

The Knowledge Creating Cycle

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In the book *The Knowledge Creating Company*, Ikujiro Nonaka lays out a way to look at teams and collaborative processes in organizations, in particular the development of globally successful designs. He focuses on the ability of organizations to develop new knowledge which help them outperform their competition.

Tacit Knowledge

One of the first and most critical points he makes is that many organizations ignore some of the most important available knowledge. Most organizations focus their management on the “explicit” knowledge, the stuff that is easy to explain and write down. But every person has a great deal of “tacit” knowledge, stuff they know but have a hard time explaining or communicating. If you are trying to help someone, but you can’t tell them, you can just show them, that is tacit knowledge.

Education systems generally focus on delivering and assessing explicit knowledge. One of the biggest disasters of the downsizing craze was that it was obvious that recent graduates provided more current explicit knowledge at a greatly reduced salary cost. What was invisible until after the downsizing (age based outplacng) was that the firm ran largely on tacit knowledge of the business and operations, of which the newbies had zero. Many businesses found themselves having to hire back the laid off senior people as consultants just to keep the business running.

Knowledge Transformations

Nonaka analyzes knowledge creating in four zones, a two by two matrix of knowledge moving **from** tacit or explicit **to** tacit or explicit. Each quadrant requires a different kind of thinking and interaction.

Combination: Explicit to Explicit

This is our most familiar process. We take explicit, explainable knowledge, combine it with other explicit

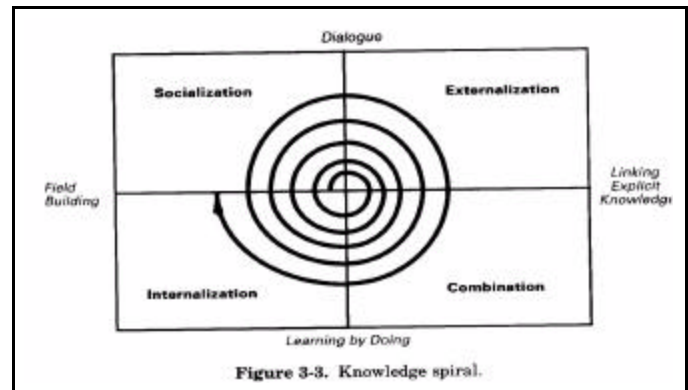


Figure 3-3. Knowledge spiral.

knowledge and develop new explicit knowledge. This process characterizes most studying in school, the development of new designs and procedures.

Internalization: Explicit to Tacit

This is the process whereby something we learn becomes automatic. When you first learned to drive, it was an explicit process, in which a constant internal monologue reminded you to check the mirror, shift the gears, press the brake, etc. Once you more deeply learned the process, it becomes completely internal and you can drive for hours without noticing your driving.

One interesting thing is that generally when you try to pay attention to how you are doing these things, it impairs your performance. Just try writing down the steps to tying your shoe and following them.

Socialization: Tacit to Tacit

One of the most powerful human learning capacities is through socialization, observing behavior by others and copying their behaviors and beliefs. Humans learn to speak and survive in their culture almost entirely by socialization. Psychologists talk about how reward and punishment are at the root of learning, but in fact we often learn by observing how others are rewarded and punished for their behavior. For example, if you are new to a group, and someone in the group does a behavior that triggers a negative nonverbal reaction in the other members of the

group, you learn immediately, and often unconsciously, not to do that behavior.

Fields that understand the role of this tacit to tacit process develop people for their field with fewer lectures and more labs, studios, and apprenticeships.

Externalization: Tacit to Explicit

The book is full of stories of product development collaborations, and one of the strongest themes is that successful design often requires getting tacit knowledge into an explicit form so that you can develop effective designs. For example, in the development of the automatic breadmaker, no matter how many times they interviewed bakers and watched them work, their designs failed to produce good bread. Finally, some engineers apprenticed themselves to a famous baker and made a whole lot of bread before they figured out that kneading process included a pulling aspect that created air spaces in the dough. As engineers, they then put blunt fins at the bottom of the chamber to pull on the mass of bread dough as it was rotated, making much better bread.

The Knowledge Spiral

While engineers and managers tend to think of design as all happening in the explicit-to-explicit combination and deduction mode, Nonaka argues that all design, problem solving, and knowledge creation processes are more effective when they spiral through all the quadrants. In many projects it may be necessary to rotate deliberately through the cycle several times until the knowledge is complete enough and accurate enough for the organization to take effective action.

Again, the processes to work effectively in each quadrant are different, and part of the task of a manager is to make sure that people have the kinds of relationships and interactions to allow the knowledge to emerge. For example, he tells the story of the invention of the small copier which became the basis of all laser printers, in which the driving issue was to make an inner workings cheap enough to be disposable. One of the most expensive components was the drum on which the image is created in toner before application to the paper. In the middle of a weekend beer bash/brainstorming session, the manager held up his beer can and pointed out how much it looked like the drum. By changing to manufacturing methods similar to beer can production, the design became possible. A climate in which suggesting using a beer can to make a copier is not easy to achieve.

The Role of Middle Managers

One of Nonaka's more interesting conclusions is that knowledge creation is extremely difficult in the pyramid concept of organizations, in which all multiple aspect decisions are passed up to overload the next level. Instead, only the middle managers, representing their specialties and guided in company strategy by the general manager can effectively develop the complex knowledge and designs needed for organizational success today.

Of course, when middle-managers have had their jobs restricted to relaying orders, and developing reports, it is easy to replace them with spreadsheet macros and e-mail. The firms who collapsed layers of management rather than getting the middle managers to collaborate in knowledge development often suffered opportunity costs far in excess of the easily measurable savings.

The Hypertext Organization

Nonaka makes an interesting analogy for how these knowledge creating teams work, based on the idea of hypertext, the mechanism underlying the world wide web. In normal text you have words on a page, whether it is on paper or a computer screen. You can have text and graphics in the same way. The concept of hypertext is that you can also have links on a page, links which could give you other pages, programs, video links, or almost anything.

Nonaka points out that in collaborative teams, the role of members is to be links to their home departments, not independent experts. Matrix organizations and project teams often think of their members as limited to only using their capacities, when it is their access to resources that defines their usefulness to the team..

Summary

Nonaka seems to provide a useful way to think about the organization and facilitation of teams within organizations, as well as some critical lessons for people trying to structure organizations while ignoring the realities of tacit knowledge critical to organizational success.

Reference

The Knowledge Creating Company, Ikujiro Nonaka and Hirotaka Takeuchi. New York: Oxford University Press, 1995.