

ence) should feel free to criticize more senior colleagues. Inhibitions damage the knowledge gains that result from the process. Thus the climate should focus on giving and receiving feedback rather than evaluation.

It is important that after-action reviews do not become interrogations or investigations. The last thing that promotes openness and candid exchange of lessons learned is a search for someone to blame. People who are preoccupied with defending their decisions and appearing blameless will not contribute to a fruitful analysis of what really went wrong. Only when people feel safe will they volunteer input that may compromise their image.

After-action reviews are an example of a knowledge interaction that goes beyond what the individual can learn alone or in a course. How can you implement the method in your team? Pick a unit of time or performance and institute a periodic review. The review can be of day-to-day tasks at the end of the day, at the end of the week, or at the end of the month. It can follow large projects as well as smaller milestones along the way.

Many claim that reviews should be conducted in groups that include only those people who were involved in the activity itself. It helps the participants feel that they can be totally honest and, more importantly, be committed to the corrective action or corrective action required. Others claim that an outsider, especially if more experienced than the group, is necessary for a better perspective or to make out-of-the-box proposals. In any case, it is important to keep the proper climate in order to minimize status differences and encourage open and honest feedback.

The results of the review should be disseminated to a predetermined target audience in an attractive and user-friendly document. The dissemination of the document constitutes successful lesson learning. The goal of the after-action review is to improve future performance, and this goal is attained if the lessons learned are internalized by those who might repeat the mistakes of their predecessors (or who are supposed to make similar successes). An example of a successful method of dissemination follows.

## Failure of the Month

---

When you conduct after-action reviews, you study what you did and investigate how to do it better next time. One of Rafael's production departments used to publish a "Failure of the Month" newsletter, describing a noteworthy design or production problem and analyzing how to deal with it and/or prevent it. The idea was that if you told everyone about the mistake, they would not repeat it.

*(continued)*

When Tuvya once visited Hughes Spacecraft and Communications in California, he found that they had a similar practice with almost identical goals and dissemination methods. They, however, used a more positive perspective and called it “lessons learned.”

Tuvya told them about Rafael’s method, admitting that perhaps because of the Californian “think positive” style, projecting the more constructive title of “lessons learned” was better. So he mentioned that he would suggest that Rafael change the name of their newsletter. But the Hughes people did not agree. They said: “‘Failure of the Month’ is such a good brand name, do not touch it!”

## Peer Reviews

Peer reviews constitute an important set of interactions of knowledge sharing and creation. The idea is that knowledge workers present their work, including work in progress, and receive feedback and ideas from their peers. We are quite familiar with the concept of design reviews (DR), which was born as a contractual requirement of customers in the technical world of engineering projects. It turns out, however, that organizations from other fields, who may have never heard the term *design review*, also use the concept for the same purpose. We believe that peer reviews should be instituted as an integral part of the life of any knowledge organization, so we describe the process in detail here.

**EXTERNAL DESIGN REVIEWS IN ENGINEERING PROJECTS** Design reviews in engineering projects are performed during predetermined milestones along the life of the project. In each DR, the contractor describes the progress of the project, technical successes and failures, resource utilization, and the plan for the remainder of the project. The customer comments on technical and programming issues and decides whether to continue the program. Design reviews often end up as shows in which the contractor attempts to create a positive impression, since payments often depend on successful progress. In spite of this tendency, DRs often lead to important knowledge gains. A design review entails preparing documentation, reflecting on the progress of the project, sharing knowledge during the presentation, and processing the comments of the customer.

**INTERNAL DESIGN REVIEWS IN ENGINEERING PROJECTS** Many engineering organizations have learned that in order to be successful they must have internal DRs in addition to the contractual DRs. They establish these reviews as formal steps in the design process and have procedures for conducting them. In these DRs, engineers present their work to peers, superiors, and

other experts for a thorough examination. They attend to the recommendations and improve their design accordingly.

Note how these internal DRs are a perfect method for knowledge creation and sharing. The reviewed designers (and designs) benefit from the comments and expertise of the reviewers. The reviewers also gain: They learn about new designs, methods, or problems without working on them directly. Usually, they also gain recognition and prestige as expert reviewers. Internal design reviews are usually official or semiofficial and are supported and even enforced by management. Everybody knows about them, and they attract active participants from outside a small team of designers and reviewers. Employees are motivated to share and accept knowledge with the management's blessing.

The following two examples demonstrate the issue.

### **Peter Himes on the National Semiconductor Review Experience**

---

When Peter Himes became leader of KM initiatives at NSC, he knew that design reviews were already embedded in the technical culture of the organization. But recognizing their importance, he strove to make them even better. Some of his efforts toward improvement were to encourage cross-departmental participation, whereby participants from other departments were either official reviewers or just sit-ins. Thus he achieved two goals:

1. Increasing the effectiveness of the DRs by incorporating multiple perspectives.
2. Enhancing the informal CoPs by involving everyone in the organization interested in the specific subject.<sup>8</sup>

### **Tuvya on the Rafael Review Experience**

---

Tuvya witnessed similar success in establishing semiformal internal DRs in his department at Rafael. Initially, some people were reluctant to expose their work to critical review. But as they realized the value of DRs for improving their designs, they began to initiate them with almost no need for management enforcement.

## Peer Reviews in Other Organizations

Although the term *design review* is taken from the engineering world, almost every profession has a similar mechanism. For example, as a part of the daily routine in hospitals, department heads walk through patient rooms, accompanied by senior and junior residents and medical students; each patient's doctor describes the case and receives comments from the others. Most advertising agencies have in-house practice sessions before making presentations to customers. Many departments in universities also have regular internal seminars in which colleagues present their current research projects and receive critical feedback.

All in all, peer reviews work. The manager's job is to make sure that such a forum for the exchange of information exists in his unit. This is one of the main messages of the CoPs model. Experience shows that this forum should be established and institutionalized into a coherent format with well-known procedures. It also benefits from incorporating interdisciplinary perspectives.

## Methods and Techniques for Effective Interactions

Interactions cannot be managed but they can be facilitated. They can be effectively hosted: The communication environment can be properly designed to enhance deep dialogue—productive conversations for knowledge creation and knowledge sharing. Here we offer some good practices to enhance effective interactions, which you might want to try yourself.

### Facilitation of Meetings

The importance of meetings as the arena for knowledge creation and sharing raises a host of considerations. One of the key questions regards who facilitates the meetings. Many professional knowledge managers and organizational consultants suggest that team meetings should not be conducted by the manager. Patricia Seemann of Hoffmann-La Roche tells us the reasons behind this:<sup>9</sup>

*The managers of a team cannot effectively lead these discussions because they are in power and can be biased. Even though some managers actually want the freedom to speak as "one of the gang," it is difficult for them to remain neutral, and the group does not really expect it. They instead suspect that you are manipulating them.*

Dr. Seemann suggests employing a professional facilitator who is familiar with the subject areas of the team. Being an outsider constitutes,

according to her, an advantage for ensuring a proper environment, particularly when you want everyone's participation.

But realistically, it is not practical to have a facilitator at every meeting. Moreover, managers should be careful that the presence and occasional use of a facilitator for important meetings does not prevent the managers from taking upon themselves certain facilitative roles. Managers have an obligation to be active listeners during ongoing interactions and effective leaders of day-to-day meetings. They should make sure they have the skills to extract knowledge from all of their workers on a continuous basis and actively listen and encourage them.

### The Physical Environment

Another methodological consideration with respect to managing knowledge interactions is the physical space. The physical environment of a workplace is very important for fostering connectivity and positive interactions between people in a community of practice. However, the physical environment is never a stand-alone issue—it is inherently connected to the cultural environment.

Take the familiar debate between open space and personal offices. Although the ultimate decision may be based on parameters outside of the knowledge context, such as price and flexibility, knowledge management considerations favor open spaces, which encourage people to mingle. But an open-space office alone is not enough to facilitate collaboration and openness—you need to promote the appropriate cultural environment. If the mind-set of the workers is that of an open door, then the physical doors of personal offices will not prevent them from meeting each other. And then you get to keep the main advantage of doors—the option to close them.

Another example is the common practice of conducting important meetings, such as brainstorming sessions about the organization's strategy, outside the regular workplace. Experience shows that these discussions benefit from getting the relevant people together somewhere that is isolated from day-to-day interruptions. Skandia—the Swedish financial services company we mentioned in Chapter 2, and a knowledge management pioneer—fine-tuned this concept to create its Future Center, located on one of the islands in the Stockholm Archipelago, where managers conduct “brain stealing” sessions and generate new ideas about the future.

### The Knowledge Café

The knowledge café is a format for meetings especially designed to promote knowledge creation and sharing. It is a method that involves many

people at once in a conversation regarding a particular issue that management chooses to discuss. It can be particularly beneficial when management is making a significant decision and is interested in broad input from various perspectives in the organization.

The concept of a knowledge café has several advantages. First, it improves the quality of decisions by incorporating multiple perspectives. Second, the extensive involvement of people fosters a more widespread commitment to the decisions. Also, it is a relatively short process, from a couple of hours to a half-day session, which has significant added value relative to cost.

**CAFÉ CONVERSATIONS AT A GLANCE** Having designed strategic conversations for many years, Edna originally questioned the wisdom of using the café method. But when she saw David Marsing, VP at Intel, and David Isaacs, a consultant, coordinate a knowledge café in the first “Knowledge in Action” conference she hosted in Israel in 1996, she fell in love with it right away. The following is a step-by-step outline from TheWorldCafe.com, describing what is involved in these café conversations.<sup>10</sup>

- Seat four or five people at small café-style tables or in conversation clusters. Start up progressive (usually three) rounds of conversation of approximately 20 to 30 minutes each.
- Have the cluster of people at each table engage in questions or issues that genuinely matter to the participants’ life, work, or community. Encourage both table hosts and members to write, doodle, and draw key ideas on the tablecloths, or to note key ideas on large index cards or placemats in the center of the group.
- Upon completing the initial round of conversation, ask one person to remain at the table as the host while the others serve as travelers or “ambassadors of meaning.” The travelers carry key ideas, themes, and questions into their new conversations.
- Ask the table host to welcome the new guests and briefly share the main ideas, themes, and questions of the initial conversation. Encourage guests to link and connect ideas coming from their previous table conversations—listening carefully and building on each other’s contributions.
- By providing opportunities for people to move in several rounds of conversation, ideas, questions, and themes begin to link and connect.
- At the end of the second round, all of the tables or conversation clusters in the room will be cross-pollinated with insights from prior conversations.

- In the third round of conversation, people can return to their home (original) tables to synthesize their discoveries, or they may continue traveling to new tables, leaving the same or a new host at the table. Sometimes a new question that helps deepen the exploration is posed for the third round of conversation.
- After several rounds of conversation, initiate a period of sharing discoveries and insights in a whole-group conversation.

It is in these town meeting-style conversations that patterns can be identified, collective knowledge grows, and possibilities for action emerge. Once you know what you want to achieve and the amount of time you have to work with, you can decide on the appropriate number and length of the conversation rounds, the most effective use of questions, and the most interesting ways to connect and cross-pollinate ideas.

Again, Edna thought some of the results of the café strategy would be problematic. She recognized that a small group would be efficient, but asked how the minds and hearts of so many people could be involved so that the quality of the strategy emerging out of the dialogue would be better and more compelling for future implementation.

At the knowledge café workshop, she saw that the café method worked like magic in achieving both of these goals at the same time and in the same place. It was apparent that one could involve as many people as desired: tens, hundreds, and even thousands! Thus it could really become an energetic happening toward changing strategic implementation, and at the same time be a quality conversation in an intimate setting of small tables exploring opportunities for growth and improvement, as well as any other questions that matter, to solve strategic dilemmas.

### **Example: Arkia's Strategic Knowledge Café**

Israeli airline Arkia (previously discussed in Chapter 3) has used the knowledge café format to gather input for their strategic decision-making.

In one such session, about 150 workers participated from all ranks, seniority levels, areas of operation, and levels of education. Arkia decided to go for maximum diversity in order to bring together as many perspectives as possible, so there were senior managers and junior employees, pilots and flight attendants, marketing people, finance people, and maintenance people, all taking part.

*(continued)*

The participants sat in tables of five. In the first round of discussions they raised topics focusing on the future of the company. Each table recorded its discussion on slides, and some presented them in front of everyone.

During the break, the CEO chose the topic of most interest to him from each of the tables' presentations in order to continue the discussion after the break and create a dialogue between the table participants and the CEO.

In this way, the strategic knowledge café can be an effective and efficient method to collect input and raise a consensus of commitment to decisions. Managers attain a perspective that is both broad and intimate within only a few hours. The quality of the decisions rises since the organization simultaneously utilizes the brainpower of many people with different points of view. The commitment of the participants to the decisions also rises, as they feel their input is truly important.

## Making the Most of Information Technology

No chapter on knowledge interactions would be complete without a discussion of the role of information technology (IT). IT enables interactions that transmit tacit knowledge, and as such, it is an important knowledge management tool—namely, it broadens the potential number of internal customers for tacit knowledge by making it systematically and broadly available.

Many organizations have information systems designed to support managerial processes, but they are not widely or comprehensively used. Without an organizational culture that encourages knowledge sharing, the information systems will remain unused. There are several ways to promote use of an information system. As we discussed in Chapter 5, concerning the human focus, you can utilize both hard compensation (bonuses, access to other's knowledge and data, promotion) and soft compensation (membership in a knowledge community, establishing a personal reputation among peers). The important point, though, is that having sophisticated technology is not enough—you need to tackle managerial problems in order to encourage and facilitate extensive utilization of the system by employees.

One way in which IT is used to facilitate knowledge interactions is during virtual conferences between people who are working together from various geographical locations. In light of the current trend to reduce air travel, we anticipate that virtual conferencing will increase. It is particularly advantageous in multinational organizations, when limited time resources

do not allow face-to-face meetings. Moreover, often when meetings are scheduled, there are too many participants to allow the kind of interactions that promote true knowledge sharing and creation, and there is not enough time to ask all of the relevant questions. A virtual conference, however, allows everyone to ask questions and receive full answers. It is simultaneously more intimate and more time- and cost-effective. Participants contribute and communicate when and where it is most convenient for them.

We have already mentioned, in Chapter 3, IBM Innovation Jam™. This may be the top example of using IT to facilitate knowledge creation and innovation between hundreds of thousands of participants. We shall not elaborate on the tools but on the effect as described in the IBM Jam web site<sup>11</sup>:

### IBM Innovation Jam™

Since 2001, IBM has used jams to involve its more than 300,000 employees around the world in far-reaching exploration and problem-solving. ValuesJam in 2003 gave IBM's workforce the opportunity to redefine the core IBM values for the first time in nearly 100 years. During IBM's 2006 Innovation Jam™—the largest IBM online brainstorming session ever held—IBM brought together more than 150,000 people from 104 countries and 67 companies. As a result, 10 new IBM businesses were launched with seed investment totaling \$100 million.

Jams are not restricted to business. Their methods, tools, and technology can also be applied to social issues. In 2005, over three days, the Government of Canada, UN-HABITAT, and IBM hosted Habitat Jam. Tens of thousands of participants—from urban specialists, to government leaders, to residents from cities around the world—discussed issues of urban sustainability. Their ideas shaped the agenda for the UN World Urban Forum, held in June 2006. People from 158 countries registered for the jam and shared their ideas for action to improve the environment, health, safety, and quality of life in the world's burgeoning cities.

Note however that most virtual CoPs are much much smaller. There the effectiveness of a virtual interaction, whether in the context of a conference or a straightforward e-mail correspondence, hinges on the formation of a cultural connection and the trust among those involved. An IT-based community of practice is enhanced by familiarity. The familiarity does not have to be face-to-face (it can be promoted, for example, by a closed virtual

environment, such as a corporate intranet, granting access only to potentially relevant people), but it is familiarity, openness, and trust that will make utilizing information technology successful. Making the most of IT is more often complicated by the cultural and managerial challenges associated with it than by the technological ones.

## Conclusion

Every manager can learn from the examples presented in this chapter and decide what methods of promoting knowledge interactions already exist in his own team. Once these interactions are identified, the next step is to encourage and enhance them. Tuvya underwent exactly this process. He realized at Rafael that they had been promoting knowledge interactions for years, and it was one of the key factors behind its success.

In order to survive, every knowledge organization must have some form of knowledge-sharing meetings. Not having a structured and explicit knowledge management program does not mean that an organization does not offer important knowledge management lessons. It just means that it is not effectively capturing the potential of its interactions. This is why we urge managers to identify the knowledge management practices that are effective in their organization and begin to systematically manage them.

Managing knowledge successfully requires investing in and promoting the appropriate culture and values for encouraging communities of practice. Since communities cannot be forced and sharing tacit knowledge is inherently a voluntary act, the managerial challenge becomes fostering, encouraging, nurturing, and enhancing existing and new interactions within communities. In this way, the manager becomes instrumental in promoting the sharing and creating of knowledge.

While this chapter is on creating knowledge, the next chapter is about capturing existing knowledge, whether for educating new employees or for dissemination throughout the company.

### The Magnificent 7

1. Knowledge is created and shared through the social process of interactions.
2. Tacit knowledge can be shared by mentoring and by making experts available through a company's yellow pages.
3. Information systems have great potential for supporting knowledge management if a supportive environment is created.

4. Every knowledge worker should be encouraged to balance his time between his project assignments and networking with others.
5. Managers should encourage the communities of practice (CoPs) that already exist in the organization and foster opportunities for additional interactions.
6. Managers should encourage various forms of knowledge creating meetings, be it “cake meetings,” design reviews, after-action reviews or others, and coordinate the physical and social aspects of meetings in order to make them effective.
7. Peer reviews (such as internal design reviews), whereby workers present their work and receive feedback from their peers, constitute an important set of interactions of knowledge sharing and knowledge creation.

EBSCOhost®

EBSCOhost®

## Capturing and Reusing Existing Knowledge

In this chapter you will:

- Understand that capturing existing knowledge by codifying and disseminating it is a must for knowledge organizations, especially for promoting new use (which prevents unnecessary innovation).
- Gain tools for efficient capturing processes and for incorporating them into the ongoing activities of an organization.
- Learn how to make the captured knowledge available to all potential knowledge workers, from introducing newcomers to the essential skills to updating the veterans.

### Motivation and Obstacles

Capturing existing knowledge, by codifying and disseminating it, is a must for any knowledge organization. It is essential to document the organization's knowledge so that employees can continuously reuse it, as well as find ways for its new-use. *New use* is a term used to describe strategizing new ways of utilizing an organization's knowledge in new and innovative ways.

Often, when introduced to knowledge management (KM) methods, the first bright idea that managers have is to install some kind of fancy software in order to document all the existing knowledge at their disposal and then try to disseminate it. We will later see that this is usually easily said than done.

In addition to documentation, though, there are many other possible methods intended to facilitate the reuse and new use of knowledge. These include practices such as mentoring programs and apprenticeships, workshops, lectures, and continuing education courses through work or in partnership with schools.

And while there are many methods intended to increase reuse and new use, they all have to overcome a similar problem: The process of codifying and disseminating always requires investing extra resources that are almost always scarce—resources like people, time, money, and attention. For this reason, capturing existing knowledge is often neglected even though it directly affects long-term success. The following lesson illustrates this conflict.

### A Project Manager's Confession

While at Rafael, David was known not only as a bright scientist and a good project manager, but also as a militant spokesman against the company's "blue reports." These were essentially technical reports in which workers summarized designs, analyses, test results, and other similar work processes.

So why would David object to such a classic method of codifying and documenting technical knowledge? Because they had grown into documents used for purposes other than documentation for knowledge management. Over time, instead, Rafael's promotion system became based partially on the quality and quantity of these blue reports. David claimed that too many reports were written for the sole purpose of securing a promotion and that nobody really needed or read them. What's more, people were wasting time and effort to write them at the expense of their actual projects, thus lowering their productivity and profitability.

After leaving his position at Rafael, David shared some of his impressions of the new job he had recently started while meeting with some of his former colleagues at an event outside of work. "It is much more difficult than I expected," he admitted. "Even though I am now a senior executive, I still need to understand the core technologies, but," he complained, "there are no blue reports there to learn from."

As David's confession to his former coworkers illustrates, the extra effort required to capture the knowledge created during work processes does have an added value. Although the individual worker and his projects may pay a small price in terms of time and energy, the organization as a whole benefits a lot from capturing the knowledge in reports like these.

Of course, some of David's objections were not without validity. While this story is about documentation, there are issues managers should consider when deciding on a method of capturing and disseminating knowledge: documentation, creating lectures, and producing processes for the reuse of knowledge, including mentor programs. In general, some questions managers can ask include:

- What are the overall benefits of codifying knowledge?
- What are the particular benefits for users and employees?
- Is the document worth reading? Is the lecture worth attending? Are the mentor programs robust enough to warrant the time and energy expended?
- What are the benefits to the organization and its different units?
- Is any particular method of capturing and disseminating knowledge more efficient than another? Are the methods efficient enough?

Managers also need to weigh things like conflicts that arise when specific units or projects are more burdened than others, or than the company as a whole, in terms of documenting knowledge. They also need to think about the methods of implementation, like whether a different modern IT solution might be more suitable than a classic reporting style, and so on.

Overall, what is needed is an efficient method of capturing knowledge, an effective way to make this knowledge available to all potential users, and a fair way to share the expense (in both time and money). In this chapter, we supply examples of the various techniques for installing proper documentation and dissemination processes in an organization.

## Documenting Knowledge Efficiently

---

Documenting and codifying existing knowledge is usually a prerequisite for capturing the knowledge for future sharing and new use or reuse. In addition, it is often a must, required for manufacturing the end product or by regulatory agencies. However, as previously demonstrated by David's example, it should be done in an efficient way with as little interference with ongoing work as possible. This section describes some methods to respond to this challenge.

### Example: The Pharmaceutical Industry

Documents are a large part of the work process at pharmaceutical companies, particularly while developing a new drug. Although the end customer is the individual patient, the actual customer during the development phase is the FDA, which regulates the introduction of new drugs into the marketplace. The lengthy process of new drug approval (or NDA) is based on documents presented to the FDA. So effective documentation of

the processes of companies in this industry is critical, and may have strategic implications.

The following example outlines the documentation methods established at Hoffmann-La Roche Pharmaceuticals in the 1990s. It is presented by Patricia Seemann, who at that time was their director of knowledge systems:<sup>1</sup>

### Hoffmann-La Roche's Knowledge Map

Managers at Hoffmann-La Roche decided to focus KM initiatives on accelerating the documentation required for the NDA process. They forecasted that saving just one day's work by efficiently documenting certain processes could be worth up to \$1 million for the company per product. Over three months, that translates to a savings of approximately \$90 million per product, and there were about 30 products that Hoffmann-La Roche wanted to document simultaneously!

They began by evaluating the quality of the documentation methods, and it turned out they were not effective enough. Some of their main findings were as follows:

- The documents were not customer-friendly. People in the drug development groups wrote lengthy documents for themselves but they were not appropriate to the needs of the FDA's customers.
- Overall, the knowledge that needed to be documented was not easily available or retrievable. It was difficult and time-consuming to assemble the information from all the various departments.
- Similarly, overall, the knowledge was not shared. The same questions had been surfacing back to the FDA over the course of many years, but each new project was always surprised by them because their existence was not known outside of the group in which they originally surfaced.

The Hoffmann-La Roche managers took some steps to redefine the process of presenting knowledge documentation. The first step was to create a template document to satisfy the customer. Working together with an array of ex-regulators, they realized that regulators typically have three crucial questions about a drug:

- Is it safe?
- Does it work?
- Does it work well/sufficiently?

From these top questions, they then drilled down to more detailed guidelines to create more extensive documentation, including addi-

tional specific questions and more templates for the capturing of the information.

The next step was to create a *knowledge map*. The knowledge map included the detailed templates, various links to directories of information and findings, as well as the names of people who had the answers to particular questions. It also documented examples of the experience gained from all previous projects.

Hoffmann-La Roche's process is a classic example because it addresses a slew of the requirements necessary for proper documentation. It is a process organized in reaction to the specific needs and questions of its customers, and it directly benefits the producing organization and its individual workers by creating long-term gains for the company and its users.

Even though the cost of implementing the program was several million dollars, management was ready to pay because the expected gain was very high.

### Example: The Aerospace Industry

Documentation in the aerospace industry is as important as in the pharmaceutical industry, but for somewhat different reasons. The aerospace industry is a long-term, technology-driven industry, conducting research and development for sophisticated products, with product cycles of 10 years and longer. For these companies, product development, maintenance, and support take many years. Communication of knowledge and certain work processes is essential to the success of the company in keeping track of the organization's experiences. They need documentation to develop, produce, and support current products, as well as to develop future ones.

The level of investment and sophistication in documentation is different for each phase of a product's life cycle, according to the perceived benefit. In the *production and maintenance phases*, documentation is a must. The need and benefits in these departments are obvious, so their documentation practices are very advanced and continuously improving with time. Each company selects one of the commercially available information technology (IT) solutions, and requires employees to use it.

The documentation in these departments is an extensive discipline in itself, and we do not elaborate on it here. We do want to mention just one family of software these companies use, called product data management (PDM) software. It contains, organizes, and updates all the data necessary for the manufacturing of a product: thousands of drawings and assembly

instructions for all of a product's components, from items and parts to subassemblies and then full products. We mention it because it may be also used during the development phase, as we discuss later.

The efficiency of documentation during the *development phase* of products is not as obvious an issue for companies as during the production and maintenance phases. However, tackling it is a must for an efficient development process and good engineering practice, which eventually does help improve the bottom line.

The example that follows describes an experience at Rafael, which demonstrates the problem of knowledge documentation and the way the solution is advancing with time. Earlier in this chapter, we discussed the blue reports at Rafael and how they were consuming too much time and effort for today's fast-paced age (versus when they were first developed). The following example describes another old-time method, the *development folder*, and how in order to retain its benefits it needs to be paired with modern IT.

### The Development Folder

---

When Tuvya was a young engineer at Rafael, he was invited to a lecture on why and how to prepare and use a development folder. The lecturer, Giroa Shalgy, was a young junior engineer at the time (but later became a CEO). The message of his talk was to keep a continuous daily log of all the activities associated with a project. The log included information on the data, calculations, and test results of a project, as well as the design considerations. The development folder could be a personal folder but could also be shared with colleagues working on the same project.

Mr. Shalgy spoke about how the incremental documentation process, done by an individual as a project is happening, is faster and more reliable and accurate than when a report was written at the end of a project. It is also a much less tedious and daunting task. Thus, the development folder process also relieved the burdens associated with the blue reports discussed previously, while keeping most of their knowledge management benefits.

Tuvya liked the idea of incremental documentation and has been using it ever since when doing engineering design work. He later discovered that similar methods were used in competitive aerospace companies, only the processes had different names: For instance, when Tuvya was introduced by Arian Ward to some Hughes engineers in

1997, they were using what they called a “project book” for the same purpose.<sup>2</sup> Later, when Tuvya described the idea to Professor Bryson, an internationally known veteran leader in aerospace sciences from Stanford University, the professor recalled using a similar “workbook” in his days as a young engineer at Raytheon in the 1950s!

While using the development folder idea, there are a few things we should keep in mind:

- The process takes self-discipline. It must be done properly, in a timely manner, and in an orderly format.
- The development folder can lack the extra insight gained in writing a report at the end of a process. However, if in the end an employee wants to or has to write an official report, he can do so by copying most of it from the folder he’s kept all along.
- If you have handwriting like Tuvya’s, the development folder might not be as suitable a tool for knowledge sharing as you’d hope!

All kidding aside, modern developments in the methods of documenting processes, and pairing them with modern IT capabilities, enable a wider and more convenient use of this idea of the development folder method. For instance, we may use the PDM software, aimed initially just for production purposes, to include different sets of development data like R&D data, information for the subassemblies in relation to the whole system, and other considerations as a project develops. The PDM coupled with modern IT software enables updating throughout the full life cycle of a project and makes for easier knowledge sharing.

Some modern developments include:

- Creating computerized templates that can be used to structure what data should be preserved and how to write it up.
- Collating information from design reviews, which now influence the whole design process, and having it automatically download into the development folder.
- Getting other information, like calculations from specialized design software, test summaries, and so forth, also easily added by cut-and-paste or special download.

This modern realization of the development folder, combining the old method with new capabilities, satisfies most current requirements for efficient documentation of R&D. The benefit for capturing various user and organizational processes is obvious, and there is almost no extra effort beyond what was already required in the usual process of design and manufacturing. Of course, one condition still exists: It still requires self-discipline.

While the preceding examples come from experience gained in the aerospace industry, most professions can use a similar combination of this self-documentation process and pair it with any number of basic software systems available today. They may be as simple and general as word processing and/or spreadsheets, or systems that are more customized to a particular profession.

### IT—Has the Future Already Arrived?

Throughout this book we try to emphasize the cultural sides of KM, fighting the notion that KM is about fancy Information Technology (IT) software to document existing knowledge. However, modern developments in the late 2000s and early 2010s may suggest a better solution for both cultural and technical issues.

These prospects are demonstrated in the story of Eran, Tuvya's young next-door neighbor, who has recently graduated as an engineer and recruited to the military into a technical unit:

#### The Younger Guys Solve an Old KM Problem

Eran's technical unit is responsible for developing and maintaining some electronic equipment. This unit suffers from various severe sources of KM problems:

- They have to support legacy equipment, aging 10 or even 20 years, versus few years in commercial electronics.
- They are not only maintaining the equipment, but they are also responsible for defining new equipment and overseeing its development and production.
- The staff consists mainly of very young and inexperienced engineers and junior managers, like Eran. They change frequently, with a typical assignment of about two years. This, combined with very heavy workloads, prevents them from achieving deep knowledge of the old equipment or gain familiarity with the process of developing new ones.

Hence there is a large problem of knowledge capturing and dissemination. Legacy knowledge is distributed in many outdated paper documents or even computer documents, difficult to browse and maintain. Some knowledge is only in people's heads, where some of them are older veterans who are only available for short-term reserve duty.

The problem existed for many years, and solutions seemed either impractical or too expensive. Eran, together with some other new young engineers, suggested a solution based on a Wiki-style platform. They have been acquainted with such platforms since high school, and know they offer a convenient way to accumulate, access, and update data.

Initially senior managers, the unit commanders, did not like this idea. They were especially worried about configuration control and content control. And they have some reasons to worry—these are the same reservations raised against the famous global Wikipedia concept.

However, the young guys decided that something is better than nothing. They prepared the tool nevertheless, and succeeded in making it useful and achieving extensive usage. They later introduced some configuration control methods, thus eventually convincing their junior managers and later even their senior managers.

The moral of the story has several aspects:

- First, it has the elements of grass root initiative, which many times arrives at more acceptable solutions than methods dictated from above.
- Second, the solution is a good example of a simple and inexpensive tool, which is very convenient and easy to use and is not a burden on employees' time. Thus it fulfills all the requirements we stated at the beginning of this chapter for an efficient method of knowledge capturing and dissemination tool. It can also easily be used as a modern realization of the development folder.
- Third, and maybe most important as a hope for the future, this tool may overcome some cultural obstacle: People like it, use it frequently, and are encouraged to share their knowledge with others.

## Teaching the Organization What It Knows

In this next section, we discuss an array of methods available to employees for capturing and disseminating the knowledge that already exists within their organization. The methods are ordered from one-to-one mentoring to one-on-many encounters like lectures. Further, the various types of one-on-many encounters are ordered by increasing commitment from the employees and organization, from sporadic lectures to continuing education in courses and internal schools.

## Mentoring and Apprenticeships

The basic interaction for disseminating tacit knowledge is a dyadic, or one-on-one, situation. The best example is apprenticeship or mentoring, in which newcomers to a job learn the ropes of their new role. Mentoring is appropriate in many contexts, from the guilds of the Middle Ages to modern-day training of doctors and professors.

In these familiar cases the potential benefits for both trainer and trainee are obvious. However, in other cases, the benefits are not as easily realized. Hence we need mentoring programs to formalize the process, thus ensuring that the mentor facilitates the processing of insights and does not abandon the learner. Organizations with very different characteristics and types of knowledge all face the same problems, and the examples in this section show how they have been resolved.

### The Supermarket Cashier

A simple but instructive case regarding mentoring was revealed to Tuvya during a casual talk with a cashier in his local supermarket. Tuvya always tries to choose a particular cashier's line because she handles customers very efficiently and with a smile. One day the cashier proudly introduced Tuvya to her new colleague at the next cash register, and boasted how she taught her all the secrets of the trade (i.e., everything she knew).

Such a classic example of apprenticeship is probably common in supermarkets, so it is no wonder the cashier's management instructed her to dedicate valuable time for teaching the new cashier the ropes. In this case, management not only chose a good mentor, but also increased the potential success of the training by tasking the cashier with the training. Tasking her with the training actually gave her extra motivation because she felt pride at being senior enough to instruct others!

**LEARNING THROUGH EXPERIENCE** The following examples describe how knowledge workers (KWs) should aspire to learn continuously throughout their careers by learning directly from experience as well as from others' experience.

**A BALANCE OF ATTENTION IS KEY TO QUALITY MENTORING** Rafael has a structured and formal apprenticeship program. Each new employee, be it a

## The Bank Teller and the Consultant

Historically, banks in Israel have trained new employees by sending them to an off-site job training to be tellers. At some point they decided to switch the order. They had new recruits first serve as tellers for six months, with mentors by their side, and only afterward sent them to the training. They realized that this was a more effective method for knowledge dissemination than simply sending them to the training right away.

Seeing the success of this method, Edna's consulting firm also applies this concept in its practice. In general, she prefers to hire BA-level workers to MBAs because they are encouraged to work and study for their master's degree simultaneously. Overall, Edna sees this as a win-win for both her firm and the new employees because the latter benefit from the combination of studying while directly applying their education to their daily work office experiences.

secretary, a production worker, an engineer, or a scientist, is assigned a mentor. In the program, the mentor prepares a customized mentoring curriculum for the newcomer, which is checked and approved by the department manager. It almost always consists of on-the-job training, where the newcomer is performing tasks with the help of the mentor.

The program is especially comprehensive for engineers. It ensures that new engineers learn all about the different aspects of the work environment during the first year of work. It particularly emphasizes the specific subjects not taught in the university: working with specific trade software and gaining valuable experience in collaborating with coworkers inside and outside company departments. The mentor refers the newcomer to various sources of information and also contributes his own tacit knowledge.

The mentoring program at Rafael is subject to formal reviews. The progress of every newcomer is checked at least quarterly by the department manager. One division even instituted a yearly meeting of the participants in the mentoring program, involving both mentors and trainers and the division head, in order to provide feedback on the process.

In rare cases there are problems with the mentoring process. Usually it comes down to a bad match of personalities, solved by replacing either the mentor or the newcomer and reassigning the couple. The opposite problem is even rarer, but amusing to watch. For example, in some departments we have found mentors—usually older veterans—behaving like an

overly worried parent and becoming protective of their apprentices. These mentors enthusiastically give their best to the newcomers, investing lots of time and effort to teach them everything. However, this kind of attention can also make the trainees insecure, feeling like they can't work unsupervised, let alone manage others. In most of these cases, though, mentoring yielded positive results, and efforts to step in and correct the overly attentive mentoring were successful.

Overall, because the apprenticeship program at Rafael has brought about such success for the parties involved, it is now an essential part of managing knowledge workers at Rafael. New employees usually praise the program and appreciate the knowledge gained.

The mentors sometimes do complain about the amount of time they spend on this activity in terms of balancing it with their day-to-day tasks. However, they usually enjoy it and understand its importance. They are further motivated by the newcomer taking on some of their projects in the spirit of training, and by management's praise in giving them credit as experts tasked with passing on their expertise to newcomers.

## Lectures and Workshops

When managers are first introduced to the issues of knowledge management and the methods for solving them, their second bright idea is usually scheduling lectures or workshops. (Remember, as mentioned in the beginning of the chapter, the first bright idea is adopting an IT solution for documenting knowledge.) They usually think of the various experts, from inside and outside the organization, whom they can invite to share their experience on relevant subjects. Some managers even succeed in launching a weekly, biweekly, or monthly series of expert lectures. However, after the initial buzz of the programs, most of them fizzle out after a few events.

When we look at the reasons why so many are tempted to launch a series of lectures, we see that they are really a useful method for disseminating knowledge. First, they are one-on-many encounters, which are more efficient for some subjects when compared with the one-on-one training of mentoring. And when the lecturer is from inside the organization, we see the additional benefit of codifying existing knowledge from within the company.

The reason lecture series eventually fail to gain popularity is that they take time away from a knowledge worker's other work commitments. It is especially difficult when attending the lectures requires the KW to be in a specific place on a specific date and time. If the lectures are not of the utmost importance, they are seen as a nice bonus but not a requirement, and the lecture loses the competition for the workers' time.

**HOW TO MAKE A LECTURE OR WORKSHOP SUCCEED** Contrary to those unsatisfactory experiences, there are examples where some lectures did better than others. National Semiconductor Corporation, for instance, experimented in the 1990s with various KM initiatives like biweekly lectures and technical seminars and they cite them as very successful. From their headquarters in Santa Clara, California, they coordinated lecture series for several years with continually large audiences (with an average attendance of about 15 percent of their employees showing up).

Peter Himes, who at that time was responsible for some of the lecture initiatives at NSC, says the following things helped to make the lectures a success:<sup>3</sup>

- *Offering valuable and unique content.* The lectures at NSC were usually given by an internal expert who provided some added value on a subject beyond what is commonly known or written in textbooks. For example, a veteran analog design engineer might explain how one “really” designs an analog circuit in the NSC environment.

- *Conducting lectures in an interactive format.* Only half of the allotted lecture time was dedicated to the formal lecture. The rest of the time was dedicated to a question-and-answer session where both group and one-on-one conversations occurred during the break.

- *Making sure the subject is relevant.* The subject of the lecture should be potentially interesting for a large enough target audience to justify the effort and create the most social interest.

- *Providing a professional preparation.* NSC designated staff for organizing the lectures and helping the lecturers prepare for them.

These elements ensured that employees would benefit. They were eager to participate in peer lectures, on relevant issues, tailored to fit their knowledge needs.

Many people might naturally consider these factors essential to any good lecture series. However, in the workplace environment and for the purpose of attaining proper KM, the most important aspects to include would be codifying in-house knowledge and motivating coworkers to attend and learn from it.

**THE ALTERNATIVE APPROACH** In addition to using NSC’s guidelines for good lectures, you may want to avoid classrooms and replace larger settings with some kind of personalized learning. The simplest method is through a company intranet: E-mailing written material or presentations, which the worker can read in his room and when he has the time, will enhance the experience. This way KWs retain the advantages of having an expert codify existing knowledge for them, but they can use it at their convenience. The current NSC web site links to a realization of the above: Analog University<sup>®</sup>,

offering on-demand videos and webinars in the Knowledge Exchange Center.<sup>4</sup>

Another method is to group disconnected lectures into some kind of structured course, which we explain in the next section.

## Courses

Courses may have a unique and important role in capturing and disseminating knowledge. The structure of a course in an organization is somewhat similar to a course at a university. It consists of a series of related lectures, about a specific connecting subject, for the same continuing audience. They involve many hours that may be spread over a period of weeks or months. Some courses may be taught by an outside expert or vendor, such as a course in a computer language; others are prepared in-house for teaching special skills.

Courses entail a larger commitment of time than sporadic lectures, and therefore larger efforts, but hopefully with larger gains. The following example shows how courses became a major turning point in a department at Rafael.

### Renewing an Electronic Integration Section

In 2006, Yael was a newly appointed manager of an electronic department at one of Rafael's divisions. Right away, she identified the problems in the electronic integration section of her department as a major crisis, requiring immediate and extensive action.

This section was responsible for the design and testing of the electronic interface between various components of an aerospace vehicle. The processes occurring in that section are not usually taught in a university setting, and they are almost always interdisciplinary: requiring not only knowledge of electronics, but also knowledge on how specific components work, the interfaces between them, and the requirements from the system as a whole in terms of performance, reliability, safety, and so on.

The crisis Yael reported had many facets. In the past, this used to be an elite section that grew many senior project managers. However, for various reasons the section had decayed and was perceived as a lower-level section in the company, both by its internal clients and by its workers. Clients were constantly complaining about the work from that section.

Yael quickly took many steps to upgrade the department, including appointing new managers and hiring more qualified engineers. But a

major step in its transformation was realizing that there was no structured body of knowledge common to the whole section. Every group of workers used different unwritten methods and all groups were lacking some basic skills, especially because they were not sharing their knowledge.

Yael decided to establish a comprehensive course on integration. She appointed one of the section experts to design a course and manage it. The curriculum included lots of lectures on relevant systems and components by the organization's top experts for each subject, as well as special lectures on integrating methods from different areas. A very important outcome of the preparation of this course was the creation of a unified integration method, based on the knowledge assembled from the experts and the various groups of that section.

The course consisted of weekly half-day sessions, continuing for almost a year. Half the section members were chosen to participate in the first round and, at the same time, continue fulfilling their commitment to their projects. In spite of the burden of working on both, the course was completed on time and very few participants were forced to drop out.

The result of these steps was a visible revitalization of the section. Over time, instead of low-level assignments, its workers became responsible for important designs. The unified integration method not only affects this section but also improves the way and pace that products across many departments are assembled and tested, thus leading to increased satisfaction for both clients and workers.

The course at Rafael is a very good example of proper knowledge management. The process of capturing knowledge and disseminating it was very successfully *managed*. Any obstacles to success were carefully removed to assure benefits for everyone involved.

The benefits to the organization were obvious. The process of revitalizing the department was welcomed by senior management. Project leaders and managers alike did not complain about workers putting time and energy into the process, and especially in the course, because they knew the long-term benefits were worth it.

The benefits to the students of the courses were also obvious. The material was important and interesting, and they understood that the course was a positive step for their career path.

Relating this example to some issues discussed before, we see that:

- Such a course, in spite of its being a major effort for the organization, is definitely more efficient than sporadic lectures or one-on-one mentoring.
- The course engaged lecturers in knowledge capturing, as the students experienced knowledge dissemination and sharing.

- As the two interactions combined, the stage was set for the creation of new knowledge, culminating in the preparation of a new, unified method for electronic integration.

## Internal Schools for Continuing Education

Some companies establish an internal school to teach their employees company procedures. In its simplest form, a school may be just a collection of courses—a professional training department with a mission to help other departments organize in-house or off-site courses like the ones described in the previous section. A school may also be responsible for cross-organization courses, like management or strategy courses. The school can also create and share knowledge about how to implement successful courses.

For many major corporations, the internal school is more than a collection of courses. It can be a symbol of the common culture and knowledge that unites an organization. In these cases, the school is usually called a university or academy, and its goal is to assure an efficient and unified dissemination of knowledge required for both low-level and high-level workers. It teaches employees specific procedures, methodologies, and competencies needed for their work. The school focuses on teaching those things that the employees need to know for the job that they did not learn during their formal education. Some examples include:

- *The military.* In every country, the military has schools that teach specific job knowledge that soldiers cannot learn from a regular high school or university education alone. However, the schools and their course offerings differ widely from country to country, and even between various forces of the military organization in the same country.

- *Corporate cultures.* McDonald's "Hamburger University" and Disney's "Disney University" are just two of the most commonly known examples, with training programs catering to teaching their employees skills they will need on the job.

- *Niche industries.* Amdocs, a multinational Israeli software provider, has a school where workers learn the basics inherent to the niche Amdocs organization: its marketing methods, proposals writing, and so on.

Once an organization has documented its knowledge processes and shared its knowledge in various ways, it is poised to be able to reuse and create new uses for it.

## Reuse and New Use

In some people's experience, the term *reuse* can be associated with stifled creativity, but we think an appropriate way of looking at knowledge reuse

is in terms of *new use*. Using existing knowledge in new, creative ways is essentially engaging in efficient innovation. It is about building on the accomplishments of predecessors and accumulated knowledge in an organization, rather than starting from scratch each time you embark on the design of a new product or process.

The following examples clearly demonstrate the way some organizations are solving common reuse problems, and also convey the kinds of atmosphere in which organizations are reusing knowledge and innovating.

### Example: Reuse at Hughes

Hughes (now Boeing SDC)\*, a leading satellite manufacturer, is about reuse. Satellites are so expensive and prone to failures in the harsh environment of space that designers must use proven components. An expert in the industry describes this paradox with the adage, “No new component will fly on a satellite unless it has already flown before.”

The methods of reuse at Hughes were discussed in a meeting in the late 1990s with their KM director at that time together with two team leaders in the engineering group. They described:<sup>5</sup>

*At Hughes, the most successful designs of new satellites utilize elements from previous designs. The company provides engineers with data on previous products and components, so they avoid unnecessary risks and make the most of resources so they are not reinventing existing knowledge.*

*When asked if they are not bored by working on old stuff, they claimed the opposite. They do not need to reinvent the old stuff and work hard on the simple repetitive tasks, but to concentrate on innovation in the important new things and especially the system for a new mission.*

The database at work at Hughes was a major sponsored project in documentation. Readers with an engineering background will appreciate the effort it took for Hughes to create such a database, because product design in engineering is usually not a simple plug-and-play. You cannot reuse a component unless you have enough knowledge on its design. You not only need its current characteristics and performance statistics, but also

---

\*Hughes was acquired by Boeing in 2000 to become Boeing Satellite Development Center (SDC).

its full design history, the context of its design, the data on testing it and especially its failures, and so on. And even then, there are plenty of examples of failures in the reuse programs.

Therefore, from a KM perspective, the experience at Hughes has been a source of motivation in the field of reuse and new-use. Reusing proven components increases communality, thus lowering expenses and increasing reliability. The new-using of old components does not stifle innovation; on the contrary, engineers focus on innovation by optimizing the system, based on the reused components, for a new mission.

### Example: New Use at Intel

We mentioned in Chapter 4 that Intel has the slogan “Copy Exactly.” In the context of reuse and new use we can look at this slogan from another perspective.

When Tuvya first heard this slogan in the late 1990s from an Intel Fellow in California,<sup>6</sup> the meaning seemed simple and obvious: When it comes to producing chips in different locations, the slogan emphasizes that it is very, very important for Intel to make sure that all its fabrication plants worldwide produce its chips in exactly the same way. Thus the customer always has the same product, and when a problem is discovered and fixed in one plant, it can be fixed in all the plants in the same way.

In terms of reuse, a simple lesson to take away may be that innovation toward new use does not always belong in every work process, every organizational setting, or every production plant. While Intel is famous for its innovation in developing chips, at its production level copying exactly was a slogan to succeed by.

About 10 years later Tuvya learned a more sophisticated lesson during a visit to Intel FAB in Israel and attending a presentation by the manager of Intel Israel.<sup>7</sup> Actually, the production plant does have many new uses and innovations. Of course, the recipe of making the chip is still required to be “copy exactly” reuse of knowledge. However, all other activities associated with production, from the design of the impressive FAB to managing its day-to-day operation, involve major and continuing innovations.

## Conclusion

This chapter described the various methods of capturing the knowledge that already exists in an organization and disseminating it to all relevant parties. It complements the previous chapter about creating new knowledge.

While this chapter was about inside knowledge, the next chapter will look outside the organization: the important knowledge that we gain from customers.

## The Magnificent 7

---

1. Knowledge organizations must capture the knowledge of their workers.
2. The knowledge that is captured should be valuable to a complete array of potential users and continuously updated.
3. Knowledge-capturing processes should be efficient so that they do not require too much time from employees. Providing employees with templates or fostering incremental documentation processes can enhance the efficiency of the knowledge-capturing process.
4. Organizations should provide incentives to their knowledge workers for documenting their knowledge to share with others.
5. Current (early 2010s) IT solutions make knowledge capturing and dissemination not only more efficient but also help to alleviate some cultural obstacles.
6. Methods with some elements of continuing education, such as mentoring, courses, and intranet services, are effective combinations of capturing and disseminating knowledge in organizations (and they are usually preferred to sporadic events like lectures).
7. New use of captured knowledge should be encouraged in order to create an accumulation of knowledge and prevent unnecessary innovation.

EBSCOhost®

## The Customer Focus

### *Harnessing Customer Knowledge through Meaningful Interactions*

In this chapter you will:

- Learn about the importance of constant contact with customers for continuous knowledge creation on all organizational levels.
- Gain tools that enable you to glean important knowledge from your customers and make them partners in the process of innovation.

Imagine an organization that conducts customer satisfaction surveys and bases its view of them on the statistical analysis of the surveys. Sound familiar? Now imagine a change in tactic. Imagine the organization invites its customers to an interactive meeting. The customers arrive, spend a few hours, eat a snack, and share their knowledge with the organization coordinating the event.

There's quite a difference between the two scenarios because the interactive meeting is much more personal and immediate. Why spend time, effort, and money on a survey when so many customers are willing to tell you what they think for free?

It is a simple fact that people seem to enjoy being asked what they think, feel, and expect. All you have to do is invite your customers to a conversation, ask some questions, and, most importantly, listen. Then you will discover how valuable direct communication is in creating your future with them. By helping the organizations that supply them with the products and services they need, they are also helping themselves. It's a mutually beneficial situation where both sides win. In this chapter, we discuss ways in which you can create value by interacting more closely with customers.

## Customers Are Willing to Share What They Know

Knowledge management inevitably involves making customers partners in shaping an organization's future. Customers generally want to be partners with organizations they do business with, and they are willing to share the various types of knowledge they possess.

The following example demonstrates the importance and benefits of such interactions.

### The Furniture Company Knowledge Café with Customers

Several years ago Edna consulted with a well-established Israeli furniture manufacturing company. During their talks, it became obvious to Edna that the company managers did not realize how much relevant knowledge their customers held and that they could easily get to it by conversing with them in order to use it for both their benefits.

As part of her consulting, Edna suggested the furniture company set up knowledge cafés with two of their most strategic customer bases—architects and carpenters. The management team was apprehensive in coordinating the event. They wondered if any of the customers would show up, among other things. But to their surprise, they did.

A number of leading architects from Israel showed up for the first knowledge café. They were not paid for attending; they were just offered coffee and cake and arrived ready to fill in questionnaires, after which they gladly engaged in a conversation on “questions that matter.” They focused on products, including why some of them, though beautifully packaged and practical, were no longer trendy. They discussed how some products sold little while other product solutions, even when less practical and more expensive, were more popular. Since the architects were opinion leaders in the field—they told the end customer what to buy—their opinions were highly informative.

During the café, the organizers and the participants found a typical KM problem was surfacing. When the café was complete, the company realized the customers were not disinterested in their products, but were simply not aware that the company was manufacturing newer products with beautiful colors and textures.

Further, similar feedback was captured from the second knowledge café organized for the carpenters. In the end, working directly with their customers (the opinion leaders of their specific market) resulted in a significant growth in income for the company.

Whenever Edna encounters skeptical and reluctant organizations, she relays the outcomes of this story about how intensive knowledge sharing with customers can lead to dramatic results. It is sometimes ironic that companies are willing to spend a lot of money on market research, while they ignore the great opportunity of just talking to their own customers in a relaxed setting. Edna likes to ask CEOs when they last had a long conversation with one of their customers to find out about the customer experience (what customers need and expect), in order to decode what would most interest them, even before they know it themselves.

### Surveys versus Direct Communication

The 1980s was an age of quality revolution. Everyone in business was excited about deepening their partnership with customers, knowing that their customers were a key component of their future success. But our experience in consulting with companies during that time did not indicate that the partnerships organizations had with their customers were real partnerships. We saw organizations overly employing customer satisfaction surveys and relying too heavily on statistics. In these types of communications, the customer remains anonymous. Even though they thought they were connecting with their customers, companies employing these types of methods were not really engaging in a dialogue with them.

Overall, we think that some of the market surveys are a waste of time and money. They bring organizations to conclusions about future demands on their resources based on hypothetical questions. We believe it is much more preferable to interview one's current loyal customers directly—to really talk to them and see how they think. The direct conversation should not be about solving day-to-day problems per se, but about making the customer a partner in shaping the future of an organization. Asking your customers questions such as:

- Which core competencies should we develop?
- Which new markets should we enter?
- What type of services do you really need?
- How can we connect to your real needs?

At Supersol, the largest chain of supermarkets in Israel, management experimented with certain methods of direct communication with customers by installing local customer advisory boards in each of their stores. These customers advised store management on where and how to display products as well as what type of services they needed versus which ones were a waste of time. What a unique and inexpensive consulting team!

## The Living Lab Concept

An innovative and relatively new method where customers and users are seen as full partners in the development of new products is known as a *Living Lab*. A Living Lab is a new product development (NPD) project team, which not only includes the developers but also incorporates the end users from the very beginning as full team members.

This is very different from the usual procedure: analyzing the needs of end users, then doing R&D with developers only, and evaluating the almost-ready product with the end users only in the last stages. When end users become developers themselves, the project becomes a Living Lab, since it allows for ongoing improvement of the new product through an ongoing fine tuning based on constant end-user feedback.

An example of such a project developed in a Living Lab in which Edna and her team have been involved is the wearable computer, wearIT@work:<sup>1</sup>

### The Wearable Computer

Edna's team was a full partner in a big European Union consortium which developed systems of wearable computers for a variety of working environments: health care, production, maintenance, and emergency response. The end users—physicians, production workers, maintenance engineers, and firefighters—were full members of the project team from the very beginning. They helped design the prototypes, they tried them, and they offered new perspectives and new solutions throughout the process which the hardware and software developers had not thought about.

Edna's team, as a partner in this project, was responsible for the social science research piece in it. At the very end of the project, in interviews they did with the product developers from hardware and software, they asked what surprised them during the project. They were fascinated to find out that the largest surprise was the complexity of the customers—not just the end users but the whole ecosystem of users and decision makers. They had not accounted for it!

This proves the importance of the Living Lab concept, in which a user-centered design team allows for the use of customer knowledge in a very intensive way.

## Learning from Internal Customers

While this chapter is mainly dedicated to the *external* customer, we use this section to mention the too-often-overlooked knowledge management of *internal* customers. Edna is constantly amazed at how organizations neglect to take a good look within and “know what they know.”

Typically, information technology (IT) departments and other support functions within companies have the most to improve upon as far as their performance in this area. It is easy to ask internal customers what they need and what they expect of their supporting colleagues, yet—as with other KM cases—one of the biggest barriers to knowledge sharing is lack of time. When members of teams like these (those that support organizations) meet, they are usually trying to solve pressing problems quickly. They never have a chance to have a conversation, with their managers or peers or customers, on a deeper level regarding the questions that matter.

The solution to this challenge lies in teaching ourselves and our friends, colleagues, and peers, what quality dialogue is all about. In today's world, the creation of useful intellectual capital through proper knowledge management depends on creating effective conversations. We may use the various interaction methods, presented in Chapter 6, in order to explore how best to communicate effectively. The strong tools we have advocated to use with our external customers, like knowledge cafés and Living Labs, are especially effective for interacting with our internal customers.

## Engaging Customers in Defining Strategy

This section is about one of the most significant ways we can use customer knowledge—by involving them in defining the long-term strategy of an organization. We already mentioned in Chapter 3 that instead of limiting the strategy making to top management alone, we had better seek the cumulative knowledge of other stakeholders in the organization—middle managers, leading inside professional and marketing experts, and even all employees if possible. Engaging the customers in creating strategy is an extra step toward an additional, and very important, perspective. It has some risks of exposure, but there are major opportunities to gain such as achieving better trust and bonding.

### The Strategy Workshop

Our example is about a large industrial company in Israel, whose business depends mainly on a few large, long-time customers. A newly

*(continued)*

appointed CEO identified that although these customers usually liked the company's products, there was some tension about the current technical support and possible disagreement about future needs. Hence he coordinated a strategic process in which to collaborate with the largest customers.

They outlined the strategic process in a workshop conducted over two days, with Edna as a facilitator. On the first day, the company invited a group of senior representatives from its customer base. They were seated in a circle, with the company's senior managers sitting in a circle around them. The representatives were asked to imagine themselves, or their successors, in the next following years:

- What could their business and future market look like in that period?
- What would they or their successors need in order to fulfill the needs of that market?
- What is the expected role of the hosting organization in catering to these needs?

To make the most of that workshop, there were predefined rules for the participants. People from the hosting organization, even though they were top managers, were not allowed to intervene in the rounds of discussions (except for clarification questions). Most importantly, they were not allowed to argue or criticize. Most of the time, they just listened.

This questioning and brainstorming continued with a number of the representatives. In the end, the session was fascinating for all of the participants because it was of great benefit for both the organization and its customers to think about the future of the market they were participating in.

The session was recorded, and the next day the company managers met, without the customers, to process what they had learned and to determine how to use the information for their strategic decisions about the future.

This example proves the necessity of special workshops with a customer. Actually, when the idea of such a workshop was first introduced by Edna, the managers at the company resisted it. They claimed that since they were in continuous contact with their customers, there was no added value for coordinating this type of session and they did not think that they had something new to learn. Eventually, however, they were convinced that talking to their customers on a strategic level, rather than a day-to-day

level, was a different matter. Moreover, the opportunity of involving multiple perspectives was a clear advantage.

The strict rules of engagement, where the hosting organization managers were supposed to listen without arguing, were also difficult to accept at the beginning. However, this also proved successful by creating an atmosphere of respect that enabled customers to speak freely.

Ultimately, by taking a chance on implementing a method they were not used to, these managers realized that they learned things they had not known. For instance, as the new CEO suspected, one of the issues that came up in the workshop is that the products may be too sophisticated to use. The customers relayed to the company that they were very interested in more training and better technical support for current products, and designing future products for simpler usage.

## Conclusion

In this chapter we described various methods for gaining customer knowledge. We believe that one of the factors in the collapse of the technology bubble of the early 2000s may be the fact that many high-tech companies were not communicating with their customers effectively enough. They didn't make sure there was enough of a need for their sophisticated products. The high-tech industry, at that time especially, was technology-driven rather than market-driven. The following is a typical example:

### Chromatis—a Broadband too Broad?

At the time of its sale in May 2000, the Israeli start-up Chromatis went to Lucent based on a market value of \$4.5 billion.<sup>2</sup> Part of the broadband business, Chromatis provided the service of being able to transmit as much data as possible over the Internet. At the time, everyone agreed this was an important technological development and an important product. It turned out, however, that the speed of data transmission already in use was fast enough. Like many other promising companies at that time, Chromatis closed down about a year later because of lack of customer understanding.

However, listening to customers does not mean that you should limit yourself regarding innovation. Sometimes you can create new needs for your customers without first discussing with them what they need. Obviously, if you only base your developments on customer knowledge

acquired through direct communication, then you might be stifling your overall innovation. To this end, organizations should strive to work on two major fronts: making incremental improvements by learning from customers, and also facilitating breakthroughs through the management of innovation. We discuss this last point regarding innovation in more detail in Chapter 10.

## The Magnificent 7

---

1. Your customers are usually willing to share their knowledge with you.
2. Your day-to-day interaction with customers is not enough; you must have scheduled strategic meetings.
3. Invite your customers to knowledge cafés and have them discuss questions that matter.
4. Treat your internal customers as you do your external ones.
5. If possible, run your R&D projects as Living Labs.
6. Allow your customers to become your advisers. Consider creating customer advisory boards within your organization as a solution to lack of communication.
7. Make the process mutually beneficial by sharing your knowledge with your customers so they also know what you need.

## Measuring and Managing the Performance of Proper Knowledge Work

In this chapter you will:

Learn about current developments in measuring the effectiveness of knowledge management.

Gain tools for setting goals and objectives and measuring the performance of intangible assets.

Learn methods for measuring the dollar value of intangible assets.

Apply performance assessment to nonprofit units, including departments within organizations.

There is a commonly used business cliché that, unfortunately, is usually right: “If it can’t be measured, it can’t be managed.” We therefore have to define various indicators to measure the knowledge work of an organization and its intellectual capital (IC) creation. However, unlike the customary accounting methods for assessing tangible financial capital, measuring intangible IC is much harder. This chapter describes the challenges and some of the methods to answer them.

### The Challenge: Determining What You Need

---

A manager practicing knowledge management (KM) is looking for a system to measure the work of an organization or team, and assess the results of their efforts to increase their intellectual capital. The manager should expect this assessment system to fulfill two requirements:

- *Management*—to set goals and objectives for managing assets.
- *Assessment of monetary dollar value*—to know the actual influence of these efforts on company value.

These requirements are derived from a manager's experience with traditional accounting methods. These methods were invented at the end of the Middle Ages in Venice and, except for minor adjustments, have not changed much since then. They continue to do a good job of accounting for the tangible aspects of companies, enabling both management and assessment of value.

Unfortunately, although traditional accounting methods work for tangible assets, they are unable to elucidate the true value of the intangible assets of a company in today's information age. Some efforts have been made over the years to overcome this challenge. Accountants are increasingly interested in intangible assets—including research and development, patents, copyright, trademarks, knowledge databases, customer and hardware lists, contracts and agreements, and so on. However, none of the efforts for the accounting of intangible assets has reached the kind of maturity and sophistication that is needed. The increased interest has given us a few processes for deriving an inkling of the true value of a company, but not a coherent, extensive picture.

### Assessing Assets

You might recall a few of the advantages and disadvantages of two specific directions of efforts we mentioned previously in Chapter 2: estimating value by reviewing an organization's intellectual capital and creating a system of managing knowledge by using a management tool.

One direction we discussed previously was toward estimating the value of an organization's IC. We discussed the inherent inaccuracy of many of the present methods of estimating IC based on fluctuating market value (MV). Instead, we suggested using Professor Baruch Lev's method to find quantitative dollar results (take the actual annual earnings of a company, deduct the customary yield on physical assets of that industry, and the result is the contribution of the intangible assets).<sup>1</sup> The results helped us establish the business case for proper knowledge management, one that could potentially help investors get a more concrete sense of the intangible assets of a company. But we are still a long way off from seeing this method as an accepted part of company reports. And even if it were accepted, it is not quite timely enough to serve as a basis for future action or for day-to-day business decisions.

The other direction we discussed was toward developing a management tool consisting of a structured set of indicators, representing various

focal points of interest for a particular business. These structures, like the Skandia Navigator or Balanced Scorecard, cannot estimate dollar value or derive goals from it. They require that managers make the right strategic decisions, based on their experience and some available data, choosing an appropriate set of indicators to arrive at the proper conclusions. All of these requirements are difficult to determine. Provided managers make the right choices, the management tool might become valuable, enabling managers to set goals and control progress. Nevertheless, they also could fall short of the challenge.

But we hope the disadvantages of some of the methods discussed don't leave readers feeling frustrated.

### **Frustrating Conclusion? Not Yet!**

We admit that there is a reason for frustration. In spite of sophisticated financial reports, it is often difficult to determine the real value of a company in terms of the total sum of its assets (tangible and intangible). Even when used, systems such as the Navigator or Balanced Scorecard just might be too abstract of a tool to come to the correct conclusions.

However, most companies do make reasonable decisions about intangibles insofar as their natural processes are concerned, even when undocumented. Some of them even have practices for managing the natural processes that shed light on the company's worth. Next, we describe some examples upon which we built effective methods for confidence in using the Navigator or Balanced Scorecard systems.

### **Current Practices: Knowing What You Have**

---

The following sections consist of examples detailing how some companies and organizations have successfully managed their IC assets toward proper KM. In each example we describe the strategic decisions underlying the relevant goals, as well as the way the indicators are chosen and some comments about their relative advantages.

Unlike financial indicators, IC indicators are not always clear-cut. As their name implies, they may be partly intangible. Sometimes the decisions and goals are based on intuition rather than quantitative analysis. Sometimes we cannot measure the desired output, but rather an input we assume might lead to it.

When managing IC, managers should begin with the organization's vision and business strategy. From this general framework a manager would

derive the key success factors (KSFs) of the company. These are essentially the business's IC goals.

For each key success factor, a manager would then define several indicators that measure its performance. The indicators are methods of measurement of an organization's current status and its progress regarding the key success factors. The KSFs allow managers to assess to what extent they meet their goals. In this way, they become the units for measuring one's performance in managing intellectual capital.

What follows are examples of the different focal points organizations might assess, in order to more properly measure and control their knowledge work. We present these examples arranged along the Navigator structure, from foundation to top: research and development (R&D), process, customer, human, and financial.

### Focusing on R&D to Gain Improvements

Most responsible companies invest in R&D. This is usually a limited resource for which many departments in the organization are competing. The decisions cannot be based on pure analysis but on a mixture of both experience and intuition, as described in the following example:

#### Example: Making Decisions at DuPont

DuPont's textiles and interiors division has more than \$12 billion in annual sales, so it probably spends hundreds of millions of dollars on R&D. We do not know exactly how the managers there decide on investments, but we can assume they have a structured process for allocating such hefty sums.

Professor Baruch Lev's paper, "Sharpening the Intangibles Edge,"<sup>2</sup> described in Chapter 2, gives us some clues as to the questions that R&D managers at a company like DuPont are considering. They include:

- What is the share of a particular manager's division out of the total teams involved in DuPont's R&D?
- How would a manager further divide this share between *product* R&D and *process* R&D?
- How would a manager then allocate resources between various departments inside a given division?

Judging by the success of DuPont's products and services, its managers have probably done a good job in determining where best to

allocate their funds. However, they were able to quantitatively show the relative value of some of their investments only after using Professor Lev's calculation methods. Until the calculation methods were available, the managers at DuPont were relying mainly on a mix of intuition and experience in asking these questions and answering them for a desired output.

The moral of this story could be that even large strategic decisions at multimillion-dollar companies are not based solely on pure analysis, but on the tacit knowledge of the top managers and most valuable knowledge workers. However, after those intuitive decisions are made, they are translated into tangible processes that have explicit quantitative goals regarding expenditures and/or milestones that can be managed as a project.

Hence, managers must learn to live with a somewhat ironical process when it comes to trying to manage their intangible assets. Such a process might look like this:

Making a semi-*intangible* decision process,  
toward allocating very large *tangible* resources (as toward R&D, as just explained),  
intended to aim at achieving an *intangible* IC result,  
then managed by a *tangible* project process with decipherable and tracked milestones.

### Focusing on Process to Gain Improvements

Many process improvements, like some of the possibilities in the DuPont example above, can be measured in financial terms: Shortening the time to manufacture a product, or lowering the expenses to do it, will have a tangible effect on cost. So a manager can make that strategic decision based on quantitative analysis and measure the improvements accordingly. If the improvement is based on risky R&D, then we again add some intangible elements to the decision.

Some other improvements must be decided upon soft criteria alone. Take Tuvya's experience with peer reviews in Rafael:

#### Example: Peer Reviews at Rafael

We previously discussed in Chapter 6 how a well-performed peer review is a must toward implementing a good design process. However,

*(continued)*

this belief is based mostly on our experience of intangibles, with very little quantitative evidence to support it. Because it has an intangible component, we have no firm indicator to measure its results. And since we cannot measure the output (as we said at the beginning of this chapter), there is seemingly no proper way to manage the process.

In a situation where there is little quantitative data, some project managers might claim it is a waste of time to perform various types of reviews. They may only want to retain things like official customer reviews and the like. Conversely, some veteran engineers want to implement additional review processes as a more thorough and longer process in order to come to more well-rounded conclusions.

Even though it is difficult to make the quantitative case for enacting processes like peer reviews, we at Rafael made the strategic decision to do so: in a specified format and at specific stages of particular design processes over the life of a project. Fortunately, our taking a leap of faith based on intuition—and one that did not require huge amounts of time or energy—turned out to be positive for many of the departments at Rafael. In this case we measure the input, making sure that these reviews are conducted on time and methodically, while still looking for an actual indicator with which to measure their effectiveness.

### Focusing on Customers to Gain Improvements

When focusing on customers, we have both hard indicators and soft indicators. In a project-oriented organization like Rafael, for example, the value of hard indicators like annual orders and financial logs is carefully budgeted and monitored. The results from these indicators become a part of the company's recorded financial data and represent the success and failure of its past endeavors.

The softer indicators, such as where managers decide to put marketing dollars, the various methods of attracting new customers, and so forth, also represent a company's efforts toward future success but may not have as tangible an outcome.

### Focusing on Human Resources to Gain Improvements

At Skandia, we have found many hard indicators that represent soft strategic decisions on human resources. Indicators like the number of employees and their age distribution, compared with the budgeted desired goal, may seem obvious and trivial. Nevertheless, these are objective hard numbers that can point to desired corrective actions, if necessary.

However, any strategic decision determining that desired goal, which may affect the present and future of the organizations, is not trivial. But such strategic decisions cannot be based purely on quantitative data. One organization's goal may be different from another's; goals may even differ from department to department within the same business.

As an example of different approaches toward different desired outcomes, we present a story from Henrik Danckwardt of Skandia AFS, on customizing goals toward remedying employee turnover rates:<sup>3</sup>

### Example: Employee Turnover Rate at Skandia AFS

Skandia AFS took measures of its employee turnover rate, but set a different goal for each of its allied companies based on their unique position. Three situations and their pertinent goals are outlined here:

- One AFS company suffered from a high employee turnover rate. Accordingly, its yearly goal was to stabilize the workforce and to reduce the level of turnover.
- Another allied company was plagued by the opposite problem. It wanted a higher turnover rate to attract new and innovative workers to refresh the company. Its goal was toward raising turnover.
- A third company decided that its employee turnover rate was not important for the time being. That year it concentrated on other indicators that were affecting the bottom line of the business.

These situations are all quite different and each has its own unique goal. At a company like Rafael, managers strive for a very low rate of employee turnover. In the Skandia AFS example, each company would get hard numbers as goals, all derived from somewhat soft strategic decisions. Each company's decision process and final setting of goals will have a major influence on the future of its IC.

### Focusing on the Bottom Line to Gain Improvements

The focal points we have been discussing are from the Navigator system, which was designed for a commercial company. For such organizations, the *bottom line* is the financial results, represented by traditional financial data like sales, profit, and so on. The strategy and goals here are based on hard numbers familiar to managers. There is no need to elaborate on them except to mention that although finances are at the top of the

structure as far as goals are concerned, they represent the outcome of past activities and hence are not sufficient to predict future results.

A more challenging task is to derive indicators for nonprofit organizations where financials are not at the top of the structure in terms of goals. Examples of such organizations include academic institutions, or departments that are cost centers in a for-profit organization.

In general, the question, “What is the bottom line by which an organization’s success is measured?” is an important one in raising strategic discussions about the mission of an organization. Take, for example, the following decisions that a department in a university should make:

### The Bottom Line for a University Department

Typical strategic questions of a university department are:

- Should it judge itself by the quality of research? Or should it judge itself by the students—their number, quality, and satisfaction?
- Should it strive to be the *best* (in some sense) or the *largest* in some area of expertise or in some community?
- Should it include all these criteria in its assessment? And/or are there other criteria to consider?

Obviously, each decision may lead to different actions, and consequently to a different set of hard or soft indicators to measure their influence on the bottom line. But a bottom line for a university department is usually difficult to measure by hard numbers, especially if you look at the quality of research or quality of teaching. That is why some departments in Israeli universities are conducting a regular inspection of themselves, every several years, by an international committee of renowned professors. The committee is asked to review the various aspects of the department activities, and its observations and recommendation are a substitute for the difficult-to-get hard numbers.

### The Navigator: A Framework for IC Management

We’ve demonstrated important aspects of assessing IC and its management in various focal points. In this section we offer examples of how various organizations comprehensively manage the whole of their IC, in all focal points, using the Navigator.

Before we continue we remind again that while we are accustomed to the Navigator, you may use Balanced Scorecard (BSC) for the same purpose.

We begin with Skandia, which was the pioneer, and continue top-down from a nation to a small department in a large organization. In all cases we emphasize the process from strategy to indicators.

### Using the Navigator to Assess the IC of Skandia AFS

Skandia AFS, located in Sweden, was a pioneer in KM in the 1990s when it incorporated the Navigator in its day-to-day management processes throughout the company. These processes are still a good role model, even though Skandia underwent major changes in the mid-2000s. Next, we show you an example of its IC balance sheet and describe the way it used this balance sheet in its management.

**SKANDIA AFS'S BALANCE SHEET** Leif Edvinsson, then Skandia VP for intellectual capital, described Skandia's balance sheet to Tuvya in an interview conducted in Skandia headquarters in Stockholm in 1997.<sup>4</sup> (For a visual representation of the balance sheet, please see Figure 9.1. It contains examples of some typical indicators.) The balance sheet complements traditional financial reports by providing managers with new tools for managing IC. Figure 9.1 uses numbers from American Skandia's IC balance sheet for the years 1993 to 1995. This balance sheet was given as a supplement to Skandia's annual report to its shareholders.

We have already gone over the various focal points for a company to consider, so we now comment on some of the most important specifics of the points:

- *Financial focus.* This first focus area incorporates standard financial indicators such as sales and profits. What is striking to us as we review the entire balance sheet is that most companies look only at these parameters in making their managerial decisions.

- *Customer focus.* The "number of contracts" and "number of points of sale" are on the rise in this balance sheet, signifying continuous growth. Based on these indicators we would be optimistic about the flow of revenue over the coming years.

- *Human focus.* You can see some of the data showing different aspects of the employee population by reviewing this section. An interesting observation relates to the information about "training expenses per employee" and the "change in IT literacy." These were high in the first year, reflecting the importance of IT and training for a fledgling financial organization. But they decreased significantly over the years on this balance sheet. Is that a sign of maturity at the company or a telltale indication of neglect in these

Indicator	Year		
	1995	1994	1993
Currency in Swedish Kronas, 7 SEK $\approx$ 1 US\$			
<b>Financial Focus</b>			
Return on net asset value	20%	12%	24%
Management operating results (MSEK)	247	115	96
Value added per employee (MSEK)	1.63	1.66	1.98
<b>Customer Focus</b>			
Number of contracts (K)	87.8	59.1	32.0
Saving per contract (KSEK)	360	333	371
Number of points of sale (K)	18.0	11.6	4.8
<b>Human Focus</b>			
Number of employees	300	200	133
Number of managers	81	62	NA
Number of managers who are women	28	13	NA
Training expenses per employee (KSEK)	2.5	9.8	10.6
Change in IT literacy	+2%	+7%	NA
<b>Process Focus</b>			
Number of contracts per employee	293	269	241
Administration expenses/gross premium	3.3%	2.9%	2.6%
IT expenses/administration expenses	13%	8.8%	4.7%
Processing time, new contracts [days]	8	6	NA
Processing time, changes [days]	3	13	NA
<b>Renewal and Development Focus</b>			
Premiums from new launches	49%	11%	5%
Increase in net premium	30	18	205
Development expenses/administration expenses [%]	10.1	11.6	9.8
Percentage of staff under 40	79	72	74

FIGURE 9.1 American Skandia Balance Sheet

Source: Adapted from the AFS Balance Sheet (Leif Edvinsson).\*

\*The currency used in this balance sheet is the Swedish Krona. The typical exchange rate at the middle 1990s was approximately 7 Kronas per 1 US\$. (Surprisingly, after variation during the years, it is approximately the same rate in 2010).

areas? This was an important question for Skandia's management to assess, and they became aware of it as a direct result of the Navigator's statistics output.

- *Process focus.* The data are self-explanatory, but it is instructive to point out that the IC indicators in this section include human capital turned into organizational capital. These are competencies that remain in the organization when employees go home. They include procedures, IT infrastructure and databases, and so on. IT literacy is an indicator for human capital, as mentioned previously, but IT systems are process capital

- *Renewal and development focus.* Renewal and development is directly related to the expected future results. In a high-tech company, this focus refers mainly to the R&D function. But the Navigator is framed to be appropriate for all kinds of companies utilizing various levels of technology. As a financial services company, Skandia still identified the importance of and need for innovation within its goals. Most of the indicators are obvious and expected here. An intriguing indicator is "percentage of staff under 40." The fact that this indicator appears here, and not in the human focus, sends a strong message about Skandia's management viewpoint at that time. They considered that continuous vitality of a company required a high percentage of new, and many times younger, people. What is the viewpoint on this issue in your organization?

**HOW DOES THE NAVIGATOR WORK?** Henrik Danckwardt, then chief financial officer of Skandia AFS in Sweden, showed Tuvya how they applied the Navigator for managing their IC.<sup>5</sup> Danckwardt's task was to control the status and performance of all the AFS allied companies in 18 countries worldwide. Each local company had considerable freedom to utilize its expertise in the local market, while enjoying Skandia's expertise and technologies.

Danckwardt used several principles in devising his control system:

- Although he was chief officer of finance, he broadened his vision to encompass the whole picture, not only the financial parameters. His broad view was based on the structure of the Navigator and enabled both comprehensive and flexible management.
- The indicators in the Navigator were customized for the specific need of each local company, while maintaining common managerial goals (e.g., we have mentioned before the customization of "employee turnover rate").
- The indicators and goals were not forced from above. They were developed in coordination with the local company.

Every year Skandia headquarters had a discussion with each of the companies, during which they evaluated the previous year's results and

prepared the next year's budgets. These budgets included traditional financial goals as well as all the agreed-upon nonfinancial IC indicators. The yearly indicators were derived out of this strategy, prepared according to the IC methodology we described earlier:

Mission and strategy → Key success factors → Indicators → Action

Once the strategy was decided upon, the management tool was incorporated into special software, with the indicators implemented on a web site. At that time financial data was automatically derived from the preexisting IT system of the corporation, while IC indicators were manually input by each allied company.

**CONCLUSION ON SKANDIA'S EXPERIENCE** According to Danckwardt, most of the alliances embraced this management system. The key to its favorable reception was that it served as a common ground for management. Each company aimed to achieve the mutually agreed-upon values of its indicators.

In some of the subsidiaries, such as American Skandia, managers were actually rewarded according to how well they met the IC goals. Note that because financial terms constituted only a small part of their expected bonus, managers were not tempted to sacrifice IC for short-term book value (BV).

At the time, Skandia seemed like the ultimate realization of knowledge culture in a company. It had the right combination of vision, culture, and knowledge management tools. Even though its prosperity somewhat declined later, its knowledge culture is still worth learning from as a successful example.

### Using the Navigator to Assess the IC of a Country

If the concept of intellectual capital and a Navigator to manage it is so good for a specific company, why not use it for a country? Why not establish formal, systematic measurement criteria to document and report the progress of a nation according to key success factors that represent the prosperity of the nation? We describe the experience of two countries that have tried to do this.

**INTELLECTUAL CAPITAL INDICATORS IN SWEDEN** In 1997 a group of students from the Market Academy of Stockholm University, in collaboration with Skandia, applied a modified form of the Skandia Navigator at the national level in order to identify Sweden's critical success factors. The resulting report was entitled *Welfare and Security*.<sup>6</sup>

The following is a brief summary of their groundbreaking representation of the country's intangible values. Readers can assess for themselves the meaning and relative importance of each indicator.

- The financial focus represents the traditional economic way of measuring a country's wealth, including per capita gross domestic product (GDP), national debt, and the mean value of its currency in terms of the U.S. dollar.
- The customer focus highlights the relationship between Sweden and certain other countries. Success factors included extent of tourism, perceived trustworthiness of businessmen, balance of service, and balance of trade, particularly in terms of intellectual property (patents, royalties, etc.).
- The human focus outlines indicators for assessing the prosperity of the Swedish people. These include quality of life, as defined by some health indicators (average life expectancy, infant survival rate, smoking, etc.), education, crime rate, and resources for the elderly.
- The process focus highlights the efficiency of social structures. These include structural changes in industry toward increasingly knowledge- and service-oriented firms, management practices that foster innovation and quality, widespread use of information technology, road safety, and the employment of women.
- The renewal and development focus assesses Sweden's investment in developing competencies for the future through research and development in industry and science, entrepreneurship, the development of trademarks, and the attitudes of its youth.

The purpose of Sweden's balance sheet is clearly to present the country's tangible and intangible assets in a comprehensive manner and raise awareness of indicators and goals beyond the traditional financial measures. As in business organizations, awareness of these broader intangible assets can guide the successful implementation of strategic decisions.

**INTELLECTUAL CAPITAL INDICATORS IN ISRAEL** Israel was the second country in the world, after Sweden, to produce an IC balance sheet. Edna and her consulting team produced the first edition<sup>7</sup> of the balance sheet themselves in 1998, and later editions were sponsored by the Israeli government (with the last one published in 2007).<sup>8</sup>

In order for Israel to maintain its lead position in certain fields, and in order to improve its standing in other fields, it needed to focus on allocating its resources accordingly. The IC report was an important helpful device in identifying the fields that required focus regarding the country's national resources.

Israel's IC focal points are arranged in groups similar to those of the Navigator's (and to the Sweden report we just mentioned). The data is compiled from many sources, including internationally renowned surveys. The following details showcase a few of the innovative indicators that materialized as being on an upswing.

- The financial focus, as in the Swedish report, represents the traditional economic indicators of a country's wealth.

- The customer focus includes indicators like the number of start-up companies and biotechnology companies, which highlight the extent of the country's participation in a knowledge-based world economy. Note that these same indicators are in some way promising renewal, and may also be included in the renewal and development focus.

- For the human focus, the number of female students at institutions of higher education and women in the professional workforce are important indicators, assessing the extent of the country's ability to optimally utilize its human resources through the implementation of equal opportunity as a fundamental value. Additionally, alcohol consumption and youth experimentation with smoking were used as signs of the physical and mental health of the country's population. Events like museum visits were seen as an indicator of the population's consumption of, and interest in participating in, culture.

- For the process focus, the extent of Internet use, software use, and the circulation of daily newspapers are indicators of the levels of processes of communications and computerization.

- For the renewal and development focus, scientific publications in the world and registration of patents per capita are indicators of the country's ability to contribute to global renewal and development.

These and other indicators are promising avenues for the development and implementation of national policies for future growth, just as they would be for a private organization to ensure future growth of a company.

**CONCLUSION ON THE NATIONAL IC EXAMPLES** We look at Israel's IC with mixed thoughts. On the positive side, we are proud that the promises and expectations created by the IC indicators in these reports are proving to materialize. In recent years the Israeli economy has prospered—mostly because of its large investments in IC, both publicly and privately—and was one of the first nations in the Western world to come out of the world financial crisis of 2008.

On the less positive side, we know that these indicators are snapshots of the IC we have now, which is a result of past national policies. Unfortunately, they do not represent our country's current common vision and strategy. We believe this is because Israel is grappling with defining its vision within the context of conflicting internal identities.

Just like organizations, countries should define their strategies for improving their competitive position relative to other countries, to enhance sustainable prosperity of their citizens. Without such a strategy, the IC balance sheet loses its significance as a potential source for policy.

### Using the Navigator to Visualize and Increase IC of an Old Industry Corporation

In Chapter 1 we have presented the strategic problem that faced Danya Cebus in the late 1990. Danya Cebus is a leading Israeli construction company that has implemented many large, complex projects including malls, government offices and ministries, and industrial science parks. When it decided to go public, it sought a method for raising its apparent value to potential investors, who at the time were more attracted to the booming high-tech industries.

It decided to create an IC balance sheet as an elegant way of presenting itself and its potential for growth. IC balance allowed Danya Cebus to visualize its core competencies, which were its hidden values. It showed, essentially, that Danya Cebus was a high-tech company in the low-tech construction industry. It revealed that it was a company on the rise in a declining market. As expected, the IC balance sheet significantly raised the value of the company and led to satisfactory results on the stock market.

The following are some sample indicators, demonstrating core competencies that are not shown on the traditional financial report:

- *Human:*

- Worker loyalty as expressed by the average period of work at the organization (for managers: 20 years!);
- The number of engineers employed;
- The number of workers with graduate degrees;
- Managerial training (at least one training day a month).

- *Process:*

- Use of advanced technology and information systems;
- Lesson-learning procedures;
- Quality management systems.

- *Customer and Suppliers:*

- Joint collaborations with foreign companies;
- Subcontractor loyalty.

Although Danya Cebus's IC Balance Sheet began as a creative marketing tool aimed at raising its market value, it eventually came to be used as a management tool. The company's managers found that they can use the indicator to delineate goals and work plans for strengthening the company's core competencies.

### Using the Navigator to Assess the IC of a Nonprofit Unit at Rafael

The IC management of a department within an organization is intertwined with the organization's overall business strategy. Nonetheless, departments can delineate their own vision, strategy, and IC indicators within the larger policy to reflect their unique character and needs.

The strategies of divisions of large organizations, which are managed as independent business units, are essentially scaled-down versions of the IC management strategy of the organization as a whole.

This is not the case with units for which performance is not assessed according to their profits. These units may be engineering R&D departments in a matrix organization, human resources departments, and so forth. They, too, can (and should) use Navigator-like tools to set goals and measure their performance. However, they must define their strategy and their bottom-line results.

While we do not claim to have a structured and comprehensive answer to this issue, we can present some lessons learned at Rafael. We give the following examples of creating IC indicators in a large R&D center versus creating the indicators in a typical smaller section of that center.

On the one hand, we have a large R&D center at one division of Rafael, consisting of more than 1,000 scientists and engineers of various disciplines. All of them are doing research, development, and engineering work for internal customers, who are all actual business units of that division. On the other hand we have a section, which is a small unit with 25 to 50 workers, usually dedicated to a specific discipline. (We also have a middle hierarchical level between them, which we shall not discuss here.)

**STRATEGY** Defining the strategy and vision, as a prerequisite for defining indicators, was easier for the center than for its sections. The R&D center strategy and vision are derived somewhat from the division strategy with some center's unique additions. While it was not fully codified, it was clear enough for the center's top managers. They were also experienced enough to define the necessary updates over the years.

Defining section's strategy was more difficult. Some section managers, while doing well in their day-to-day operations, had a difficult time with the more abstract task of creating an actual strategy and vision. Still others had difficulty deriving the key success factors toward creating IC indicators.

Further, contrary to what you might think, in some cases veteran technicians managing a support department did better with this task than some of the younger PhD employees managing groups of scientists. A more serious analysis of the problems taught us two lessons:

1. Many of the difficulties resulted from creating this process from the bottom up, instead of waiting for a defined center strategy and then going top-down.
2. Strategy is really a difficult task for inexperienced managers who require better training and mentoring.

**BOTTOM-LINE INDICATORS** Bottom-line indicators for these nonprofit units, replacing the financial indicators of business units, were simpler to get for the small section than for the large center as a whole. The small section usually has well-defined tasks, by which it is judged by internal customers (completing a design and being ready for a formal review, building a sub-assembly and testing it as a unit, etc.).

The indicators presented here for the bottom line of the large center are more complex, and evolved from years prior. First, the division required this major large center to measure itself according to the overall division's financial results—sales, profit, and so on. Even though the R&D center is not the only one influencing the division's financial results, and many times it has no direct influence, it must be aligned with them. This assures it will do its best to add to the success of the division.

Second, the large center managers decided they needed some indicators with a more direct relationship between center activities and internal customers—the division and its project managers. They came up with two, one measuring input and the other, output:

1. Input: the success in meeting individual project demands for R&D personnel. This indicator is checked frequently, almost daily, by the center and its customers and the results lead to corrective actions.
2. Output (obvious for an aerospace organization): performing flight tests on time and with successful results.

**INDICATORS FOR THE OTHER NAVIGATOR FOCUS AREAS** Some of the bottom-line indicators described thus far also serve to achieve customer goals. In a perfect process, we would also hope to factor formal internal customer satisfaction surveys into these indicators. But at the time of this exercise, we had failed to employ it as timely tool. However, please do keep it in mind for your organization when doing a similar exercise.

To the preceding bottom-line indicators, we would brainstorm on all other focus areas regarding planning work processes, human resources,

and R&D. These tasks were simpler than the previous ones, for both the center level and the section level. In many cases, the section level indicators could have been directly derived from the center indicators. Further, many indicators are similar to those already mentioned for other organizations. Examples include the following:

- **Renewal and development:** Unlike the abstract strategy, no manager (junior or senior) in an R&D center has difficulties setting ambitious short-term and long-term research goals and deriving indicators to measure them.
- **Human resources:** In addition to the usual indicators like depicting number and professions of new recruits, we follow the processes of screening and training top employees for future leadership assignments.
- **Work processes:** In some departments that seem to grow too fast, we set goals for outsourcing some of the work.

### A Final Note on the Navigator as a Universal Framework

The preceding discussions prove the effectiveness of the Navigator as a universal framework to manage the IC of various and different organizations, be it a country, a company, or a department within a company.

For example, sections, centers, and divisions at Rafael are vastly different from those at Skandia and its subsidiaries (for which the Navigator was originally developed). The two companies engage in completely different work (in this case, financial services versus the aerospace industry), they are different sizes, and they are located in geographically distinct areas and within divergent cultural contexts. In spite of these differences, though, the Navigator proved to be a useful framework for measuring and setting performance goals for both of their intangible assets. Rafael's only modification while using the Navigator framework, in light of its unique characteristics, was adding an additional focal point: technology and infrastructure.

This type of nimble adjustment, depending on the core competencies of a company, can only make the Navigator framework even more valuable.

## Conclusion

Unfortunately, in terms of assessing the *monetary dollar value* of intangible assets, these methods of assessing IC indicators are not fixed and polished accounting tools, but this is to be expected when you are using innovative methods and treading new ground. Even though the systems are not up to speed with all the needs, managers and investors must become familiar with such tools while waiting for improvements in these accounting systems.

In terms of *managing intangible assets*, though, we have attempted to demonstrate to managers the various methods currently available to them in order to start them on their path toward proper knowledge management. Using structured frameworks like the Navigator or the Balanced Scorecard can help managers learn from what their organizations are already doing. The principle behind these frameworks is the same no matter the method: They assist managers in defining their strategy regarding intangible assets and IC, by helping them set goals to derive appropriate indicators to measure and manage their goals.

The methods presented in this chapter for managing intellectual capital may be adapted to different types of organizations—from local to global and public to private, as well as both profit and nonprofit.

This chapter concludes the third phase of our knowledge management journey, where we have presented several chapters describing the various view points of knowledge. The next chapter, on Innovation, is the last phase and final peak of the journey.

## The Magnificent 7

1. Managing intellectual capital requires an appropriate system for measuring intangible assets.
2. Responsible organizations already have some methods of measuring and managing their intangible assets, or at least part of them. Managers should identify the existing method, and use them as a basis for a more comprehensive and/or more structured method.
3. Skandia's Navigator is a comprehensive and convenient method for measuring intellectual capital and setting goals that can be utilized by a variety of organizations.
4. The Navigator involves a sequential process of deriving critical success factors based on an organization's vision and strategy and devises indicators to assess performance and set goals according to these factors.
5. The Navigator framework divides intangible assets into five focus areas: financial, process, human, customer, and renewal and development.
6. New accounting methods are being developed for assessing the monetary value of intangible assets and improving predictions of an organization's success.
7. Nonfinancial units also need a method to assess the performance of their knowledge management endeavors, and may adapt the Navigator to do it.

EBSCOhost®