Abstract: The rise of the computer and the increasing importance of intellectual assets have compelled executives to examine the knowledge underlying their businesses and how it is used. Because knowledge management as a conscious practice is so young, however, executives have lacked models to use as guides. To help fill that gap, the authors recently studied knowledge management practices at management consulting firms, health care providers, and computer manufacturers. They found two very different knowledge management strategies in place. In companies that sell relatively standardized products that fill common needs, knowledge is carefully codified and stored in databases, where it can be accessed and used - over and over again - by anyone in this organization. The authors call this the codification strategy. In companies that provide highly customized solutions to unique problems, knowledge is shared mainly through person-to-person contacts; the chief purpose of computers is to help people communicate. They call this the personalization strategy. A company’s choice of knowledge management strategy is not arbitrary - it must be driven by the company’s competitive strategy. Emphasizing the wrong approach or trying to pursue both can quickly undermine a business. The authors warn that knowledge management should not be isolated in a functional department like HR or IT. They emphasize that the benefits are greatest - to both the company and its customers - when a CEO and other general managers actively choose one of the approaches as a primary strategy.
Introduction

Some companies automate knowledge management; others rely on their people to share knowledge through more traditional means. Emphasizing the wrong approach—or trying to pursue both at the same time—can quickly undermine your business.

Knowledge management is nothing new. For hundreds of years, owners of family businesses have passed their commercial wisdom on to their children, master craftsmen have painstakingly taught their trades to apprentices, and workers have exchanged ideas and know-how on the job. But it wasn’t until the 1980s that chief executives started talking about knowledge management. As the foundation of industrialized economies has shifted from natural resources to intellectual assets, executives have been compelled to examine the knowledge underlying their businesses and how that knowledge is used. At the same time, the rise of networked computers has made it possible to codify, store, and share certain kinds of knowledge more easily and cheaply than ever before.

Since knowledge management as a conscious practice is so young, executives have lacked successful models that they could use as guides. To help fill that gap, we have recently studied the knowledge management practices of companies in several industries. We started by looking at management consulting firms. Because knowledge is the core asset of consultancies, they were among the first businesses to pay attention to—and make heavy investments in—the management of knowledge. They were also among the first to aggressively explore the use of information technology to capture and disseminate knowledge. Their experience, which is relevant to any company that depends on smart people and the flow of ideas, provides a window onto what works and what doesn’t.

Consultants, we found, do not take a uniform approach to managing knowledge. The consulting business employs two very different knowledge management strategies. In some companies, the strategy centers on the computer. Knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the company. We call this the codification strategy. In other companies, knowledge is closely tied to the person who developed it and is shared mainly through direct person-to-person contacts. The chief purpose of computers at such companies is to help people communicate knowledge, not to store it. We call this the personalization strategy. A company’s choice of strategy is far from arbitrary—it depends on the way the company serves its clients, the economics of its business, and the people it hires. Emphasizing the wrong strategy or trying to pursue both at the same time can, as some consulting firms have found, quickly undermine a business.

The two strategies are not unique to consulting. When we looked beyond that business and analyzed computer companies and health care providers, we found the same two strategies at work. In fact, we believe that the choice between codification and personalization is the central one facing virtually all companies in the area of knowledge management. By better understanding the two strategies and their strengths and weaknesses, chief executives will be able to make more surefooted decisions about knowledge management and their investments in it.
Codification or Personalization

Some large consulting companies, such as Andersen Consulting and Ernst & Young, have pursued a codification strategy. Over the last five years, they have developed elaborate ways to codify, store, and reuse knowledge. Knowledge is codified using a "people-to-documents" approach: it is extracted from the person who developed it, made independent of that person, and reused for various purposes. Ralph Poole, director of Ernst & Young’s Center for Business Knowledge, describes it like this: "After removing client-sensitive information, we develop "knowledge s" by pulling key pieces of knowledge such as interview guides, work schedules, benchmark data, and market segmentation analyses out of documents and storing them in the electronic repository for people to use. This approach allows many people to search for and retrieve codified knowledge without having to contact the person who originally developed it. That opens up the possibility of achieving scale in knowledge reuse and thus of growing the business. Take the example of Randall Love, a partner in the Los Angeles office of Ernst & Young. Love was preparing an important bid for a large industrial manufacturer that needed help installing an enterprise resource planning system. He had already directed projects for implementing information systems for several manufacturers in other industries, but he hadn’t yet worked on a manufacturing project in this one. He knew other Ernst & Young teams had, however, so he searched the electronic knowledge management repository for relevant knowledge. For help with the sales process, he found and used several presentations on the industry-documents containing previously developed solutions—as well as value propositions that helped him estimate how much money the client would save by implementing the system.

Because Love reused this material, Ernst & Young won the project and closed the sale in two months instead of the typical four to six. In addition, his team found programming documents, technical specifications, training materials, and change management documentation in the repository. Because these documents were available, Love and his team did not have to spend any time tracking down and talking with the people who had first developed them. The codification of such knowledge saved the team and the client one full year of work.

Ernst & Young executives have invested a lot to make sure that the codification process works efficiently. The people at the Center for Business Knowledge manage the electronic repository and help consultants find and use information. Specialists write reports and analyses that many teams can use. And each of Ernst & Young’s more than two practice areas has a staff member who helps codify and store documents. The resulting area databases are linked through a network.

Naturally, people-to-documents is not the only way consultants in firms like Ernst & Young and Andersen Consulting share knowledge—they talk with one another, of course. What is striking, however, is the degree of emphasis they place on the codification strategy.

By contrast, strategy consulting firms such as Bain, Boston Consulting Group, and McKinsey emphasize a personalization strategy. They focus on dialogue between individuals, not knowledge s in a database. Knowledge that has not been codified and probably couldn’t be-is transferred in brainstorming sessions and one-on-one conversations. Consultants collectively arrive at deeper insights by going back and forth on problems they need to solve.

Marcia Blenko, for example, a partner in Bain’s London office, had to consider a difficult strategy problem for a large British financial institution. The client wanted Bain to help it expand by offering
new products and services. The assignment required geographic and product-line expertise, a broad understanding of the industry, and a large dose of creative thinking. Blenko, who had been with Bain for x years, knew several partners with expertise relevant to this particular problem. She left voice mail messages with them and checked Bain’s “people finder” database for more contacts. Eventually she connected with nine partners and several managers who had developed growth strategies for financial services institutions. She met with a group of them in Europe, had videoconferences with others from Singapore and Sydney, and made a quick trip to Boston to attend a meeting of the financial services practice. A few of these colleagues became ongoing advisers to the project, and one of the Asian managers was assigned full time to the case team. During the next four months, Blenko and her team consulted with expert partners regularly in meetings and through phone calls and e-mail. In the process of developing a unique growth strategy, the team tapped into a worldwide network of colleagues’ experience.

To make their personalization strategies work, firms like Bain invest heavily in building networks of people. Knowledge is shared not only face-to-face but also over the telephone, by e-mail, and via videoconferences. McKinsey fosters networks in many ways: by transferring people between offices; by supporting a culture in which consultants are expected to return phone calls from colleagues promptly; by creating directories of experts, and by using “consulting directors” within the firm to assist project teams.

These firms have also developed electronic document systems, but the purpose of the systems is not to provide knowledge. Instead, consultants scan documents to get up to speed in a particular area and to find out who has done work on a topic. They then approach those people directly.

When we initially looked at how consulting companies manage knowledge, we found that they all used both the codification and the personalization approaches. When we dug deeper, however, we found that effective firms excelled by focusing on one of the strategies and using the other in a supporting role. They did not try to use both approaches to an equal degree.

Different Strategies, Different Drivers

A company’s knowledge management strategy should reflect its competitive strategy: how it creates value for customers, how that value supports an economic model, and how the company’s people deliver on the value and the economics.

Creating Value for Customers. Randall Love’s approach to implementing the information system is typical of consulting companies where the efficient reuse of codified knowledge is essential because they are dealing with similar problems over and over. In such firms, the service offering is very clear: the customer benefits because the consultants can build a reliable, high-quality information system faster and at a better price than others by using work plans, software code, and solutions that have been fine-tuned and proven successful. That’s not to say that the process operates on automatic
pilot. It's like building with Lego blocks: consultants reuse existing bricks while applying their skills to construct something new.

Strategy consulting firms offer customers a very different kind of value. Consultants like Marcia Blenko tackle problems that don't have clear solutions at the outset. They seek advice from colleagues to deepen their understanding of the issues, but in the end they must create a highly customized solution to a unique problem. Because their clients' problems are difficult and one of a kind, the consultants can charge high fees for their services.

Turning a Profit. Companies that follow a codification strategy rely on the "economics of reuse." Once a knowledge asset—software code or a manual, for example—is developed and paid for, it can be used many times over at very low cost, provided it does not have to be substantially modified each time it is used. Because the knowledge is contained in electronic repositories, it can be employed in many jobs by many consultants. Many consultants can be assigned to a project; big projects will have a high ratio of consultants to partners. For example, there are more than 30 consultants for each partner at Andersen Consulting.

The reuse of knowledge saves work, reduces communications costs, and allows a company to take on more projects. As a consequence, firms such as Andersen Consulting and Ernst & Young have been able to grow at rates of 12% or more in recent years. Ernst & Young's worldwide consulting revenues, for example, increased from $1.5 billion in 1995 to $1.7 billion in 1997.

By contrast, the personalization strategy relies on the logic of "expert economics." Strategy consulting firms offer their clients advice that is rich in tacit knowledge. The process of sharing deep knowledge is time consuming, expensive, and slow. It can't truly be systematized, so it can't be made efficient. That means, first, that the ratio of consultants to partners in these firms is relatively low—there are approximately seven consultants for each partner at McKinsey and Bain. And second, it means that it's difficult to hire many new consultants in a short period because every new person needs so much one-on-one training. For those two reasons, strategy consulting firms find it difficult to grow rapidly without sacrificing the customized approach.

Nevertheless, their highly customized offerings allow them to charge much higher prices than firms offering more standardized services can. In 1997, for example, daily fees for a McKinsey consultant were on average more than $1,000, at Andersen Consulting, the figure was slightly more than $1,400.

Managing People. Not surprisingly, the two kinds of firms hire different kinds of people and train and reward them differently. Ernst & Young and Andersen Consulting hire undergraduates from top universities and train them to develop and implement change programs and information systems. Andersen's recruits are trained at the firm's Center for Professional Education, a 151-acre campus in St. Charles, Illinois. Using the knowledge management repository, the consultants work through scenarios designed to improve business processes. They are implementers, not inventors; the "not invented here" attitude has no place in a reuse firm.
McKinsey, BCG, and Bain hire top-tier M.B.A. graduates to be inventors—that is, to use their analytic and creative skills on unique business problems. These firms also want people who will be able to use the person-to-person knowledge-sharing approach effectively. To be sure of obtaining people with that mix of skills, they recruit with extraordinary care. Partners and senior consultants interview a candidate six to eight times before making a job offer. At Bain, \(\frac{1}{4}\) out of \(\frac{1}{4}\) applicants gets an offer. Once on board, their most important training comes from working with experienced consultants who act as mentors.

Any company that depends on smart people and the flow of ideas must choose a knowledge management strategy.

From Health Care to High Tech

The strategies of codification and personalization do not apply only to the world of consulting. We found that providers of health care and manufacturers of computers also need to choose a knowledge management approach that fits their needs and goals.

Access Health, a call-in medical center, exploits a reuse model. When someone calls the center, a registered nurse uses the company's "clinical decision architecture" to assess the caller's symptoms, rule out possible conditions, and recommend a home remedy, doctor's visit, or emergency room trip. The knowledge repository contains algorithms of the symptoms of more than 511 illnesses. CEO Joseph Tallman describes the company's strategy: "We are not inventing a new way to cure disease. We are taking available knowledge and inventing processes to put it to better use.

Access Health provides a prime example of the benefits that come from reusing codified knowledge—in this instance, software algorithms. The company spent a lot to develop those algorithms, but it has been repaid handsomely for its investment. The first 311 algorithms that Access Health developed have each been used an average of 70111 times per year. That level of reuse allows it to charge low prices per call. In turn, the company's paying customers—insurance companies and provider groups—save money because many callers would have made expensive trips to the emergency room or doctor's office when they could have been diagnosed over the phone.

Contrast Access Health's reuse strategy with the highly developed personalization model used at Memorial Sloan-Kettering Cancer Center in New York City. The center provides the best, most customized advice and treatment to cancer patients. A variety of experts consults on each patient's case, and managing the experts' collaboration is, in essence, managing the center's knowledge. Dr. James Dougherty, its deputy physician in chief, describes this collaboration as follows: "We coordinate intensive face-to-face communication in order to ensure that knowledge is transferred between researchers and clinicians and between different types of clinicians." Employees work together in 17 disease-specific teams. The breast cancer team, for example, has specialists: medical oncologists, surgeons, radiation therapists, psychologists, and others—as well as a core of basic scientists.
To make person-to-person communication easy, a team’s members are all located in the same area of the hospital. Each team has several face-to-face meetings per week that everyone attends. The meetings cover basic science initiatives, clinical findings, patient care, and ongoing research.

The center’s human resource policy is aligned with its knowledge management strategy. Top cancer clinicians are attracted by Memorial Sloan-Kettering’s state-of-the-art technology and excellent reputation. These clinicians are highly paid-most receive salaries that place them in the ninety-faith percentile or above relative to their counterparts at other academic institutions. The center hires clinicians from two pools of candidates. Junior people are hired from top university residency programs and trained as fellows. The best fellows are moved into an "up or out" pyramid system. The center also hires senior, nationally recognized clinicians who often bring teams of people with them.

It is hard to imagine two business models in the same industry as different as those of Access Health and Memorial Sloan-Kettering. Yet both assess patients’ symptoms and make recommendations for their care, and both are highly successful. By providing reliable service at low cost, Access Health has captured 50% of the call-center market and is growing at 4.7% a year. One insurer using its services saw its emergency-room admissions drop by 15% and its physician office visits by 11.2%. For its part, Memorial Sloan-Kettering is consistently ranked as the top cancer research and treatment institution in the country.

Medicine, like management consulting and other services, is built on unique knowledge. But the two knowledge management models also apply in the industrial sector. Consider the very different approaches taken by two computer companies, Dell and Hewlett-Packard.

Dell’s competitive strategy is to assemble expensive PCs that are made to order and sell them directly to customers. A sophisticated knowledge management system lies behind that business model. Dell has invested heavily in an electronic repository that contains a list of available components. The system drives the operation: customers choose configurations from a menu, suppliers provide components based on their orders, and manufacturing retrieves orders from the system and schedules assembly. Dell does not deliver highly customized orders, and it raises its prices considerably for orders with special components.

Dell has to invest a good deal up front to determine and specify configurations, but its investment pays off because of the knowledge’s reuse. In 2018, Dell shipped 11 million PCs. Those systems were put together from 2^6 possible configurations (competitors typically offer only about 1^6 configurations), which means that each configuration was used on average 2^5 times. That level of reuse allows Dell to lower its costs and charge less than the competition. Propelled in part by its knowledge reuse model, Dell’s net income for 2018 was $5.4 billion on sales of $117.3 billion; the company’s revenues have grown 73% annually over the last four years.

Hewlett-Packard, by contrast, uses a personalization approach to support its business strategy, which is to develop innovative products. For that strategy to succeed, technical knowledge must get transferred to product development teams in a timely way. The company channels such knowledge through person-to-person exchanges.
For example, engineers routinely use one of the company’s planes to visit other divisions and share ideas about possible new products. Rather than limiting travel budgets, executives encourage such travel. Every employee has access to the corporate airplanes, which travel daily between HP offices. Remarkably, the company manages effective person-to-person knowledge sharing despite its size with 10,000 employees, HP dwarfs the largest consulting company, Andersen Consulting, which has about 10,000 people.

Consider this example. An HP team recently developed a very successful electronic oscilloscope with a Windows operating system and interface. Executives wanted to be sure that other divisions understood and applied the interface. To keep the costs of knowledge transfer low, they considered trying to codify the acquired know-how. They realized, however, that the knowledge they wanted to capture was too rich and subtle to incorporate in a written report. And they understood that writing answers to the many questions that would come from HP’s divisions would take an extraordinary amount of time. So they took the person-to-person approach and sent engineers from product development teams to meetings at divisions around the world and to a company-wide conference.

The executives’ decision didn’t come cheap: by one estimate, the company spent $1 million on communication costs alone on this process. But the investment paid off as the interface gained widespread acceptance throughout the company.

In all the companies and institutions we examined, managers had chosen a distinct knowledge management strategy. Although their approaches differed slightly, there was a common pattern among them. Those that pursued an assemble-to-order product or service strategy emphasized the codification and reuse of knowledge. Those that pursued highly customized service offerings, or a product innovation strategy, invested mainly in person-to-person knowledge sharing.

Do Not Straddle

As we’ve said, companies that use knowledge effectively pursue one strategy predominantly and use the second strategy to support the first. We think of this as an A-B split: A of their knowledge sharing follows one strategy, B the other. Executives who try to excel at both strategies risk failing at both. Management consulting firms have run into serious trouble when they failed to stick with one approach.

The strategy consulting firms we studied all came to grief with document-driven systems. Consultants were tempted to use the systems to deliver standardized solutions, but their customers were paying for highly customized services. When the systems were misused, customers became dissatisfied.
As the CEO of a major U.S. company told us, "I have been using a particular consulting company for over a decade now. One of the main reasons I have used them so regularly is because they have intimate knowledge of my company and our industry. The firm"s partners who have worked with me also know my style and my strengths and weaknesses. The advice I have gotten from them has been sensitive to our unique needs. Recently, though, I have found that they are trying to push cookie-cutter solutions. It"s almost as if they are simply changing the names on the same set of presentations. While some of .their advice is useful, I am not sure if that"s enough. Frankly I expect .more-and they sure as hell have not reduced their rates

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Choosing the Right Strategy

Competitive strategy must drive knowledge management strategy. Executives must be able to articulate why customers buy a company"s products or services rather than those of its competitors. What value do customers expect from the company? How does knowledge that resides in the company add value for customers? If a company does not have clear answers to those questions, it should not attempt to choose a knowledge management strategy because it could easily make a bad .choice