by the intellectual capital model, which to date has been the basis of all efforts and models to manage intellectual capital, it falls short of providing business with pragmatic practices and applications. Building on the intellectual capital model and expanding it immensely, the author develops the Comprehensive Intellectual Capital Management (CICM) model outlined in Chapter 4, after examining the question of IC reporting in Chapter 3.

The CICM model is designed to manage all forms of intellectual capital at three stages—knowledge, innovation, and intellectual property management. Though the latter two stages have been established for decades, they are presented under the light of the IC concept and combined with the new discipline of knowledge management to create the CICM model. Chapter 4 presents an overview of the CICM model and outlines its pragmatic features, and thus serves as a gate to Part Two.

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Intellectual Capital Management and the Knowledge Economy

INTRODUCTION

Exponential growth of information in the knowledge economy focuses attention on the importance of managing knowledge in organizations. So-called learning organizations, those that recognize the value of knowledge within their organizations, can grow and prosper through knowledge management (KM). Much has been written on the subject of KM and the learning organization. An equal number of writings similarly addressed intellectual property (IP) and its potential in securing a competitive advantage and generating revenue. Indeed, it is no secret anymore in the business world that IP can on its own be the core business asset, which underscores the importance of intellectual asset or intellectual property management (IAM/IPM). Little, if any, has been written about the correlation between KM and IAM/IPM and how an organization can use both management approaches to implement an integrated program or system for the total management of its intellectual capital and resources. KM and IAM/IPM are not one and the same despite many similarities in their basic precepts. KM relates to the creation of value, the harvesting of ideas, the mining of employee brainpower, and the conversion of tacit knowledge into explicit knowledge that the organization can codify and transfer. IAM/IPM relates to the maximization of value, the licensing of know-how, patents and trademarks, and the use of IP to gain a competitive edge, enter new markets, establish strategic alliances, and generate revenue.

Proponents of each management approach admit the benefits of the other management approaches to the bottom line, yet fail to see the connection or the interplay between them. It is true that for some industries, one approach may seem more important than the other. Nonetheless, for any organization to succeed in the knowledge economy, it is essential that it adopt both management approaches to some extent, as each deals with complementary strategic needs. What some organizations fail to see is that KM and IAM/IPM are essential components for the total management of an organization's intellectual capital.[1]

Focusing on one approach to the exclusion of the other would result in a waste of management and financial resources, and the polarization of the management philosophy of the enterprise. This in turn will result in desynchronization between the departments within an organization as well as conflict between the proponents of the different approaches. Attempting to combine both approaches is not the solution. At best, such a combination would be artificial, resulting in disoriented processes and a dysfunctional system.[2] This is because each of these management approaches has a different function, namely, creation versus extraction of value, and to combine them an organization should implement another intermediary management approach: innovation management (IM).

The only way to work with intellectual capital management (ICM) as a coherent discipline and approach is to understand the relation between the three management approaches (KM, IM, IAM/IPM) and how each affects the bottom line and facilitates the management of the whole

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organization. This is what this book is all about. It presents an approach developed for the total strategic management of an organization's intellectual capital throughout the entire enterprise and at every stage of development of the intellectual capital. The Comprehensive Intellectual Capital Management (CICM) approach is designed to overcome the limitation of any one discipline in the field of ICM, while taking advantage of what each discipline has to offer in creating and sustaining an organization's[3] competitive advantage.

Traditionally, and to date, ICM as a discipline has been divided among IP lawyers and professionals, business managers and consultants, and accountants. Intellectual property professionals call it IAM or IPM (used interchangeably), and limit their attention to the knowledge assets that can be codified and legally protected. They mainly focus on business strategies and techniques that enhance the commercial exploitation of the IP in question. Those with human resources and information technology (IT) backgrounds, however, prefer to call it KM and focus on sharing knowledge that an organization has both in its practices and databases, and that it knows is stored in employees' and customers' heads. Research and development (R&D) and product development people focus mainly on managing the innovation and research process to produce the most efficient results, while accountants mainly experiment with designing metrics to measure IC to enable better investment decision making.

But is ICM new? Since the 1950s, managers from various disciplines have developed a number of management models and approaches to strategically manage intellectual capital, in search of a competitive advantage. R&D management, human resource (HR) management, total quality management (TQM), just-in-time (JIT), and, more recently, conversation management are all approaches attempting to manage one form or another of IC. In today's ICM terms, R&D manages human and process capital, HR manages human capital, both TQM and JIT manage process and structural capital.[4] So what else does ICM has to offer?

The thesis of this book is that ICM should be seen as a total approach to strategic business management and not merely a compilation of all the previous approaches purporting to manage different types of IC—an approach that purports to manage the organizational wealth of the whole enterprise, 80 percent of which is now intangible. The fact that 80 percent of corporate wealth in America and other developed economies is intangible makes ICM not a mere method or collection of processes to manage one resource of the enterprise, but an approach for the management of the entire enterprise.

Comprehending ICM as a coherent discipline with all this diversity may seem impossible. It would require the expertise of the multidisciplines involved: business, law, technology, accountancy, and industrial psychology. But bringing all these perspectives under a coherent model is not the main challenge confronting ICM. The challenge is to understand the interplay between them and bring them together in an effective way to enable an organization to realize, manage, and leverage its intellectual capital effectively.

The CICM approach integrates the three management approaches—KM, IM, IAM/IPM—while recognizing that each has unique objectives, processes, strategies, and tools. One of the functions of this book, and perhaps the most important one, is to present the CICM approach as an evolutionary stage of strategic business management for the knowledge economy. *Comprehensive Intellectual Capital Management: Step by Step* will demonstrate with practical examples that to create and extract value from organizational intellectual capital, and create and sustain competitive advantage, an organization needs to adopt ICM as its modus operandi, rather than implement separate programs limited to one or a few divisions.

Part One introduces ICM in a way that the business reader can understand. It explains the relationship between IC and market value, business growth, stock price, and overall competitive performance. Use Chapter 1 to understand the challenges that face your business in the new

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economy, the competitive dynamics that your business is subject to, and the solutions that ICM can provide for capitalizing on your business innovative power. Real-world examples are used to demonstrate the real value of IC and its relation to market capitalization. Chapter 2 defines what IC is and the models that emerged to explain how value is created from its management. This chapter will also cover the crucial issues relating to measurement of intellectual capital, and the systems that emerged for this purpose, while Chapter 3 will deal with the issue of IC reporting and future trends. Suggestions for a reporting model will also be presented. Part One will conclude with an overview of the CICM model, and the framework it sets for managing IC under three stages of knowledge, innovation, and IP management.

Part Two presents the disciplines of knowledge, innovation, and IP management under the IC concept. Two case studies are presented in Part Two: Dow Chemical and Skandia—companies that implement models of comprehensive intellectual capital management. These companies have been chosen for their pioneering work in the field of intellectual capital management as well as in their respective industries. The case studies aim to provide businesses with practical guidance on how Dow and Skandia mastered ICM with demonstrated benefits. A case study of the U.S. Department of the Navy will also be used to demonstrate mastering knowledge management.

Part Three takes the business reader into step-by-step application of practical techniques, processes, and strategies for managing intellectual capital using the CICM model. Chapters 11 through 13 will present a detailed account of the three stages of the CICM model, for managing IC under knowledge, innovation, and IP management stages. Each of these chapters commences with defining the management objectives that should be targeted for each of the stages, which in turn informs what returns to expect, and what indicators to monitor. But not every organization can implement the three stages of ICM to the fullest degree. For one thing, this will place considerable demand on resource allocation when maybe it is not the right time to introduce change. More importantly, this may not be what is required in view of the strategy of the business. Nonetheless, it is essential that management understand that the three stages reinforce each other and that implementation of a program or effecting certain changes under one of the stages will affect programs and changes under the other. Chapter 14 presents the variables that should be taken into consideration in implementing the CICM model, as well as suggestions on how to devise a phased-out plan that takes into account budgetary constraints and strategic objectives. Chapter 14 also presents a diagnostic tool, the Intellectual Capital Grid, that a business can use to assess its needs in terms of ICM initiatives, where it is, where it needs to be, and how to get there.

Because this book is written for the general reader, no more than the general knowledge of business management and of intellectual property is assumed. To be able to fully appreciate and later implement an ICM model, a deeper knowledge is needed. Therefore, the book includes a number of appendices: a mini MBA (Master of Business Administration) presenting basic business management concepts, and a mini MIP (Master of Intellectual Property)[5] presenting requisite knowledge of intellectual property law.

INTELLECTUAL CAPITAL AND BUSINESS VALUE— THE HIDDEN RESOURCE

What is intellectual capital and how is this "capital" used or converted into business value and profits? The IC of an organization comprises such intangible resources and assets that an organization can use to create value by converting it into new processes, products, and services.

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Though there is no solid consensus on what IC is, there is wide agreement on its definition.[6] It is the knowledge, experience, and brainpower of employees as well as knowledge resources stored in an organization's databases, systems, processes, culture, and philosophy.[7]

Business has always relied on its intangible resources, along with tangible and capital resources, to create value and achieve the organization's goals. Business performance and success depend on how well an organization manages its resources. Formerly, business resources comprised 80 percent of tangible and capital resources, with intangible assets making up around 20 percent. Gradually, this changed with intangible assets reaching 80 percent of the assets of most organizations by 1999. Though a widely declared observation, it is important to explain how the 80 percent is calculated.

The 80 percent figure is calculated by considering the divergence between the market and book values of an organization, known as *market capitalization.* Though market capitalization is not a phenomenon specific to the knowledge economy, it has escalated in the knowledge economy to reach unprecedented multiples of the book value. Market and book values are never identical,[8] but in the knowledge economy staggering market capitalization figures sent many writers in search for the hidden resource that is creating such huge market values. So what does the book value communicate?

Book values of publicly traded companies mainly reflect the value of tangible and capital assets of the company. Sometimes the book value reflects some of the intangible assets of the company under the heading of goodwill. This is hardly an accurate reflection of the value of intangible assets as it is created to balance the books following an acquisition.[9] The market value of the company reflects the value of a hidden resource that is recognized and valued by the market, including but not limited to the company's reputation, innovativeness, technological prowess, and brand equity. These and other attributes like a company's culture make up the intangible resources of a company. Market capitalization only reflects such resources that can create value (i.e., the company's intellectual capital).[10]

To arrive at an approximation of the value of a company's IC, subtract the book value of a company—the total of its tangible and capital resources—from its market value. For example, Microsoft's book value (total assets minus total liabilities) on March 31, 2001, was $54.3 billion. This included $1.4 billion in goodwill and $277 million in intangible assets. Its market capitalization (number of outstanding shares multiplied by stock price), however, amounted to approximately $301 billion. Subtracting the net book value and that of reported intangible assets results in a staggering figure of $248.4 billion. If we agree that this is the value of Microsoft's intellectual capital, then it makes 82.4 percent of the company's total assets.

Carrying out similar calculations on other companies, it is noted that IC makes up around 80 percent of the Standard & Poor's (S&P) 500 companies, with an average market capitalization rate of 6.5.[11] Of course, the 80 percent figure may be higher in high-tech industries or dot-coms where intellectual capital may reach over 90 percent of the corporate value. Think of Amazon, for example. One would think that this percentage would drop when it comes to more traditional or low-tech industries, but the best-performing companies in all industries show similar results. Ford's IC amounted to 83 percent of its total assets based on its market capitalization value of March 31, 2001.

Studying market capitalization rates[12] by reference to industry in 1995, Sveiby found that industries heavily dependent on IC like companies in the pharmaceutical and business services industries are valued at multiples of their book value. In contrast, companies that mainly manage tangible assets like those in traditional manufacturing and real estate industries have market values that are close to their book values.[13] Interestingly, the best-performing companies in any industry still display high market capitalization rates regardless of their industry. Sveiby

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compares two steel companies, Nucor and Bethlehem. He notes that though both companies have nearly the same annual revenue of $1.3 billion, Bethlehem is valued by the market close to its book value. Nucor, however, is valued by the market at around four times its book value. Sveiby attributes this to Nucor's mini mill technology and its "management approach that releases the competence of its employees"[14]—in short, its IC and its ability to effectively manage it.

In an economy where IC forms the majority of an organization's resources and assets, it is essential to develop ways to identify and manage it. According to IC theorists, intellectual capital is made up of three main components: human capital, customer capital, and structural capital. The first represents employee knowledge, competency, and brainpower. Customer capital represents relations with customers, suppliers, and distributors. Structural capital designates the organizational systems, culture, practices, and processes.[15]

Human, customer, and structural capital have always been part of the intangible resources of business. To say that organizations have to allocate more resources for the management of IC now because it makes up 80 percent instead of 20 percent of organizational resources does not adequately explain how that would impact business performance in the knowledge economy. Generally speaking, business performance in any industry is affected by an organization's business processes, the capability of its employees, and its understanding of customers' needs. The knowledge intensity of these three pillars of business performance, however, proliferates in the knowledge economy to such an extent that an organization that neglects managing knowledge and other forms of IC risks dissipating its most valuable business resources and assets. The fact that these resources are intangible raises the question whether they can be managed under the traditional management approaches, which evolved for managing tangible and capital resources. As will be shown later in this chapter, the management of IC requires the development of specific competencies. But first, let's look at how business processes, employee roles, and customer needs have been transformed by the knowledge economy.

THE KNOWLEDGE ECONOMY—THE MAIN CULPRIT

The knowledge economy has transformed business processes by elevating the role of innovation as the core production process and the main enabler of business success. As a result, the role of the employee also changed. Employees in the knowledge economy are required to do brainwork most of the time to incorporate knowledge into new applications and innovate new products, processes, and services. To a great extent the knowledge intensity of business processes and the workforce is brought about by an increased demand in the market for knowledge. The customers of the knowledge economy are knowledge thirsty, creating more demand for knowledge-intensive products. Knowledge gets cycled and recycled through the innovation process to make new products, which in turn increase the body of knowledge that gets fed again into the production process as illustrated in Exhibit 1.1.

Business Processes and the Fast Lane of Innovation—Join It or Pull Off the Highway

In the industrial economy, organizations were able to secure a strong competitive position for a greater number of years. Once a competitive position was secured, organizations then created and maximized value through a process of optimization (or economizing). Organizations that performed well were those that optimized their production process by shortening the time of production, improving the quality of the end product, and reducing the number of employees

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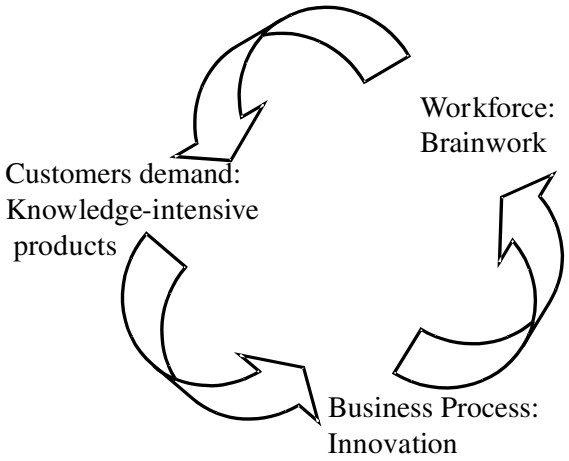

EXHIBIT 1.1 The Cycle of Knowledge, Innovation, and Production

assigned to any single task. Value creation then was dependent more on an organization's industrial capability and capital budgeting—its tangible and financial assets.

In the knowledge economy this is not the case anymore. For one thing, to maintain a competitive position, regardless of its strength, for a long period of time is not possible with the short life cycles of knowledge and the high rate of innovation. Though optimization, as a process, is equally important in the knowledge economy, it alone cannot create or maximize value. The only way to create value in the knowledge economy is by adopting innovation as the core business process. An organization's ability to create value depends on its innovation process, its intellectual resources, and the creativity of its workforce—its intellectual assets.

Innovation has been an important driver since the dawn of humanity, but now it is the main driver of business performance. The knowledge economy is all about the speed with which markets and business embrace and create change.[16] It is about the creation and production of new knowledge and new applications of old knowledge to deal with short—or much shorter compared to that under the industrial economy—product life cycles. Knowledge and intellectual resources are not only the raw materials for production, but once developed into defined methods become the main process of production as well (hence the innovation process).

A new computer game, for example, has the same tangible material used in older products. The tangible material is abundant and is not critical to the product. The most important and valuable raw material that goes into the production of the computer game, however, is intangible. Artwork, graphics, ideas, and the technology are what makes it all happen and distinguish one game from another.

The extensive use of intangibles as raw resources is not limited to the high-tech, chemical, and consumer products industries. Organizations in traditional industries found it hard to succeed without a strong commitment to innovation as well. Organizations in traditional industries are continually pushed into this fast lane of innovation. While new technological applications have presented them with new challenges, they have also opened a world of opportunities.

In one of the most traditional industries, oil, British Petroleum was able to use technological advances to innovate its drilling activities. As a result, the company invented the *smart drill,* which in turn reduced the company's production costs and enabled it to produce new products that emit fewer pollutants into the atmosphere.

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In the steel industry, organizations that innovate are able to excel, while others just struggle to survive. Faced with the danger of extinction, Norton Steel innovated the way it makes and sells steel. The company survived tough economic times by incorporating its customers' input into the composition of the steel it produces. Coming from its customers, knowledge, like iron, became a raw material and, like steel, became a product.

With intellectual resources forming the majority of the required raw materials for production, the knowledge economy has created a demand for new ideas that can be processed through innovation into new products and services. But machines do not produce ideas. Even artificial intelligence computer engineers have not been able to create a computer that can think like a human brain. Until they succeed, if ever, the human mind is the primary machine that organizations need to generate new knowledge and innovation.

Employees—The Knowledge Processors

New industries have emerged and some have been transformed by the knowledge economy, but the whole workforce has undergone a metamorphosis as well. The majority of the workforce in most industries in developed economies is comprised of knowledge workers—workers who apply their brainpower and skills to process information into applicable knowledge to make new products. The knowledge economy gives real meaning to the business motto "Our people are our most valuable assets." Because the generation of new knowledge and innovation creates value, organizations need employees who can process the vast body of information available into applicable knowledge. And employees need to be enabled, or to use a term more in vogue, *empowered,* to activate their ideas and creativity.

This is in sharp contrast to the profile of the ideal worker of the industrial economy. The ideal worker then was one who operated machines in the most efficient way on a production line. That is not to say brainpower was unimportant in the industrial economy, which created some of the greatest inventions. Brain work, however, was limited to those who worked primarily in R&D laboratories, engineering, or marketing departments. Not only was brain work limited within an organization to certain departments and sometimes to certain employees in that department, but also the demand for innovation was much lower.

Having a limited number of brain workers will not work in an economy where you need 3,000 ideas to get one commercially successful product,[17] and where you have to plan for the maturing of your products shortly after launching them. The organization needs the contribution of every mind it has access to, in order to meet the high demand for new ideas, or it will run out of raw resources. The ideal worker now is one who innovates, brainstorms ideas, shares knowledge, thinks, contemplates, and experiments. It is not enough to limit the innovative activity to the R&D department any more. A good idea from the marketing department or administrative staff may save the organization a substantial amount of time and money, which will be detailed later on in Chapter 7. A vital component in employee job descriptions now includes terminology for the creation, application, transfer, and commercialization of knowledge.

In the industrial economy, salaries and wages were considered a production cost and knowledge and training were provided only on a need basis. This is strikingly different from what business now demands from its workforce, and in turn what the knowledge worker expects from the workplace. Salaries and wages are now seen, at least by some, to be more of an investment in one of the most important intellectual resources of the enterprise. As such, learning, continuous training, and development becomes an essential tool in building strategic competencies.

Whether in the industrial or the knowledge economy, people are people. In the former, management concerned itself with machines more than with people to optimize production.

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Machines that could be operated easily were the main tools of production. Though machines are still very important in the knowledge economy, the main tool of production now is the human mind, a "machine" that operates under a chaotic set of rules, if any. Generally speaking, operating even the most complicated of machines is possible. They come with instructions; human minds don't. How do you make minds work or stop? How do you maintain and improve them?

As if that was not enough complexity for business managers in the knowledge economy to deal with, minds do not come alone. Minds come with hearts and aspirations, and offer another challenge for management: how to motivate knowledge workers to innovate? How to manage the social aspects of knowledge creation while maintaining efficiency? All this means that not only are the raw materials intellectual, but also the production process is dependent on intellectual processes. In the knowledge economy, the demand for the new and sophisticated is very high. This is because both consumers and customers have also been transformed by the knowledge economy.

The Knowledge-Thirsty Customers

Customers now more than ever want what is new and innovative. The increase in technological awareness of customers created more needs for businesses to satisfy. More than ever, customers need to be connected, informed, entertained, and provided with "emotional" value.

There are numerous examples of ordinary products and goods that have been transformed to meet technological needs. In the auto industry, for example, manufacturers also realized they needed to deliver more in emotional value to consumers. Many automobile manufacturers have made substantial investments in making their cars more interesting to the buyer. Customers want a car that is "cooler," like the new Volkswagen Beetle with its bright colors and bud vase or one that has seats that can be removed for a quiet day in the wilderness.

Customers and consumers also want to have an input in the development of new products and services. Given the value of such input, many organizations adapted to receive and accommodate it. Consumers asked: Can this mobile phone show me e-mail messages? Can I activate my home alarm from a distance? Can you prescribe this medicine for my condition? Although customer input was valuable in the industrial economy, in the knowledge economy customers look at knowledge as a commodity where the more they can get the better.

These differences between industrial and knowledge economies in the nature of the raw materials, the need for speedy innovation, the sophistication of customers and consumers, and the transformation of the role of the workforce have affected business management in the knowledge economy in many respects. But the real question is: Do these differences require the development of a new business management approach?

DOES A NEW ECONOMY REQUIRE A NEW BUSINESS MANAGEMENT APPROACH?

Are the new features of the knowledge economy sufficient for us to claim that there is a "new" economy that is subject to "new" rules, and which requires different business management approaches and procedures? Many have argued that the knowledge economy is subject to new rules.

According to Brian Arthur of the Santa Fe Institute, it is an economy of increasing rather than diminishing returns. Once a product is adopted as the market standard, the cost of reproduction and production of new versions becomes minimal while the profits multiply.[18] Is that a phenomenon that is limited to the high-tech industry, and thus may be an accurate description of

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the wealth of companies like Microsoft, IBM, Apple, and Netscape but not companies in other industries?

Granstrand argues that it is not, and that in the knowledge economy a new form of capitalism emerged—*intellectual capitalism.* When intellectual resources are increasingly the source of economic wealth, they become the main driver of the knowledge economy, while the tangible and financial resources become of a lesser importance for success.[19] Whether or not we agree with Granstrand that the knowledge economy is subject to a new form of capitalism, it is evident that there has been a change, at least in the way that the most successful organizations now describe and envision themselves.

DuPont describes its work as "delivering the miracle of science," while Dow Chemical sees its mission as "driving value from our intellectual assets." Ford advertises, "We have a passion for better ideas," while General Motors professes, "Technology is a significant enabler for us to meet our vision." And British Petroleum proclaims, "Our business is about discovery." How is it that organizations now see themselves differently?

Regardless of the view taken and the degree of importance attributed to the role of IC for competitive performance, it is undeniable that business now is subjected to disruptive and turbulent waves brought about by an innovation- and knowledge-intensive economy. It is an economy that is different because the production processes are different, the customers are different, and the workers are different. All these differences require a business management approach that accommodates the peculiar nature of IC and differentiates between its various forms.

In fact, business management in the knowledge economy has undergone a number of substantial changes reflected in how organizations now structure themselves and reorganize their business. These changes are not based on a specific methodology or a theoretical framework, but to a great extent stem from organizations' need to better manage their IC. That being said, there is one common thread that permeates all these changes—namely, that they are all based on and driven by the dynamics of intellectual capital (IC-enabled dynamics). Following is an outline of these dynamics and how they influenced organizational design, management and leadership styles, and business strategy and growth.

IC-ENABLED DYNAMICS AND TRANSFORMATION OF BUSINESS MANAGEMENT: THE MANAGEMENT OF MINDS

> The single greatest challenge facing managers in the developed countries of the world is to raise the productivity of knowledge and service workers. The challenge, which will dominate the management agenda for the next several decades, will ultimately determine the competitive performance of companies.
>
> —Peter Drucker[20]

In the industrial economy, machines—being nonhuman—were both predictable and easily operable. That all changed with the knowledge economy, in which the main machine or tool of production is the human mind. Business leaders in the new economy will no doubt agree that it is difficult, maybe even impossible, to manage minds. Perhaps managers should not even try because any attempt to control a mind may stifle its creativity, an essential enabler of innovation. Left to its own rhythm, a mind may produce nothing more than whimsical ideas much like a walk with Alice in Wonderland, never to come back again. While that may be good for some industries that offer the magic of Wonderland as their main product line, or what Disney calls "the magic of Disney," other industries need to have a systematic way to manage or attempt to manage these mind machines.

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Another potential problem is control. In order to control something, you need to own or possess it. But when it comes to minds, an organization can never do that, because minds are possessed by human beings, or knowledge workers. Even with the best of intentions, one might wonder how much of his or her mind a knowledge worker can control. How to motivate and guide the thought processes of knowledge workers has been the subject of many disciplines: philosophy, psychology, epistemology, and anthropology, to name a few. So how can the business leader in this economy manage these "machines" to ensure productivity?

Organizations in the industrial economy were designed to maximize value extraction from an organization's industrial capability. Organizational boundaries were well defined and the chain of command and authority was clear. Innovation and research were functions of R&D or the new product development department, where a clear research agenda was identified. Workers in this department had it as their job to innovate. Others had different work to do: to market, to legalize, to sell, to lead, and so on. Top management was the source of ideas that revitalized business and made it succeed and grow, while the workers primarily performed the tasks assigned to them or written in their job descriptions.

Great ideas in the industrial economy were initiated and implemented by business leaders, and legacies were created. Henry Ford, for example, conceptualized the $5.00 a day wage and an economical automobile his workers could afford. Sears & Roebuck extended services to U.S. farmers in remote areas and established the company as the provider of *well*-priced quality goods. Legendary leaders with new good ideas, and workers following in his or her steps is no longer the ideal model. For one thing, one idea is not enough. Ideas are contagious in this age, and competition quickly adopts an idea unless it is novel and patented. The demand for new ideas supplied by one or even a whole R&D department is now uneconomical and insufficient.

More raw ideas and innovative resources are required. Once new ideas are supplied, more minds are required to sift and process them into new products, processes, and services. It has been claimed that it takes 3,000 good ideas to have four research or product development projects, and only one of these four will be commercially successful.[21] If this is true, then that means the more new ideas generated the higher the probability of market success. If innovation is initiated at the top of the organization, then not only will the number of ideas be meager but the value of these ideas will be doubtful as well. This is because those at the top are not necessarily the ones in constant contact with customers, and thus possess the knowledge about market trends and customer needs.

To grow, organizations need a structure that allows for the creation of new knowledge and generation of ideas from the frontlines. Innovation needs to be a bottom-up–driven activity that travels through as few layers as possible. This also requires fewer horizontal boundaries between departments, divisions, and business units so that the organization can benefit from the mix of expertise and richness of knowledge that each brings from his or her own perspective. This can hardly be achieved through a command line management style. Other styles need to be developed to accommodate IC-enabled dynamics as well.

Take for example Asea Brown Baveri[22] (ABB), the U.K. giant of 60 businesses, 6000 profit centers in 1300 operating companies, and $30 billion annual revenue. ABB's success can be attributed to a great extent to its management style, symbolized by the 30-30-30-10 rule, which ABB's leadership applies to existing and acquired businesses. The rule provides that 30 percent of employees are kept at top management, 30 percent at middle management, 30 percent on the frontline management and 10 percent are laid off. The point is to push down as many managers as possible and thus to push decision making further down where actual contact with the market, and hence innovation, occurs. At ABB, "frontline managers are now entrepreneurs driving a bottom-up process; middle managers are coaches, leveragers, and developers of the organization; and top managers are institution builders and creators of the organization's values and purpose."[23]

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In the industrial economy the majority of management resources and expertise are focused on managing the production line and ensuring that assigned tasks are performed as efficiently as possible. Management style was linear at best and less complicated, as displayed in Exhibit 1.2. The core of business management under this system is capital budgeting, in which the emphasis is on cost reduction and efficiency. Under this system, measurement of performance is mainly quantitative, where a break in the production line and its effect on the final output is ascertainable. Units of cost, time, and sales are thus effective metrics to measure the success of a certain project and inform future investment decisions.

In the knowledge economy, the production flow is strikingly different. Business management is no longer focused on managing predictable, controllable production lines but must pay attention to rather complex human and knowledge systems and relations. What business needs to manage is the process of knowledge creation and innovation as well as the resultant intellectual products or products of the human mind. At best, this creates an environment of organized chaos, in which the role of management is transformed from a supervisory to an inspirational role. The core of business management under this system is knowledge accumulation to enable innovation, production, and business growth. Under this system, the metrics are performance measures, many of which are qualitative. This creates the need for management to consult a set of measures and outcomes that are not as predictable or controllable.

Overall, the variables that management needs to consider in order to leverage organizational IC have changed. More importantly, the profiles of the good manager and the good leader have also changed. Management genius and excellence now are demonstrated by those who know how to motivate and inspire knowledge workers so that more ideas are produced. Leadership success is possible only when the leader creates a culture of trust wherein workers at all levels and in various departments share their knowledge—sideways, top-down, and bottom-up.

Managers and leaders need to have a nose for good ideas and a gut-feeling indicator that detects good projects. Again, determining what is a good idea depends on the manager's experience, hunch, or previous training—in short, tacit knowledge. The more the leadership and managerial role changed the more the organizational structure and communication patterns changed to allow for collaboration sideways, vertically, and between individuals. This gave rise in some organizations to new top managerial positions: for example, the chief knowledge officer (CKO), and VP of intellectual capital management (VP of ICM),[24] who are particularly focused on development and management of knowledge and IC.

The creation of such new positions, though necessary for the development and advance of ICM in the whole organization, are not enough to enable an organization to extract the maximum

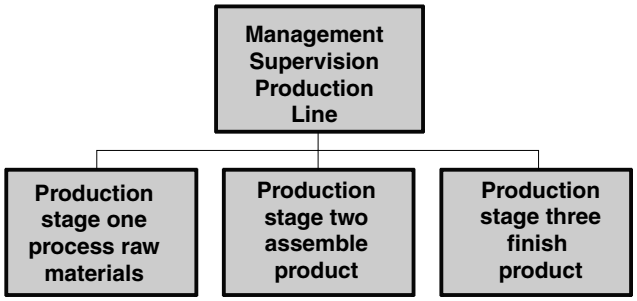

EXHIBIT 1.2 Production Flow: Linear

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value of its IC. The whole organization needs to adapt to the IC-enabled dynamics, which transformed the organizational design of the most successful knowledge organizations.

IC-ENABLED DYNAMICS AND TRANSFORMATION OF ORGANIZATIONAL DESIGN

The Democratic Organization—Fewer Layers and More Ambassadors

> On the Eve of 2000, the structure of most industries looks very different than it did fifteen years ago.
>
> —Science Technology and Economic Policy Board[25]

With the growing demand for new ideas, an organization needs the ideas of employees everywhere in the organization, not only in the R&D department. The increased importance of communication for the transfer of knowledge made it essential for organizations to implement an IT infrastructure that provides means and channels of communication if the motivation is there. To compete effectively, most organizations implemented an infrastructure to facilitate the collection and processing of knowledge and ideas for their incorporation in new forms.

Idea banks, intranets, networking, and brainstorming sessions became part of the modus operandi of businesses in most industries today. It is the infrastructure brought about by the knowledge economy. Those organizations that did not have such an infrastructure were pushed to change. Xerox, for example, after discovering how its technical reps solved more problems by merely sharing their stories with each other in the coffee room, provided them with radiophones to share their ideas about the problems while in the field.

But IT is only one part of the transformation that the knowledge organization needs to go through. IT can, in the right culture, facilitate knowledge transfer between various departments (i.e., sideways). However, more structural reform is necessary if knowledge is to be shared upward and downward as well. As a result, organizations found the need to delayer to reduce the number of layers that information, knowledge, and decisions have to traverse.

Dow Chemical delayered 9 layers and reduced its layers to 5 from 14, and thus created a more flattened structure. A flattened structure is more effective for the transfer and sharing of knowledge across geographical, departmental, and hierarchal boundaries. ABB, for example, has only four layers.

A very interesting structure is one that Harley Davidson Inc. adopted to reinvent itself. Harley Davidson changed its pyramid hierarchical structure to three circles called “the Create Demand Circle, the Produce Products Circle, and the Support Circle.” The three circles overlap and intersect, representing the integration among the marketing, sales, manufacturing and engineering, and administrative and support functions at the various intersections. In addition, there is a fourth circle where the three circles intersect that consists of seven executives—the CEO and managers elected by their peers from the three circles.[26]

Organizations started to flatten their structures, promote boundaryless flow, and provide the tools to enable real-time communication. However, any structure, no matter how flexible, will become rigid with time. A flexible structure alone is not enough. The continuous movement of personnel and the formation and dissolution of communities of practice are necessary to keep the structure alive and act against stagnation. In addition, knowledge sharing should be tied to employees’ jobs or practice to prevent employees from perceiving knowledge sharing as a senseless social activity or, worse, a waste of time.

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Savvy organizations have addressed the problem of stagnating structures by developing communities of practice (CoPs) and communities of interest (CoIs).[27] CoPs are groups of people coming together to share and learn from one another in a specified area of practice (or interest for CoIs) tied to a strategic objective. CoP membership spans vertical, horizontal, and geographic boundaries and sometimes includes external parties (from outside the organization). CoPs range from being formal to informal, temporary to permanent but, most importantly, fuel the organic evolution of groups regardless of the fixed structure, and irrespective of how flexible it is.

The second problem precluding knowledge sharing stems from the social and human nature of knowledge sharing and transfer. Employees need an environment of trust in order to feel comfortable in sharing their knowledge, and they need to see its value in getting the job done. Raising awareness about the value of IC for organizational success, and changing the organizational culture to make it acceptable to socialize, are only one part of the solution.

This is why many organizations included knowledge sharing in job descriptions and tied it to their compensation and reward systems.[28] More importantly, some organizations created new positions at middle and frontline management levels to raise employee awareness and implement programs that enable effective management of intellectual capital. As a result, many organizations incorporated in their job designs intellectual capital "ambassadors" (Skandia), knowledge managers and engineers (the Navy), and intellectual asset managers (Dow).

These ambassadors may be organized in teams like Dow's Intellectual Asset Management Teams, in a separate business unit like DuPont's Intellectual Asset Management Business, an independent company like BellSouth Intellectual Property Management Co., or as individuals like Skandia's Navigator Ambassadors. Some organizations, like the U.S. Navy, went as far as developing new career paths for knowledge management.[29]

Regardless of the way they are organized, these ambassadors are entrusted with facilitating knowledge transfer in the whole organization and finding ways to develop and leverage the organization's IC. Or, as DuPont puts it in the mission statement of its intellectual asset management business, "to get paid for what we know as well as what we make." They are ambassadors because they work beyond business and departmental boundaries and focus on the good of the whole enterprise, advocating ICM at all levels.

The intellectual capital concept[30] has changed not only the way organizations are evolving internally and in relation to their employees but also in the way organizations grow and compete. Increasingly in the knowledge economy, IC-enabled dynamics shape business growth strategies.

IC-ENABLED DYNAMICS AND TRANSFORMATION OF BUSINESS GROWTH STRATEGIES

Business growth in the knowledge economy has been characterized by exponential growth in the service sector/industry; proliferation in the rate of mergers, acquisitions, and strategic alliances; and the rise of the start-up business model. Examination of each of these characteristics, and the growth strategies of the knowledge economy, will show how they are driven by and based on IC-enabled dynamics.

Diversify into the Business of Service: The High-Growth Sector

In 1999, the service sector generated three-quarters of the U.S. gross domestic product (GDP) and employed 80 percent or more of the workforce.[31] The situation is not much different in other developed economies. Organizations, regardless of the industry they are in, have found it necessary to

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diversify into providing services and solutions, along with manufactured goods. Whether supplying computers, cars, apparel, or kitchen appliances, the organization will not be able to retain customers for long unless it also provides service. Service can be provided as an ancillary product to the main product lines, or it can be the basis of an independent business for providing solutions to a certain segment of customers. Once organizations master manufacturing and other technical processes, they can grow by offering their expertise in the form of professional/technical service. Employing this strategy has proven to create high growth rates for many mature lines of business.

It seems to be the only survival/growth[32] strategy for mature lines of business and for traditional industries. Diversification into provision of services, such as customer services, finance, maintenance, training, and consulting, have offered the most profitable growth area for conglomerates and those in mature businesses or industries. This is because knowledge, as a commodity, never really matures. Its continuous change and development through circulation internally and externally makes it both a limitless resource and a renewable product.

General Electric (GE) adopted this strategy early on, and has demonstrated how service provision can offer the highest return to an organization. It was so successful that GE continues to acquire service companies to solidify its market position. In 2000, GE Capital announced that it would acquire Franchise Finance Company for $2.2 billion and merge it with its commercial equipment financing business to become the nation's biggest commercial lending operation. GE's finance leasing business has grown to encompass 90 equipment types, ranging from airplanes to much smaller equipment and machines.

Another example is Boeing.[33] In 2000, Boeing suffered from a plateauing of its profits and growth. The company adopted GE's strategy of diversifying into the service sector, by creating and providing a variety of services to its customers. Boeing started with providing maintenance and repair services for the airplanes it sold to its airline customers. Then, Boeing provided a service of training pilots on the use of the planes it made. With the need for increased security, Boeing now offers security training for pilots to cope with hijacking attempts. With stagnation in the aircraft industry and the pressure from its main competitor, Airbus, diversification into the service industry offered Boeing the best survival and growth strategy.

Even in businesses that are not as mature and where new processes or products are developed on a continuous basis, provision of service is a proven revenue generator. An example from the chemical industry is Dow Chemical (Dow). Dow Contract Manufacturing Services (CMS), a business formed in 1995, offers solutions and advice to manufacturing customers on process development and optimization. CMS is not a totally new business, as it has been providing custom manufacturing solutions for more than 20 years for Dow subsidiaries. Now these solutions are offered to companies outside Dow. After having excelled in a certain manufacturing process, CMS offers its know-how and expertise to customers. In an interview with then Director of Business Excellence, David Near, Mr. Near explained that "this business offers manufacturers state-of-the-art processes as well as technical assistance and advice on which processes are more suitable for the client's needs, market, size, and strategy. Dow still maintains its competitive advantage by developing advanced and improved processes at the same time for its own use."[34]

For Dow and other organizations employing this strategy, the interest lies not only in the financial revenue stream but the intellectual revenue as well.[35] Intellectual revenue is realized by directly or indirectly receiving input from customers on how to improve existing, or develop new, products.[36] Thus, the need to grow through service provision is not merely to implement a successful business strategy but to tap into customers' (suppliers, consumers, and distributors) IC. This provides businesses with a source of competitive advantage that should not be overlooked.

The need to connect with customers as an enhancer and supporter of an organization's IC is better portrayed in the high-tech industry. Even in the high-tech industry with its fierce price wars

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and quick pace of innovation, service is a source of both growth and stability. Technologically sophisticated customers of the knowledge economy will display higher loyalty rates to an organization if they are served and more involved in the development of the product. This brings us to the second IC-enabled business growth strategy.

Growth Through Mergers, Acquisitions, and Strategic Alliances: To Merge or Not to Merge

The sustenance and development of IC is closely related to the creation and maintenance of competitive advantage in the knowledge economy. The speed with which an organization would need to develop its IC to respond to market changes and challenges has increased in most industries. This led many organizations to consider mergers and strategic alliances to fortify the base of their intellectual capital and resources.

At no time has business witnessed such an upsurge in the number and value of mergers and acquisitions like the past decade. In 2000, in the United States alone there were around 7,739 deals worth about $1.2 trillion. Though over half of these deals were in the telecom and technology sector, other sectors and industries accounted for a disproportionate number of deals.[37] Indeed, this phenomenon is global with acquisitions crossing borders for better companies and better deals. A study by KPMG International has shown that the United States ranked second following Germany, which came first in foreign business acquisitions of $209 billion. As a cross-border buyer, the United States ranked third, spending $95 billion after the United Kingdom's $254 billion and France's $113 billion.[38]

The reason for this trend is that sometimes to secure the IC necessary for the desired or projected rate of growth, the level of your internal development and maximization of IC may be too slow or uncertain. To cope with this problem, companies get IC from the market or partner with another organization to share it. Mergers and acquisitions have always provided a route for growth, but in the new economy we have seen phenomenal proliferation in mergers and acquisitions—so much so that it has been called *merger mania.* The main driver of these mergers is the need to grow the IC base and maintain its depth and breadth.[39]

This explains why the most vibrant merger activity has been reported in the high-tech industries where the pace of change and the complexity of the technology sometimes drive organizations to merge or perish. Take the pharmaceutical industry, for example, which worked with 40 proteins as the basis for new drugs for decades. After the discovery of the human genome, suddenly a virtually unlimited reservoir of material for innovation, some 200 proteins, was made available. The raw materials of innovation are abundant, limitless, and, primarily, yet to be explored. That in and of itself may be a persuasive reason not to merge. However, organizations have discovered that their intellectual capabilities were not sufficient to tackle the wealth of new knowledge.

New knowledge is in many ways still virgin and requires a very strong IC to be processed before it can be the basis of any useful invention. Thus, pharmaceutical companies found themselves in great need of trained human minds, or human capital, and proven ways of extracting and processing knowledge. The only sound business decision was to merge one or more of their businesses with that of their competitors.

The most recent merger, and maybe the largest in the pharmaceutical industry, was that of Pfizer and Warner-Lambert. Pfizer paid $90 billion in February 2000 to acquire Warner-Lambert Company. Pfizer CFO David Shedlarz said at the time, "Certainly, the impact on intellectual capital and knowledge is one of the critical things we are trying to achieve." He declared the goal of the merger was to "create a new competitive standard in developing a breadth and depth of research

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capability."[40] Wall Street saw a winner in the marriage of the two pharmaceutical giants. Combined, they will grow faster (24 percent annually) than either could alone (20 percent annually).[41]

Similarly, in the computer industry, major companies are constantly on the lookout for small companies with solid IC to acquire. The AOL acquisition of iAmaze and Quack.com in October 2000 upgraded AOL's site graphic and audio capability. What AOL, Pfizer, Hewlett-Packard (HP), and other major players are buying with their mergers and acquisitions is brainpower.

There is another strategic reason for such acquisitions. Acquisitions allow an organization to maintain market leadership and create more entry barriers to competition. This type of growth strategy should be exercised with discretion as not to subject the organization to anti-trust allegations as in the case of Microsoft. Microsoft's obsession with buying every smaller company that has promising IC brought its practices under judicial scrutiny.

The rate and complexity of mergers and acquisitions sometimes makes it difficult to know who owns what and when. Take the AOL–Time Warner merger with possibilities of having AT&T becoming a party in the deal. In July 2000, there were major discussions between AT&T and AOL Time Warner to merge their number 1 and number 2 performing cable television companies. AT&T declared its intention to spin off its cable company first, then merge it with Time Warner Cable. What makes the alliance landscape between these two companies more complicated is that AT&T owns 25.5 percent of Time Warner Entertainment as well.

While it seems intuitive that this is only happening in the high-tech industries where new knowledge and inventions have made organizations doubt the efficacy of their intellectual capability to face new challenges and the resultant change, that is not true. Mergers are widespread even in traditional industries in which the combined intellectual capability is of equal strategic importance. For example, Devon Energy Corporation set out to buy the Canadian natural gas producer Anderson Exploration Ltd. in September 2001 for $3.4 billion, to become the largest independent producer of oil and gas in North America. Three weeks earlier it announced its acquisition of Mitchel Energy & Development for $3.1 billion.

Even when organizations do not want to get on the merger and acquisition radar screens, they are entering into more strategic alliances than ever, sometimes even with their own competitors, to help each other survive. The two competitors Visa International and MasterCard International found they had to collaborate to develop an Internet technology for making secure credit card payments. While the deal resulted in cost savings for both companies, the main driver was to combine their IC to provide a solution to a problem that threatened the market share of both.

It is the IC-enabled dynamic of networking and interaction that is changing the way organizations are behaving. Consequently, both the volume of strategic alliances and their frequency have multiplied in the knowledge economy. At no time was the competitive landscape as tangled as it is now. Determining who competes with whom and where requires a lot of research to uncover.

Because IC is what drives mergers, the alliance between the acquirer and acquired IC is what makes or breaks a merger. Intellectual capital misfits have been reported to be the primary reason behind failed mergers where major financial losses have been sustained. In the example of MedPartners Inc. and PhyCor Inc., two physician practice management companies spoiled their $6.25 billion merger as a result of IC misfits. The two companies found that they not only could not integrate their computer systems but that their respective approaches to business were different in a number of key areas. In short, their business philosophy and cultures were different to the point of defying the streamlining required for a merger despite the great potential in cost reduction as a result of the merger.

The need to have the right IC, including business approach, culture, and people, promoted the start-up business model as one of the main models in the knowledge economy. That development is also one brought about by IC-enabled dynamics.

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Growth and the Start-Up Business Model: The Idea Incubators

Start-ups have operated in the knowledge economy as technology or idea incubators, wherein a technology is tested and developed by a highly motivated, culturally aligned, and dedicated group of people. The trend has been to clone a start-up company somewhere in a garage until the technology has developed to a stage where it can be commercialized and marketed. Once that happens, the start-up company can be offered publicly or becomes an interesting target for big, established companies looking for more IC to solidify their position.

There is no doubt that the rise in the number of high-tech start-ups is a phenomenon enabled by the IC dynamics of a group of entrepreneurs. The promise of such IC and what it can deliver have resulted in the rise of venture capital funds to a staggering $5 billion in 1999.[42] Despite the slowdown in funding Internet or dot-com companies, the funding of biotech, software, and computer chip companies continues at an increasing rate.

But why start-ups? Is it because of the old-time proposition that smaller companies are more innovative? Real-life situations have proven the contrary. The most innovative companies nowadays are of the giant size, like 3M, IBM, Dow, DuPont, and Microsoft to name a few. What is it, then, in the structure of start-ups that makes them more attractive to innovators who prefer not to join one of the major companies instead? Is it that kindred innovative spirits prefer to choose whom to work with and to keep control over their project development? But most research labs in companies and universities provide considerable autonomy to their innovators. What then is so special about the start-up business model?

The answer may be in the fact that start-up businesses are less controlled by bureaucratic structures. Even an innovative company like IBM professes to be highly bureaucratic. David Snowden, the U.K. Director of IBM's Institute of Knowledge Management, explained how the United States and other governments like to work with IBM "because it makes them feel non-bureaucratic" in comparison.[43] It is interesting that this bureaucracy stops at the research lab doors. Researchers at IBM are known to have a lot of time to play as well as work on assigned projects. When a group of IBM researchers wanted to see the effect of laser beams on a human wounded finger, their curiosity then led them to wonder about the effect of laser beams on dead cows' eyes. From this creative play, the application of lasers to eye surgery was discovered.

So start-ups are less bureaucratic, and innovation thrives in a liberal environment. But that's not all. Start-ups have a very loose and flat organizational structure. Idealab, like most start-ups, has a physical layout that reflects its organizational structure. Idealab employees work in an open space—a 50,000-square-foot, one-level building with very few walls. The office of Bill Gross, the CEO, is in the center with concentric circles around it; the innermost circles represent early-phase start-ups. There is an egalitarian environment, with people actively interacting with each other. As businesses grow, those that reach a size of around 70 employees are spun off and moved to another building.[44]

Above all, the start-up business model has relaxed financial objectives—at least at the start-up and preliminary phases—thus freeing intellectual and management resources to focus on innovation goals. The vision and mission statements of such companies are not like the ordinary "we want to be the best" or "the leader in the market" statements. Instead, they have a shared, sometimes undeclared, vision/mission of "changing how people do things," and of "introducing new disruptive technologies." It is that vision—the culture it creates, the loose structure, the dedication and teamwork it inspires, and the innovation that results—that makes the start-up business model a success (or sometimes a failure). This is because breakthrough innovation is both a high-return and high-risk business.

Major organizations (companies and universities) adopt the start-up business model either internally or externally to capitalize on the innovativeness of their people. 3M's[45] model is an example

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of an internal application in which managers and technical employees are allowed 20 percent of their time and financial resources to experiment with new ideas. If successful, the same manager is allowed to establish, and possibly run, an independent business and have equity shares in it.

Other organizations adopted the model externally by creating venture capital units or companies with the goal of investing in noncore technologies developed by their own employees.[46] Xerox and Lucent Technologies each formed venture capital companies, to finance start-ups coming out of research done at Xerox's Palo Alto Research Center (PARC) and Bell Labs, respectively. Both Xerox and Lucent learned the hard way that to develop core technologies alone is to drive out innovation and profit. Xerox lost its PC prototype to Steve Jobs of Apple Computer. Lucent drove a key researcher with his transistor technology out of the company. The researcher and his technology later formed the basis of Intel. Now both companies' venture capital funds spin out dozens of start-ups annually, some very successful.

This also explains why companies always spin parts of their business as separately traded entities wherein a "child" has developed a distinct IC warranting its independence from the "parent." Companies are spinning off both business divisions and independent companies. Kodak spun off Eastman Chemical, which originally was a business division of Kodak producing film developing chemicals. Getting better and better at it what it does, Eastman Chemical was spun off and expanded the offering of its products to customers other than Kodak.

The preceding section shows how business growth strategies have been triggered and affected by the need to acquire greater brainpower (or other types of IC), incubate, or spin off new forms of knowledge in a certain area. This not only affected growth strategies, but it transformed the art and science of strategic business management as a whole, by inducing the business community to recognize IC as the primary source of competitive advantage. This brings us closer to the thesis of this book—ICM is not a mere business practice or process, but an approach based on the core precepts of strategic management, with particular emphasis on the needs of organizations in the knowledge economy. The next section explains how, and proposes that to effectively compete in the knowledge economy organizations need to develop at least one ICM competency.

THE REQUIRED COMPETENCIES IN THE KNOWLEDGE ECONOMY: TOWARD STRATEGIC INTELLECTUAL CAPITAL MANAGEMENT

To generate new knowledge and apply it in new ways, or simply to innovate, is the main competence an organization needs in the knowledge economy to create and sustain a competitive advantage. To create and sustain a competitive advantage that is unique to your organization is the quest of strategic management. The SWOT (strengths, weaknesses, opportunities, and threats) analysis, developed by Ken Andrew of Harvard Business School in the mid-1960s, is the essence of strategic planning. Considering the organization's strengths and weaknesses, top management can strategize how to lead the organization to exploit opportunities and deal with threats. The SWOT analysis has been dominated until very recently[47] by Michael Porter's five forces model. Porter explains that five factors determine the threats and opportunities faced by an industry. These factors include the bargaining power of customers, the bargaining power of suppliers, the threat of new entrants, the threat of substitute products, and, finally, the nature and strength of rivalry in a particular industry. According to Porter, there are three generic strategies for competitive positioning[48]: cost leadership (offering a lower-cost product), differentiation of products (unique features commanding a price premium), or market focus (specializing in a certain product market segment).[49]

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In contrast to the five forces theory, the resource-based approach directs the organization's attention inward and applies the SWOT analysis to its capabilities. This approach asserts that organizations have unique resources, capabilities, and endowments, including intellectual and other capabilities; reputation; and relations that stem from the history and culture of each organization. Those resources, capabilities, and endowments that have a strategic importance and cannot be imitated or replicated by the competition are the source of competitive advantage. Based on this view the generic strategy is to identify your organization's unique strategic resources and decide in which markets and analogous markets these resources can be effectively capitalized.[50] According to this theory, financial and physical assets do not provide an organization with a competitive advantage.

In the knowledge economy the resource-based view of the organization gave birth to the knowledge-based view where these resources, capabilities, and endowments are knowledge intensive. Strategic management under this approach entails the identification of unique intellectual and knowledge resources and capabilities and utilizing them in target and analogous markets. The main point is that a competitive advantage comes from within the organization and is not one that is created by balancing some external market or industry forces. It follows that strategic management involves organizational soul-searching as well as understanding the market.

The main goal of course is to create and sustain a competitive advantage that is hard for competitors to imitate and eventually creating strong entry barriers in the way of competition. This explains why the value of intellectual property is appreciated more in the knowledge economy. First, it is well grounded in the organization, being the product of its collective brainpower, internal practices and routines, and business philosophy. As such, its uniqueness is not limited to the legal rights accorded by the patent, trademark, or copyright, but rather the technology, the brand, or the creativity that underlies each of these respective properties. Thus, the intellectual property is only the tip of the iceberg. The source of the competitive advantage is not IP per se, but the knowledge, brainpower, practices, and systems that give birth to them.

Of course, for some industries—generally service industries—IP is not the most effective generator of entry barriers to the competition. Even when it comes to R&D- or patent-intensive industries, it is not the quasi-monopoly afforded by IP that enables the achievement of a competitive advantage. To a great extent, that depends on other capabilities like time to market and creating new uses for the technology in related markets. The aggregate of these capabilities, including the ability to acquire IP, is what forms an organization's unique mix of IC and hence the basis of its competitive advantage—one that cannot be imitated by the competition.

One intellectual asset, however, does not offer a competitive advantage, but rather the unique combination of such assets. Increasingly, organizations, regardless of industry and strategy, gain a competitive advantage by having one or more of the following: a strong brand that commands customer loyalty and a price premium,[51] a demonstrated research capability with new products in the pipeline, strong IP rights that create high entry barriers for competition and huge licensing revenue,[52] or a reputation for having and keeping creative and innovative people.[53]

How to manage IC to achieve a competitive advantage is the mission of strategic management in the knowledge economy. The main question is: What are the core competencies that an organization should develop to effectively manage IC for maximum value? Therefore, the dynamics of competitive performance in the knowledge economy are IC enabled. An organization's ability to compete is now dependent on how well top management identifies, manages, and leverages the organization's IC. In particular, it depends on one or more of the following competencies:

- Speed with which the organization can acquire and apply knowledge (knowledge management)

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- Ability to anticipate change in the market and respond to it (innovation management)
- Ability and speed to protect and leverage intellectual capital (IPM)
- Ability to assess the organization's values and culture, and to adopt the culture that supports and fosters effective knowledge, innovation, and IP creation and management
- Ability to coordinate, oversee, and synchronize organization-wide practices and programs related to all of the above through strategic alignment (CICM).

Part Two will outline the requirements for establishing a system for the management of knowledge, innovation, and IP, under the comprehensive intellectual capital management (CICM) model I developed. But before getting into the CICM model, the competencies required for managing IC effectively are explained.

Knowledge Management—Increasing Your Organizational IQ

Knowledge management is the first competency that an organization needs to develop for the management of IC. Knowledge management constitutes the ability of an organization to learn, to remember what it learned, and to leverage what it learned internally and externally—internally by transferring it to different workers and departments, and externally by sharing it with suppliers, distributors, partners, and customers. In short, it enables an organization to leverage its knowledge to improve its overall performance. Knowledge management's critical importance lies in building the platform of knowledge on which innovation and other core business processes are launched and fortified. A weak knowledge management system or infrastructure would result in the waste of the knowledge resources of the organization, affecting the efficiency of its operations and processes and the leveraging of its employees' brainpower.

British Petroleum (BP) leadership, a pioneer in knowledge management, transformed the entire organization to a "big brain," boosting its overall performance extensively by implementing a progressive knowledge management program. In 1990, BP was suffering from the plummeting of its stock price after having grown in both size and operations. Downsizing and cost cutting in many operations, as well as top management promotion of knowledge sharing, did not help. It was not until 1995, when John Brown was appointed as CEO, that knowledge management was taken to another level, both on the strategic and operational planes, becoming a way of doing business at BP.[54]

Summarizing its knowledge management strategy, BP professed that collaboration between employees to transform personal into organizational knowledge is what makes "the bigger brain that is BP." BP innovated and implemented a number of programs on the operational level designed to make knowledge sharing the job of every employee and division, realizing great profits. Estimated profits from BP's knowledge management skyrocketed to $800 million to date.[55] In one instance, BP showed a saving of $50 million just by transferring best practices on how to drill new sites. Knowledge management in BP moved from being a mere program or philosophy to a core competence that translated into a formidable competitive advantage.

But to manage knowledge alone is not enough. No organization can win by brains alone. What is also needed is a system that manages the output of brains to transform it into new products and services. This brings us to the second competency required for ICM—the systemization of innovation as the core business process of the organization.

Innovation Management—Systematize Your Collective Thinking

To innovate is to apply knowledge to new situations, producing new solutions, services, processes, and products. Innovation is about change—responding to and creating change. It is about evolution and revolution, evolving into higher and newer planes, and leaping onto another

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wave of technology. Innovative organizations are futuristic, daring, and pioneers of social change. To be innovative, it is not enough for organizations to respond to changing market forces or trends as they appear. They must be able to predict, foresee, or even create change. No organization can see the future; no organization should try, but it should at least monitor possible sources of change in technology and in the market constantly. To do that, it is important that the organization emancipates the innovative ability of its employees to boost its collective innovative power. Knowledge management is certainly a powerful enabler, but the organization needs to systemize the innovative activity as the core business process as well.

Innovation management is a key core competency in an economy where cycles of change are more recurrent. As a core competency, it involves the ability to embrace and create change, take risks, accept failure as part of the experimentation process, and get from product concept to market in the shortest time. All these capabilities should translate into a new product development process that capitalizes on a pool of employee-, and customer-, generated ideas. Organizations need to listen to their employees, who are in constant contact with the market and customers. The speed with which organizations capture, leverage, and implement new ideas of their employees may be of critical importance in the knowledge economy where ideas are contagious.

Consider the experience of Encyclopedia Britannica. Britannica continued producing their leather-bound encyclopedia volumes after the market was ready to purchase the same data in another medium—compact discs. Microsoft seized the opportunity and produced their own encyclopedic CDs, Encarta, for less than a tenth of the price. The market, preferring the fractional price and the added convenience of digital, searchable encyclopedic CDs, forced Britannica into bankruptcy. As a matter of fact, Britannica saw this coming. Britannica included a CD with its last leather-bound volumes, but the organization's resistance to change caused it to cling to the old way of doing things instead of embracing change and moving forward. No matter what Britannica's reasons were, it is evident that the organization's system of innovation failed to prepare it for change. Being innovative involves having the system to transform ideas into marketable products as much as having the right ideas to start with.

Losing a chance to capitalize on employees' ideas may result not only in an economic loss but also in loss of an opportunity that may take years, if ever, to come again. The Silicon Valley legend of Xerox and Steve Jobs, demonstrates this in a striking manner.

The legend goes like this: Steve Jobs, the CEO of Apple at the time, on a visit to Xerox's Palo Alto Research Center (PARC) sees a prototype of the mouse and the PC preface. He borrowed these ideas and established the PC world as we know it today, making billions for Apple and securing other business opportunities for years after that. Of course, Jobs and Apple did so much more than borrow Xerox's ideas to launch us into the PC world. For one thing, the prototype Steve Jobs saw at PARC was a very early and expensive version of what we know today as the mouse. However, it all started with an idea and a prototype that Xerox failed to develop and it was up to the next entrepreneur to seize the moment—exactly like the Britannica example, though Xerox legend has more to it.

Xerox did not fail to innovate or convert its employees' ideas into product concepts and prototypes. Xerox, however, failed to acquire the adequate IP protection to secure exclusive commercialization rights. Had Xerox obtained the right patent(s) on their prototype, Steve Jobs's borrowing would have cost Apple dearly. Apple would then have to design around such patents, which would have raised Apple's development costs and, most importantly, deprived Apple of the market leadership position. Intellectual property rights are critical when used as competitive and commercial tools. An organization that operates in patent-intensive (R&D), trademark-intensive (consumer products and service), and copyright-intensive (entertainment) industries needs to develop IP management as well as a core competency. To that we now turn.

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Intellectual Property Management—Protect or Lose

To protect ideas, expressions, and other intellectual capital, organizations have to manage their IP, because until protected, ideas and expressions are the property of no one. The speed and comprehensibility with which an organization moves to protect a good idea sometimes can be critical. This is true now more than ever with the Internet's super highway enabling ideas to travel at high speeds.

With competitive intelligence and monitoring of market trends, the same idea may be developed almost simultaneously by two or more organizations. The only organization that can maximize its capitalization of the idea is the one that has adequately protected it. But not all ideas can be protected by patents, as many will not satisfy the stringent patent requirements. Still, a trademark or other form of IP can protect most ideas. That is where IP management helps an organization decide on the suitable protection to set up legal traps around its competitive territory.

Developing IP management as a core competency involves much more than securing the right legal protection. It involves adopting the suitable IP strategy for competitive positioning, and exploitation of the IP rights in integrated markets. IBM is a company that developed IP management as a core competency. IBM first adopted a very aggressive patenting strategy, where inventions are patented regardless of whether they fall in a core technological area or not. To enable this strategy, IBM made licensing of noncore as well as core technologies its business. Patenting widely, IBM innovated a system of licensing in which reverse engineering is used to detect infringements of its patents and subsequently seeking licensees. In a decade, IBM raised its licensing revenue from $90 million to $1.5 billion.

Organizational Culture—The Main Enabler

The previously mentioned competencies cannot be developed without the support of the right organizational culture. Many surveys and reports[56] have shown how the best knowledge, innovation, and IP management programs fail because of an adverse organizational culture. Organizational culture is the set of shared unspoken values that stem from the organizational philosophy and history, and affect its behavioral patterns. It implicitly defines and affects the way business is done and the attitude of management and other employees. It was discovered that whenever an organization's culture is contrary to the values presented by a new initiative or program, the latter fails, sometimes even before it is fully launched.

For example, a culture that is permeated by top management's apathy toward employees' new ideas defeats all attempts to push innovation down in the organization, despite the best efforts of top management to communicate that they had a change of heart. No matter how many speeches top management gives to communicate their change of heart, entrenched organizational culture infuses a contrary message that defeats the initiative. If that culture conveys the message that to come up with new ideas is to be "a troublemaker," then no attempt by top management to champion this behavior will work unless clear steps are taken to change the culture. The impact of culture is so strong because it is rooted in an organization's "subconscious."[57]

Culture is like the physical body's defense system, which is activated whenever a foreign object enters the body. The body fires out its fiercest antibodies to destroy the object, with some bodies being more sensitive than others. This is done without any control from the conscious mind. The same can be said of organizational behavior. Prior to introducing any change that is contrary to the existing culture, management needs to assess the existing and desirable cultures. In Chapter 10, ways in which management can assess and change its organizational culture are explored, among other changes that an organization has to undertake before embarking on implementing an ICM program.

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Being deeply entrenched in the organization, a positive culture and philosophy is a core competency that can hardly be replicated by the competition. Culture also enables the development of knowledge, innovation, and IP management as core competencies. Every organization needs to develop culture as a core competency, but the same is not true for the other mentioned competencies. The reason is that each of these competencies predominantly relates to the management of a particular form of IC (knowledge resources, innovation processes, or IP), which is not necessarily the main driver of value in a particular industry. For example, the crucial importance of managing patents for technologically intensive industries, or managing brands for consumer products companies, is not matched in the service industry where knowledge management is king.

That being said, each organization will still need to develop all of the ICM stages (for the management of knowledge, innovation and IP) to leverage its IC to the maximum. The ability to determine the level to which each of the stages should be developed, and the coordination between the stages, is an organizational competency in its own right.

Comprehensive Management of Intellectual Capital—Orchestrate Your Music

Despite the fact that an organization's industry, strategy and stage of development are what shape the form and features of its ICM program, each organization still needs to have a comprehensive IC strategy. By comprehensive I mean a model for the management of IC over the business cycle of value creation as explained in Chapter 4. The need of every organization for such a comprehensive model, regardless of its situational requirements, stems from the strategic questions that top management have to deal with in the knowledge economy, in order to create a competitive advantage. In a knowledge- and innovation-intensive economy, or, as I call it, one driven by IC-enabled economic dynamics, the art of strategic management involves the following questions:

- What do we know and need to know? How are we going to acquire the knowledge resources needed to attain the desired competitive/strategic position? Do we develop such resources internally through knowledge sharing and transfer or externally through acquisition and partnerships? (Questions that pertain to the realm of knowledge management)
- How are we going to utilize our brainpower to create our competitive advantage? By incremental or radical innovation? (Questions that pertain to the realm of innovation management)
- How are we going to use our IC muscle to compete in existing and new markets? (Question that pertain to the realm of IPM)
- And, finally, what is the IC strategy that will enable us to sustain our competitive advantage? (Questions that pertain to the ICM model)

The IC strategy should aim at creating a balance between the need of establishing a comprehensive model to manage IC while at the same time customizing it to the organization's situational requirements. The challenge in managing IC is that if top management does not understand the nature and value of IC, how to create, extract, and maximize such value, then they would not fully appreciate whether they have the resources necessary to make a success of a new strategy. One of the main problems when it comes to managing IC is that ICM models lack a clear methodical basis, and hence provide only partial solutions. This is in part due to the fact that to date ICM models have been developed "by practitioners without an academic theoretical basis."[58]

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This book presents a comprehensive model for the management of IC called the CICM model. While the model does not venture into an academic search for a new strategic management theory, it presents a methodical basis for making sense of all the approaches that have emerged under the banner of ICM. The model is designed to be customized through three dimensions: intellectual value drivers of a particular industry, organizational culture, and business strategy. An understanding of the type and nature of IC that drives value creation and maximization in a specific industry is essential to effective customization of CICM. An important dimension to consider is the organizational culture and management style dynamics. No model of ICM can be implemented without thorough and careful attention to the organizational context. In addition, the CICM model incorporates a diagnostic tool that enables organizations to assess and prioritize their short- and long-term needs for the various stages of ICM. The model will be presented in Part Three. Before we get to the CICM model, it is necessary to lay a foundation for it by examining the modest amount of literature on IC.

NOTES

[1] *Intellectual capital* is used as a generic term to denote all intellectual resources (e.g., knowledge and information databases), assets (e.g., processes), and properties (e.g., patents and trademarks) that an organization owns, controls, or has access to.

[2] See, for example, Sproule & Sullivan, "Case History: Integrated IP Management," *Les Nouvelles,* June 1999, p. 70. The article reveals the problems resulting from implementing two separate programs for knowledge and intellectual property management.

[3] The term *organization* will be used throughout the book to refer to corporations, publicly traded companies, government agencies, and nonprofit organizations.

[4] Pfeffer and Sutton report that only one out of five TQM initiatives succeed, while 70 percent of reengineering efforts fail. See J. Pfeffer & R. Sutton, *The Knowing Doing Gap* (Boston: Harvard Business School Press, 1999), p. 2.

[5] Master of Intellectual Property is the only graduate degree offered in the United States and the world to nonlawyers. The degree was first offered in 1983 by Franklin Pierce Law Center as part of its graduate program. Today, the program attracts over 100 students nationally and internationally, including government officials and business executives in addition to lawyers and law students.

[6] See L. Edvinsson and M. Malone, *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower* (New York: Harper Business, 1997), p. 146. The authors give credit for the creation of this model to Hubert St. Onge, Charles Armstrong, Gordon Petrash, and Leif Eduinsson.

[7] In some definitions of *intellectual capital,* intellectual property is included mainly as part of the structural capital since it is owned by the organization. Other writers, however, either do not mention intellectual property or limit it to being a legal instrument. The meaning of the term *intellectual capital* and how it emerged and evolved is covered in Chapter 2.

[8] The divergence between market and book values could be explained to some extent by the fact that some of the depreciated assets on the books may still be appreciated by the market. Sveiby demonstrates in his article [K. E. Sveiby, "Measuring Intangibles and Intellectual Capital," in Morey, Maybury, and Rhuraisingham (eds.), *Knowledge Management: Classic and Contempo-*

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rary Works (Cambridge: MIT Press, 2000), pp. 337–354] that publicly traded companies since the 1920s had market capitalization values higher than their book values. The difference is that market capitalization amounted only to 187 percent of the book value then, and it was not until the late 1980s/early 1990s that this rate jumped to over 500 percent of the book value.

[9] In an increasing number of cases the price paid for the acquired company exceeds many times the book value of the acquired company. To balance the books the difference is reported under "goodwill" in the books of the acquiring companies. Goodwill reflects the value of some of the acquired company's intellectual capital. Internally developed intellectual assets, however, cannot be reported in the books under the current accounting system. This will be discussed further in Chapter 3.

[10] Some writers use the terms *intangible resources* and *intellectual capital* as synonymous. I differentiate between the two since, though all intellectual capital is intangible, not all intangible resources can be used to drive value in every industry. Thus, the term *intellectual capital* refers to such intangible resources that drive value in a particular industry or organization.

[11] See, for example, ITWorld.com article at *www.itworld.com/Man/2698/CIO010315lev/.*

[12] Book to market value ratio.

[13] K. E. Sveiby, *The New Organizational Wealth: Managing and Measuring Intangible Resources* (San Francisco: Berrett-Koehler Publishers, 1997), pp. 6–7.

[14] *Id.*

[15] Supra note 6.

[16] Take the Internet, for example. In around five years it transformed consumer expectations and the way business is done, and created new markets—maybe even a new industry.

[17] This figure is reported in a recent study using data from venture capitalists and the patent literature mentioned in P. Norling, "Structuring and Managing R&D Work Processes: Why Bother?", *CHEMTECH,* October 1997, p. 1. Other studies mentioned in Chapter 6, however, mention that it takes four to six new product development projects to have a commercial success. The divergence may be explained by reference to raw ideas (the first figure) as opposed to product concepts (the second figure).

[18] Brian Arthur, "New Economics for a Knowledge Economy." In Ruggles & Holtshouse (editors), *The Knowledge Advantage* (U.K., Oxford: Capstone, 1999), pp. 195–212.

[19] Ove Granstrand, *The Economics and Management of Intellectual Property* (Northhampton, MA: Edward Elgar, 1999), pp. 10–12.

[20] P. Drucker, "New Productivity Challenge," *Harvard Business Review,* November–December 1991.

[21] Supra note 17.

[22] A group of Swedish, Swiss, Finnish, and U.S. companies that have been integrated into a global leader in the electro-technical field.

[23] Christopher Bartlett, "The Knowledge Based Organization". In Ruggles & Holtshouse (editors), *The Knowledge Advantage* (Oxford, U.K., Capstone 1999), p. 116. Also see p 110–117 for a detailed description of the ABB model.

[24] The first such positions created were those of intellectual capital director at Skandia in early 1990s and that of organizational learning director at the Imperial Bank of Canada.

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[25] Board on Science, Technology and Economic Policy (STEP), "Securing America's Industrial Strength," *STEP,* 1999, p. 2.

[26] Gina Imperato, "Harley Shifts Gears," *Fast Company,* June–July 1997.

[27] One very good example of the use of CoPs is provided by Siemens. A multinational with around 500,000 employees worldwide in 190 countries, Siemens uses CoPs to overcome the bureaucracy and rigidity entailed by its size and vast operations, and to mine its rich human capital. More about CoPs and CoIs and the companies that use them will be explained in Chapter 5 on knowledge management.

[28] An example here is PricewaterhouseCoopers, which ties promotion of its managers to their knowledge sharing activities. Indeed, this is common in other consulting businesses as well where sharing of knowledge is essential for the organization to remain competitive.

[29] More about this in Chapter 6.

[30] In this book, I use this term to denote the new role that intellectual capital plays in the knowledge economy as the core generator of organizational competitive advantage.

[31] Supra note 27.

[32] I call it survival/growth strategy because without growth an organization will eventually die or be relatively dormant.

[33] Credit for comments on Boeing goes to a research project by a group of my students: Susan Lesmerises, Mathew Borick, and Bryan Erickson, Fall 2001.

[34] Interview with David Near, the then Director of Business Excellence, May 2001.

[35] Originally an idea developed by Karl Erik Sveiby, a pioneer IC theorist. Sveiby explains how intangible (as he prefers to call them) revenues that a business gains from its customers are very valuable for its growth (discussed in Chapter 2).

[36] Throughout the book, the word *products* is used to denote services, processes, solutions, and manufactured goods.

[37] See *www.mergerstat.com* and *www.webmergers.com.*

[38] KPMG International Report, 2000, available at *www.mergerstat.com.*

[39] The "depth" of the IC base relates to the specialized knowledge and expertise in core areas, while "breadth" relates to new knowledge across a number of core and noncore areas.

[40] Mintz, S. L., "What's a Merger Worth," *CFO Magazine* (April 1, 2000).

[41] *Id.*

[42] "Innovation in Industry," U.S. Patent Law, February 20, 1999, p. 13.

[43] Comment made in presentation by David Snowden at the Intellectual Capital Congress, McMaster University, Canada, January 17, 2002.

[44] See A. Hargadon and R. Sutton, "Building An Innovation Factory," 78 *Harvard Business Review* 157, 2000, p. 162.

[45] One of the leading global companies with over 60,000 products, $15 billion in annual sales, and operating in 60 countries, 3M is known for its high innovativeness with more than 30 percent of its products being introduced in the last four years. Since 1948, 3M leadership has believed that only through empowering their employees can they be an innovative company.

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[46] This will be discussed further in Chapter 8.

[47] For a review of the development in strategic management theories, concepts, and applications, see M. Porter, *Competitive Strategy* (Boston, MA: Free Press, 1980), and R. Rumelt, D. Schendel, & D. Teece, *Fundamental Issues in Strategy* (Cambridge: Harvard University Press, 1994).

[48] These will be explored further in Chapter 7.

[49] M. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: The Free Press, 1985), pp. 11–26.

[50] D. Teece, G. Pisano, and A. Sheun, "Dynamic Capabilities and Strategic Management." In M. Zack (editor), *Knowledge and Strategy* (Stoneham, MA: Butterworth-Heinemann, 1999), p. 77.

[51] For example, Coca-Cola Company, whose trademark is valued at $47 billion in 1997. The value of the trademark stems from consumers' loyalty to the brand.

[52] For example, IBM multiplied its patent licensing revenue from $90 million in 1990 to around $1.5 billion in 2001.

[53] For example, 3M and Microsoft.

[54] Supra note 4, pp. 217–222.

[55] Douglas Weidner, Knowledge Management Workshop, KM Conference, April 22, 2002.

[56] See, for example, a survey done by Ernst & Young in Rudy Ruggles, "The State of the Notion: Knowledge Management in Practice," *California Management Review* 40, Summer 1998, p. 83.

[57] It is not new that organizations are referred to in psychological terms. Many theories look at organizations as living entities that not only grow and evolve but also have a personality. See, for example, Bennet, A., "Managing Change in a Knowledge Environment," (unpublished) in which the author mentions the id and the ego of organizations. Also interesting is W. Bridges, *The Character of Organizations: Using Personality Types in Organization Development* (Palo Alto, CA: Davies Black Publishing, 2000), in which the author applies Jungian archetypes of personality to organizations.

[58] See J. Roos, G. Roos, L. Edvinsson, and N. Dragonetti, *Intellectual Capital: Navigating in the New Business Landscape* (New York: New York University Press, 1998), p. 24. Also see K. E. Sveiby, "Measuring Intangibles and Intellectual Capital." In Morey, Maybury, and Rhuraisingham (editors), *Knowledge Management: Classic and Contemporary Works* (Cambridge: MIT Press, 2000), pp. 337–338.

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