Creating a Competitive Strategic Advantage

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Editor's note

This article was developed from Dr. Ackoff's keynote presentation at the Practical Applications for Using Systems Thinking *conference, presented by Linkage, Inc., with sponsorship by GOAL/QPC*—Editor.

Introduction

This article contains a brief discussion of the five kinds of changes that, based on my experience with a large number of corporations, are required for an enterprise to attain or retain a leadership position in today's competitive environment. Very few organizations have made all of these changes. Some have made a few.

But first, to provide you with a clear understanding of what I say subsequently, I will explain the way I understand a few key concepts.

Definition of a system

A *system* is a whole that is defined by its function in a larger system of which it is a part. It is never defined by the function it performs for something internal to it. For example, an automobile is defined by its function in society's transportation system, and an HMO by its function in society's healthcare system. This defining function is the product of the interaction of a system's essential parts, all of which are connected either directly or indirectly. Therefore, the whole cannot be divided into independent parts or groups of parts.

A system's essential parts are those without which it cannot perform its defining function. For example, an automobile's motor is essential, but its ashtray is not. A car can move people from one place to another without an ashtray, but not without a motor. Furthermore, the essential parts of a system lose their essential properties when removed from the system of which they are a part. When a motor is removed from a car, the motor cannot move anything, including itself.

The interaction of a system's essential parts produces the properties of the system. Therefore, when the system is taken apart, it loses its defining properties, and so do its parts. If a car was brought into a room and disassembled, even if every part was kept in that room, it would no longer be a car. A car is the interaction of its parts, not the sum of the actions of its parts taken separately.

We must change our pattern of thought

Analysis is a three-step process that consists of (1) taking apart that which we want to know or understand, (2) trying to know or explain the behavior of the parts

We must change our pattern of thought, continued

taken separately, and (3) trying to integrate what is learned about the parts to gain knowledge or understanding of the whole. Analysis is the major mode of thought in the Western world, and for 400 years it has been synonymous with thinking. It is the way we conduct inquiries into the nature of things.

It is commonly believed that if you want to understand something, you must analyze it, and therefore begin by taking it apart. To gain complete understanding you must keep taking the parts apart until you reach indivisible parts, or elements (e.g., atoms [in the past] and cells). This doctrine is called *reductionism.*

A system cannot be explained, hence understood, by analysis because when a system is taken apart it loses all of its essential properties, and so do its parts. Therefore, understanding a system requires development of a pattern of thought other than analysis, even though analysis is the prevailing pattern of thought in our culture. Analysis can reveal how a system works; it can provide know-how, or knowledge; but it cannot produce understanding. Therefore, the difference between knowledge and understanding is critical.

Albert Einstein once wrote, "Without changing our pattern of thought, we will not be able to solve the problems we created with our current pattern of thought." Explanation of a system requires a shift in thinking from analysis to a different pattern of thought known as *synthesis.*

Knowledge vs. understanding

If you want to know how a system works, you have to analyze it. If you want to find the part of a car that has become defective, you must take the car apart. But if you want to understand why the British drive on the left side of the road, you will never find the answer by taking British cars apart. Nor, by taking cars apart, can you explain why typical American cars manufactured before World War II were built to carry six passengers. Why wasn't it eight, or five, or two? Why six?

The understanding of a system, which is gained by explanations—answers to questions that begin with *why*—can never be found within the system. Understanding can be found only in the function that a system performs in the larger system of which it is a part. Understanding deals with functions and roles; knowledge deals with structure. *Knowledge tells us how a system works. Understanding tells us why it works the way it does.* Understanding a system requires *synthetic* thinking.

Synthetic thinking is a three-step process

Synthetic thinking, like analytical thinking, is a three-step process, but each step is the opposite of the corresponding step of analysis. In the first step of analysis, the system to be explained is taken apart; in the first step of synthesis, the system to be explained is not taken apart but is seen as a part of a larger system. In the second step of analysis, the behavior and properties of the parts of the system are described and explained; in the second step of synthesis, the behavior and properties of the containing system are described and explained. In the third step of analysis, the

Synthetic thinking is a three-step process, continued

knowledge and understanding of the parts are aggregated into knowledge and understanding of the whole; in synthesis, knowledge and understanding of the containing whole are disaggregated, which leads to identifying the function or role of the (smaller) system to be explained.

Progressing from understanding to wisdom

The progression from understanding to *wisdom* involves evaluation of the role or function of the system. The nature of wisdom is best revealed in a wonderful statement Peter Drucker once made. He said that there is a difference between doing things right and doing the right thing. *Efficiency* involves doing things right; *effectiveness* involves doing the right things in the right way. Knowledge and understanding enable us to increase efficiency, but wisdom enables us to increase effectiveness.

We fail to deal effectively with many, if not most, social problems confronting us today because we are trying to do the wrong things right. The "righter" we do the wrong thing, the "wronger" we become. If we make a mistake doing the wrong thing and correct it, we become wronger. If we do the right thing wrong and correct it, we become righter. Therefore, it's better to do the right thing wrong than to do the wrong thing right. But, as mentioned earlier, our approach to problems is analytical and focuses on efficiency, hence knowledge. In contrast, understanding and wisdom require *synthetic* thinking.

Examples of efforts to do wrong things "righter"

Below are a few brief examples of efforts to do the wrong thing righter. The United States has repeatedly failed to develop a national healthcare system, and the country's current system has deteriorated continuously over the last several decades. Despite what politicians say, we in the United States do not have the best system in the world. According to the World Health Organization, we rank thirty-seventh in the world in quality of health care. France, which has universal coverage and ranks much higher than the United States, spends $2100 per capita per year, whereas we spend $3724. Japan, which ranks tenth, spends only $1750 per capita per year, and its citizens have an average life expectancy that's four and a half years longer than that of U.S. citizens. We are the only developed country that does not have universal coverage; approximately 42 million people have no health insurance.

What's wrong with our system? Analyzing it won't provide the answer. One must look at how it functions in the larger system of which it is a part. What do U.S. patients pay a doctor or a hospital for? Taking care of them when they are sick or disabled. Thus, it's a sickness-and-disability-care system, not a healthcare system. In fact, the worst thing that could happen to this system would be for everybody to be healthy. If that were to happen, the current system would not exist. So, despite the declared and good intentions of the individuals and institutions that provide so-called healthcare services in the United States, the system is actually dedicated to preserving and creating sickness and disability.

Examples of efforts to do wrong things "righter," continued

That horrible fact is becoming apparent. A recent study showed that about 120,000 preventable deaths and one million injuries occur during the course of medical treatment each year. A study we did in Great Britain a number of years ago showed that more than 25% of the people in the hospital were there because of what the hospital did to them the last time they were there. Over 50% of the surgery performed in the United States is suspected of being unnecessary. There is also evidence that a good deal of illness is due to the interactions of prescribed drugs, interactions of which most doctors have no knowledge. And there are numerous other errors in the system.

A real healthcare system would require payment to the servers for keeping a person healthy, not for taking care of sickness. A design for such a system is available, but the wisdom required to adopt it is not.

The automobile is another example of trying to do the wrong thing righter. More than 90% of the energy consumed by an automobile is used for moving the automobile, not its passengers. In traffic on American roads, the average number of occupants per automobile is 1.2. Why do we need 6-passenger cars? We did back when the typical American car served as a family vehicle, and the average family contained 5.6 people. Today, the average is just over 3. The average speed of the automobiles traveling in most urban areas of the United States is only a small fraction of the cars' capabilities. Why do we need cars that can go more than twice the highest posted speed limit?

We need to have a different kind of automobile for urban use; it does not have to be the same as the kind designed for interurban use. Most U.S. households already have two or more cars. Drive-it-yourself, two-passenger, coin-operated urban automobiles are now in use in several European cities. In addition to reducing congestion, they significantly reduce pollution!

Learning how to learn

The American education system provides another example of trying to do the wrong thing righter. Educators don't understand the difference between teaching and learning. Being taught is a major obstruction to learning. Most of the things you know and use (like language and the technology involved in your work) were never taught to you. You learned them in practice. We can better learn most of what we need to know by serving as apprentices rather than by being students.

Furthermore, everyone who has taught knows that the one who learns the most in a classroom is the teacher, not the students. We've got schools upside-down. Students ought to be teaching. What university faculty members know how to do is learn. (It's what distinguishes them from most grade school teachers.) Therefore, faculty members ought to be resources that enable students to learn how to learn and motivate them to do so continually. What students learn is largely irrelevant because most of the material that they are taught, even in a university, is material that they never use. It's irrelevant or obsolete.

Five Kinds of Changes Required for an Organization to Remain in a Leadership Position in the New Century

Change 1: interactive planning

Now that I've covered some basic concepts and my way of looking at things, I can move on to the five kinds of change that I believe are required for an organization to gain or retain a leadership position in the new century. The first change concerns the prevailing concept of planning.

The principal way of planning employed in the United States is *predict and prepare.* It begins by forecasting the future and then, given that forecast, preparing a vision of where the planners would like to be in five or 10 years. Their plan then describes the path they hope to take from here to there to achieve fulfillment of the vision. Most plans produced this way are never completely implemented. Something happens that was not anticipated, and it throws the plans out of whack. In a rapidly changing environment of increasing complexity, forecasts deteriorate rapidly. Therefore, planning based on forecasting is unlikely to be effective. We have to deal with the future in some other way and reconceptualize the planning process.

Using the conventional mode of planning, the planner stands in the present, predicts the future, and then sets objectives in the form of a vision that takes the plan from where s/he is to where s/he wants to be. Concerning this process, I once heard a vice president of a major corporation ask two questions. His first was "How can you know where you want to be five or 10 years from now if you don't know where you would be right now if you could be wherever you wanted?" Therefore, he said, planning should begin with the question of where you would be right now if you could be wherever you wanted. Furthermore, there is one thing about the future you can be absolutely sure of: no matter where you say you want to be in the future, you will not want to be there once you get there.

His second question was "If you don't know what you would do if you could do whatever you wanted to, with no or few constraints, how can you know what to do when you are constrained?" These two questions lead to an entirely different concept of planning, which is called *interactive planning.*

The benefits of interactive planning

In interactive planning, the planner no longer begins from where s/he is. S/he begins from where s/he would ideally like to be. Then s/he plans backward from where s/he wants to be to where s/he is. Why? First of all, planning backward reduces the complexity of the planning process by an order of magnitude. Children know this, but adults are not smart enough to realize it. Have you ever watched a child solve a maze? A child quickly learns that it is easier to work backward from the exit and go toward the entrance.

Back in the 1950s, Richard Bellman, a professor at the University of Southern California, developed Dynamic Programming, which showed that whenever you have a known origin and a known destination and want to find the best path

The benefits of interactive planning, continued

between them, it is always better to work from the destination back to the origin.

For example, suppose 64 players enter a tennis tournament. How many matches will have to be played? Starting at the beginning: the first round consists of 32 matches, then 16, 8, 4, 2, and 1. They add up to 63. Now start at the end of the tournament. How many losers would there have to be? Sixty-three! There it is, right there. And it is just as easy to use this technique when the number of entries is not a multiple of two. Planning should start with where you would ideally like to be.

Idealized redesign

An idealized redesign of a system is a design that starts with the assumption that the system to be planned for has been destroyed. It no longer exists, but its environment remains as is. The planners then decide what features they would include if they could have whatever they wanted, constrained by just three requirements. First, the design must be technologically feasible, no science fiction; second, it must be able to survive in the current environment but need not be implementable in it; and third, it should be capable of learning and being improved over time from within and without. When the design is completed, the designers should determine the closest approximation to that design that can be attained. Designers are almost always surprised to see how close to their ideal they can actually get. Planning to get there is the realization phase of planning.

Seeing the obstructions

When you stand where you are and look out to where you want to be, you see all kinds of obstructions. But when you stand where you want to be and look backward, you don't see the same obstructions—for a very important reason. The principal obstruction between where we are and where we want to be is always us. But we see obstructions differently; we attribute them to the environment, the law, the boss—usually to something over which we think we have no control. But when we stand where we want to be and look backward, it becomes apparent that we are the obstruction; what appears to be an obstruction is at most a hurdle that can be jumped over or averted.

Consider a very simple example. Once while I was visiting friends in England, their next-door neighbor came in, hopping mad. She said, "You know what that store on the corner did to me this morning? Every weekday morning since I've been living here, I've stopped there and cashed a check in order to do my shopping. When I got there this morning, they told me they have a new policy: they won't cash checks anymore."

She encountered what could be an externally imposed obstruction, one that appeared to prevent her from doing what she wanted to do. But that is not the end of this story. She had a mischievous smile on her face, so I asked her what she did. She said, "I got around them. I went to the dress department, bought a dress, paid for it by check, took it to the return department, and got a cash refund."

Seeing the obstructions, continued

In this case, the obstruction really was her inability at first to see how to *beat the system.* Beating the system is an essential part of systems thinking, and that can occur only when we're looking at the situation from where we want to be rather than from where we are.

Planning should be a continual process

In sum, then, the first necessary change for an organization to compete effectively in the new environment is to utilize interactive planning, which starts with an idealized design of the system and then identifies the closest approximation to it that is thought to be possible. The planners must then move into the future continually trying to close the gap between where they are and where they would be right now if they could be wherever they wanted. The time to reduce or close the gap between where you are now and where you want to be now is right now. This has an important consequence.

Consider the organization you work in and the major differences between what it is now and what it was 10 years ago. Then ask yourself this question: What produced these differences? Was it something that was done to the organization, or was it something that the organization did? You will find that, by far, most of the changes that have occurred are the result of what the organization did or did not do, not the result of what was done to it.

The present is largely created by what was done in the past; therefore, the future will largely be created by what is done in the present. The continual effort to close the gap between where you are and where you want to be *now* is a way of creating the future. Furthermore, it means that planning should be a continual process, not an off-again, on-again process. Planning is a motion picture; a plan is a still photograph. You can't judge a motion picture by a snapshot taken from it. Planning has to go on continually for an organization to adapt and learn how to do things better. Otherwise, implementation will be aborted.

Forecasts vs. assumptions

Determining what should be done now always involves consideration of the future, but consideration of the future need not be based on forecasts. It can be based on assumptions about the future, and these differ significantly from forecasts. For example, we carry a spare tire in our cars because we assume a flat tire is possible, but we forecast that one is unlikely to occur during our next trip. Forecasts are about probabilities; assumptions are about possibilities. Assumptions about the future are handled by contingency planning, which involves deciding what to do now to handle any contingency that might arise—like carrying a spare tire.

Change 2: democratizing organizations

The second necessary change for an organization to compete effectively in today's competitive environment involves the nature of management and derives from a series of considerations. The first consideration is that academic disciplines

Change 2: democratizing organizations, continued

are anti-systemic concepts. Experience and reality are not organized the way universities are. There are no such things as financial problems, marketing problems, social problems, health problems, and so on. Every problem a doctor looks at is a medical problem, and every problem an economist looks at is an economics problem. But these disciplines are points of view, not categories of reality.

Limitations of managing by discipline

What's so bad about this? We have a habit of identifying problems by the discipline of the person who formulates them. For instance, if a marketing man sees a deficiency in sales, he says, "Uh-oh, I've got a marketing problem." But in over 90% of the cases I've ever been involved with, problems are best solved someplace other than where they are recognized.

Here is a simple example: When you get a headache, do you have brain surgery? Of course not. You put a pill in your stomach. Why? Because you know the pill contains a substance that will dissolve in your stomach and enter the bloodstream, which will carry it to the brain and deposit it on the pain center. You (or the person who suggests taking the pill) understand the interaction of the parts of the system and exploit that knowledge in treating the problem. So a headache is a perceived pain in the head that we treat by putting something in the stomach.

But we don't manage organizations that way. Instead, we manage them within disciplinary silos—production, marketing, finance, personnel, and so on—as though problems fall into those categories, but they don't. Problems should not be viewed as the property of any part of a system, but of the system as a whole. Therefore, all problems should be viewed from a variety of disciplinary perspectives to find the best way of treating them.

The effects of workers' educational levels on management

Another consideration that the second necessary change derives from is what has happened to the educational level of the work force. In 1900, the average educational level of the American worker was low—grade school. Many workers were immigrants who at best were barely literate. By World War I, because of compulsory public education, the average level rose to about eighth grade. Today, most workers have had some or a great deal of college. We have a highly educated work force, but we continue to manage it exactly the same way we managed the illiterate, ignorant work force of yesterday.

It is currently estimated that about 95% of the people employed in 1900 could not do their jobs as well as their bosses, because their bosses previously had been the best at doing their jobs and were promoted for this reason. This is no longer the case. Today most people employed in the United States can do their jobs better than their bosses can, but we continue to manage them as if the opposite were true. When managers who can't do their subordinates' jobs as well as their subordinates can try to tell them how to do their jobs, morale, productivity, and the quality of what is produced all suffer.

The effects of workers' educational levels on management, continued

Several years ago, a study done at Volvo showed that workers were permitted to use only about 25% of what they knew that was relevant to their jobs. Volvo's CEO pointed out that firms that used any other resource that poorly would not survive.

Managing interaction

The great challenge before management is to determine how to use what people know more effectively—how to manage knowledge, understanding, and wisdom. This requires a different kind of management. Its nature is revealed by an extreme case. Where is the most educated work force in the world? In universities, because a high percentage of their employees have a Ph.D. Can the president of a university run it? Of course not. Nobody ever ran a university. The president or provost of a university cannot tell its faculty what to teach, how to teach, and when to teach because s/he doesn't know enough about what they know to direct them. The administration's job is to manage the way subordinates interact, not how they act; the way the departments and colleges interact; and the way the institution as a whole interacts with its environment. The deficiency of universities and the education they provide derives from a lack of effective interactions, not actions.

Authority vs. ability to influence

Of relevance here is the tremendous difference between management's exercise of authority, which is *power over*, and its ability to influence, which is *power to*. I was consulted by the Shah of Iran before the revolution on a problem that reflects this difference. The Shah was the most powerful ruler on earth because he was the only head of state who was not subordinate to a constitution. His responsibility was only to God. Therefore, if he made a decision you didn't like, the only recourse you had was prayer.

Nevertheless, a colleague and I spent two and a half hours with his queen discussing a problem that he asked her to discuss with us: Why couldn't he get any of his programs implemented? The reason was that he had sent more than 400,000 Iranians to the United States and Europe for higher education, brought them back, and, since there was no place to employ them except the government, put them all to work there. And lo and behold, they didn't like his policies, so they sabotaged them. Why? Because they knew a lot more than he did about the effects they would have. There is nothing a manager can do that his subordinates can't undo, particularly when they are better educated than s/he is.

Autocratically run organizations are not effective

An organization that contains educated people cannot be run effectively if it is run autocratically. If you try to build a house in New York and tell the carpenters how to do the framing, or the electricians how to wire it, they'll laugh at you. However, if you're working with a group of aborigines in New Guinea and want to build a house, you'd better be prepared to tell them how to do it because they don't know how. You should not manage people who know how to do their job better than you do in the same way you manage people who don't. But most managers do.

Autocratically run organizations are not effective, continued

Business Week had an interesting issue about two years ago. The cover story was about the question "Who owns the firm?" One CEO said that ownership is a matter of investment of resources. He went on to say that we consider shareholders to be owners because they've invested money. However, on reflection, money is not the most important resource because, among other things, it's renewable. If you lose money, you can always replace it. The one resource that we can never replace is *time.* The CEO went on to ask, "Who invests the most time in the company?" The employees do. They have the largest stake in the company and are most affected by its success or failure. Therefore, he argued, they should be treated as owners. He went on to say that shareholders should be treated as investors, not as owners.

The four different types of systems

This way of thinking about an enterprise also becomes relevant when you consider the four different types of systems. One type is a system that, together with its parts, can make no choices. This is a *deterministic* system; for example, a mechanism such as a clock or an automobile. An automobile makes no choices; drivers do—and the motor, fuel pump, battery, and other parts do not make choices either.

One step up the ladder of complexity is an *animate* system, which can make choices but whose parts can't. These are systems of which human beings are an example. You can make choices and have purposes, but your parts—your heart, your lungs, and your stomach, for example—do not. If you woke up one morning and your heart decided it was going to take a day off, you would soon die. The behavior of the parts of an animate system is predetermined.

The third type of system is one that, as a whole, has the ability to make choices, and its parts have that ability as well. This is a *social* system. Nations, corporations, schools, and hospitals are all examples of social systems. Animate systems are purposeful parts of social systems.

The fourth kind of system is one that does not make choices, but some of its parts do. This is an *ecological* system. Nature is such a system.

Example: a social system

Let's look more closely at a social system. When the United States was industrialized in the nineteenth century, enterprises were conceptualized as mechanisms. They were thought of by the general public in exactly the same way as Newton thought of the universe, as a machine created by God to enable Him to do His work. God, in this case, was the owner of the enterprise. At that time, owners were completely unconstrained by laws, regulations, or unions. The function of an enterprise thus conceptualized was to provide its owner with a satisfactory return on his investment and make a profit.

Little skill was required of workers, and labor was in plentiful supply. If people did not work, there was no form of social security to take care of them. Unless there were others who could support them, they would be destitute. As a result, most were

Example: a social system, continued

willing to work under any conditions because they had no alternative source of support. Despite such conceptualization of enterprises and treatment of workers in the second half of the nineteenth century, our economy developed rapidly.

The disappearance of God and emergence of the biological organism

By World War I, the United States began to go through a transformation. To obtain as much growth as possible, corporations needed more capital than profit could provide. They acquired the capital they desired by going public and issuing stock. When they went public, God (i.e., the owners) disappeared. God now consisted of a widely scattered group of shareholders whom workers couldn't see or talk to. How could one communicate with this God? Young Peter Drucker told us how, when he said that this was the same problem the West had about 2000 years ago when God disappeared. How did mortals handle it? They created institutions to serve as communication links between man and God: churches.

Then they created professional administrators to run the churches: the clergy. After World War I, the institution of management was created to serve as a link between the workers and the owners. The administrators in corporations who corresponded to the churches' clergy were called managers. How did a manager know the will of the owners? The same way the clergy claimed to know the will of God—by revelation. How else?

And so we entered a period of looking at a company as a biological entity—not mechanistic, but animate. It made choices; the principal ones were directed at survival through growth. Profit, like oxygen, came to be viewed as necessary for an enterprise's survival, but not the reason for it. Even the language used to talk about an enterprise was changed. The leader of an organization came to be called its *head.* This is a biological concept. We never talk about the head of a machine.

Stafford Beer wrote two famous books, *The Brain of the Firm* and *The Heart of the Enterprise.* A company that went public came to be called a *corporation.* This word derives from *corpus,* which means *body.* The law declared the corporation to be a person in its view. The parts were treated as organs having no purposes of their own; only their health and safety were relevant to management. Corporations were thought of as healthy or sick. The biological analogy was complete.

Parts with a purpose

During World War II, a large part of the American work force was absorbed by the military and replaced by women, many of whom were on allowances provided by the government because the men on whom they had been dependent had been drawn into the military. For the first time, the United States had a work force that was not primarily motivated by economic factors. Management had to look at these workers as people whose interests had to be served if they were to be as productive as desired.

So "Tilly the Toiler" and "Rosie the Riveter" were a turning point in American

Parts with a purpose, continued

economic history. And, after the war, the returning soldiers, who had been forced to put up with the strict discipline of the military, were not going to put up with it at work. Managers began to look at corporations as systems that consisted of parts that had purposes of their own, and these had to be satisfied.

More important, the parts viewed themselves this way. Different interest groups organized and protested the poor way by which systems of which they were a part were serving their purpose. The civil liberties movement, women's liberation, the generation gap, third-world problems, and the alienation from work (identified by the Department of Health, Education, and Welfare as the most serious problem confronting our country) are all situations that arose when parts of systems began to feel that the system had obligations to them. Such a system is not an organism; it is a *social system.* It has purposes of its own, has parts that have purposes of their own, and is part of larger systems that have purposes of their own. And these larger systems contain other systems whose interests have to be taken into account. A social system is a system that floats in a sea of purposes that are often inconsistent within and between levels.

Enterprises need to be viewed as communities, not as organisms

Today, however, the dominant mode of thinking about corporations remains organismic. Social systemic thinking is still in its infancy. Herein lies the rub! An enterprise that is looked at as a social system is not an organism; it is a *community.* This is a fundamental conceptual change. To see why, consider the city of Boston. Boston is a community. Who owns Boston? Nobody. Ownership is an irrelevant concept when you look at a system as a social system, because its function is to serve its parts and the larger system of which it is a part.

A lack of democracy

The United States is a country that is dedicated to the pursuit of democracy. Although we don't claim to be perfect, we're certainly getting a little better at it. But how come almost all the institutions within the United States—corporations, schools, hospitals, and government agencies—are run autocratically? Many are run by what could be called dictators. How does one explain the incompatibility between the way we run the parts and the way we run the whole? The answer lies in the fact that it was necessary to do so when the work force was ignorant and had to be told what to do. But we did not adapt to the rising level of education in the work force. Today we have to manage workers' interactions, not their actions.

In sum, then, the second fundamental change required to attain or retain leadership in the new century is to democratize our organizations. How can we convert autocratically managed organizations, particularly enterprises, into ones that are democratically managed? Designs for doing this—called democratic hierarchies, or circular organizations—are available but are seldom used as yet.

Change 3: using an internal market economy

The third change required for an organization to be an effective competitor in the new century derives from a series of problems I have run into over the years. The first one is transfer pricing. This occurs when an organization has two parts, one of which produces something that the other one uses. If each part is a profit center, the one that buys something from the other must pay for it. A higher level of authority usually establishes this *transfer price* so that the profitability of each part taken separately can be measured.

Why the use of transfer prices causes problems

In a number of cases, I've been asked to come into a company and make the transfer prices fair. I'll let you in on a secret: there is no such thing as a fair transfer price. All transfer pricing is inherently unfair and produces conflict from which the organization as a whole suffers. It has to; it's the wrong concept. Therefore, trying to make it right is trying to do the wrong thing righter.

For example, there is a company whose largest single business unit makes small motors that are used in household appliances, such as dishwashers and refrigerators. It is a major producer of such motors. It has a small number of appliance manufacturers as customers, which account for most of its revenue. This business unit was working seven days a week in three shifts to fill orders. It was very profitable.

There is another division of this company that supplies replacement parts to electrical manufacturing distributors located in just about every city in the United States. They supply replacement parts for machinery, including small motors. This distributor-supply division was required by top management to buy the motors it sold from the motor-producing division at a specified transfer price. These two profit centers were at war.

The CEO asked my colleagues and me to see if we could settle their differences. This is what we found. Let's say the transfer price was set at $100 per motor. The motor-producing unit could sell all the motors it made to other customers for $110, and therefore lost $10 for each one it was required to send to the distributor-supply unit. Little wonder that it hated that unit. Meanwhile, the distributor-supply unit could frequently buy an equivalent motor from an external producer for $80. So every time it had to pay $100 for an internally produced motor, it lost $20. Therefore, it hated the motor-producing unit.

A solution to a transfer-price dilemma

While reviewing the cause of the conflict, we began to think that we were addressing the wrong problem. The right problem was not to do the impossible—set a fair transfer price—but to eliminate the need for one and to benefit the objectives of the organization as a whole. This turned out to be a relatively easy problem to solve. Our suggestion was as follows: allow the selling department to sell whatever it wants at whatever price it wants to whomever it wants, subject to an override (discussed on the next page). Let the buying department buy whatever it wants

A solution to a transfer-price dilemma, continued

wherever it wants at whatever price it wants, also subject to an override. The lowest-level executive to whom these two units report can override their decisions to buy or sell, just as the government can override IBM's desire to sell computers to a national enemy. But the overriding executive must pay the motor-producing unit the $10 it loses by selling units internally, and pay the distributor-supply unit $20 for every unit it pays $100 for when it could have paid only $80. Therefore, the two units never have to receive or pay more than they would if they were operating in a completely free market.

What about that executive? He incurs costs, but he is also considered to be the owner of the two units involved. He gets a share of their profits one way or another. Therefore, he has an incentive to make overriding decisions that improve the performance of the whole. He manages the interaction of the two divisions rather than their actions taken separately.

We have a problem organizing and managing enterprises

How do we generalize—and, as in this case, introduce—such a market economy into organizations in place of the centrally planned and centrally controlled economies that currently pervade? We live in a nation that believes in the free market at the national level, but most of our organizations within it operate with the same kind of economy that the Soviet Union had before its dissolution. When I point this out to a group of executives, their usual response is, "Oh, come on. How do you explain all the successful corporations? Look at them."

I think most executives have no idea of how badly corporations are managed and organized. I once read that 23 new corporations must be started each year to produce one that will survive that year. The average life of an American corporation is only about 20 years. Over 50% of the corporations listed in the Fortune 500 just 25 years ago don't exist anymore. Today, the Dow Index contains only one of its original corporations. All the others have disappeared.

We are terrible at creating viable corporations. But we look at the few that succeed and say, "Look how good we are." This is like somebody's evaluating baseball batters by looking at Mark McGwire and saying, "Boy, those guys can really hit," but ignoring all the others who are hitting in the .100 and .200 percentage ranges. The fact is that we are not very good at organizing and managing enterprises.

Improvements of the parts must also improve the whole

In sum, the third requirement for attaining or retaining leadership in the new century is for firms to adopt an internal market economy and regulate it to serve the interests of the whole as well as the parts. With this type of economy, it is possible to override decisions made by the parts, but only when it is judged that the whole is improved by doing so, and that overall performance is improved as well.

One of the most important systems principles is never to improve performance of a part unless it improves the whole. When you improve the performance of the

Improvements of the parts..., continued

parts of a system taken separately, it is very unlikely that the performance of the system as a whole will be improved.

Management of interaction is critical

For example, suppose you placed one each of every available automobile model in a large garage, hired the best automotive engineers available, and asked them to determine which car had the best motor. They might agree it is the one in the Rolls Royce. Then suppose you asked the engineers to determine which car had the best transmission, followed by which one had the best fuel pump, and so on, until you considered every essential part of an automobile. Once they were finished, suppose you asked the engineers to remove each "best essential part" from the automobile of which it was a part and to assemble them into the "best possible automobile." Would you get the best automobile available? Of course not; you wouldn't even have a bad automobile, because *the parts don't fit.* The performance of a system is not the sum of the performance of its parts; it is the product of their interactions. This is why the management of interaction is critical.

If you have a car that is underpowered—say, a Hyundai—and you try to replace its motor with one from a Rolls Royce, do you get a better car? No. The motor doesn't fit into the vehicle, and even if it did it would not perform well, because the other essential parts are not designed to work well with it. Therefore, it is critical that the focus of management must not be on the way the parts perform taken separately, but on how they perform interactively, or together. An internal market economy facilitates such management.

Change 4: organizing multidimensionally

The fourth change required for an organization to attain or retain leadership in the new century concerns the way corporations are organized. Divert for a moment and try to identify who said the following, and when: "We trained hard, but it seemed that every time we were beginning to form up into teams, we would be reorganized. I was to learn later in life that we tend to meet any new situation by reorganizing, and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization." It was the Roman satirist Petronius Arbiter, who lived during the first century A.D.

Reorganization: a problem since ancient times

Repeated reorganization is not a new problem. I estimate that the average time between reorganizations in American corporations is about four years: it takes approximately two years to overcome the last reorganization, and two years to get ready for the next one. I've estimated that 2% of the total resources, time, and effort that corporations consume is in the continual process of reorganization.

A few years ago, W. C. Goggin, the CEO of Dow Corning, asked a very sensible question: Why do organizations have to continually reorganize? The answer: to adapt to changing conditions. When AT&T was a monopoly, it could ignore the

Reorganization: a problem since ancient times, continued

customer. But not so once it was deregulated. Then it had to begin to focus on the customer and marketing. So the reason for its reorganization at that time was clear.

Goggin went on to ask if there is some way for an organization to adapt to change without reorganizing. Is it possible to design an organization that never has to restructure itself? The answer is yes, but it requires a complete revision of the prevailing concept of *organization.*

Division of labor

Consider what an organization is. First, it is a system in which there is a functional division of labor. If six people are in a car that stalls on a highway and they want to get it off the road, if all six get out and push, they don't form an organization, but an association. If one person stays in the car to steer it, one gets out to direct other cars to pass safely, and the remaining four push it, then they have formed an organization because they have divided the labor functionally.

Coordination of labor

The second requirement of an organization is that its divided labor must be coordinated. If there are a large number of coordinators, they, too, must be coordinated; hierarchy is the consequence. So an organization consists of functionally divided labor and its coordination. The horizontal dimension in a typical organization chart shows the division of labor. The vertical dimension shows the distribution of authority and how labor is coordinated.

How do we divide labor?

The critical point here is that there are only three ways of dividing labor. This is true of every type of organization, regardless of its nature. The three ways of dividing labor are by *inputs, outputs,* and *users.*

An input-defined unit of an organization is a unit whose output is primarily or exclusively consumed within the organization. It is normally defined functionally. Examples are accounting, data processing, buildings and grounds, computing, human resources, and research and development.

An output-defined unit is a unit whose output is primarily consumed externally. The Chevrolet, Pontiac, Oldsmobile, Buick, and Cadillac divisions of GMC are output-defined units because their products go outside the corporation.

User-defined units are ones based on classes of those who ultimately use and consume the product or service provided; for example, a corporation might have North American, Latin American, European, Asian, and African divisions. Many ways of classifying customers are possible; for example, catalog buyers, retail store buyers, wholesale buyers, Internet buyers, and so on.

Implicit in the way every organization is structured is an ordering of the importance of these three criteria. Starting at the top of an organization, the CEO, and going down to the next level, the question arises: How should the vice presidential

How do we divide labor? continued

level be organized? By function, by product, by market, or some combination of these? The division of labor at this level identifies the criterion or criteria that are judged to be the most important. If a company is going global, for example, it is likely to organize by markets defined geographically. If an organization produces several products and sells them to a homogeneous market, it probably organizes by products, often as strategic business units. Companies that produce a single type of product are likely to organize functionally. In every organization, you will find some ordering of these three criteria: input, output, and user.

Obtaining a Multidimensional Organization

All major reorganizations consist of reordering these three criteria. When the reason for reorganizing is recognized, it becomes possible to conceptualize an organization in a completely new way, doing away with the manner in which we usually represent an organization's structure on a flat surface.

Let me explain. I used to conduct a little experiment with groups of executives who worked for the same company. I'd divide them into smaller groups and send them to breakout rooms, to which they were not permitted to carry anything. The breakout rooms contained nothing but a table and chairs—no blackboard, notepads, nothing. I asked them to come back with a redesign of their corporate structure. Shortly after each group entered the breakout room, invariably someone would ask for something on which to draw. We don't seem to be able to talk about an organization without a surface to draw on.

How many dimensions are there on a piece of paper? Two: *up-down*, which, on an organizational chart, shows authority, and *across*, which shows responsibility. Our entire theory of organization derives from the fact that we insist on representing organizations on a two-dimensional surface and ignoring the way the parts interact. But is there anything about the nature of an organization that requires it to have only two dimensions?

When this requirement is dropped, we can obtain a *Multidimensional Organization.* One dimension is the input units, the second dimension is the output units, and the third is the market, or user, units. And these three types of units each occur at every level of the organization. This cannot be represented in a conventional tree-like diagram; it requires a three-dimensional diagram—like a cube—that makes it possible to show all the possible internal interactions.

Adapt by reallocating resources instead of reorganizing

Now consider how such an organization adapts to change. Its structure need not be changed. Adaptation consists of a reallocation of resources to units. In this way, an emphasis can be placed on the particular dimension that the organization wants most to develop: function, product or service, or markets and marketing. Furthermore, units of each type can easily be added or subtracted without changing the structure. This design has many variations, but the fundamental idea is that at

Adapt by reallocating resources instead of reorganizing, continued

each level of an organization all three types of units appear.

If an internal market economy and democratization are combined with a multidimensional structure, one obtains an incredibly powerful organization. The effect is multiplicative, not merely additive.

Change 5: a learning and adaptation support system

Now for the fifth and final change required of organizations to attain or retain leadership in the new century. I introduce it by describing the question I am most frequently asked by managers after presenting the ideas I have presented thus far: "If this stuff is as good as you say it is, why aren't more organizations using it?" This is a very good question. Put another way in a more general form, why do organizations resist change? All kinds of trivial answers are given to this question; for example, people don't like change. This is not an answer, but a restatement of the problem.

Why don't managers like change? It took me a long time to find out. The explanation begins with this observation: the primary source of learning is experience, and *you learn from it only by making mistakes.* When you do something right, you already know how to do it. Nevertheless, most organizations disapprove of mistakes and those who make them.

We measure errors of commission but ignore errors of omission

There are two kinds of mistakes. One occurs when you do something you shouldn't have done. This is called an *error of commission.* The other occurs when you don't do something you should have done. This is an *error of omission.* Errors of omission are more important than errors of commission.

Look at organizations that fail or are in trouble. Is it because of what they did or because of what they didn't do? For example, think of IBM in the 1980s. Did it get in trouble because of what it did, or because of what it didn't do? What about Eastman Kodak or Sears?

The troubles of all three companies came from what they didn't do. IBM ignored the development of small computers and the software they required. Fortunately for IBM, it made a recovery later. Eastman Kodak didn't buy Xerox when it could have done so and waited to develop digital photography. Although errors of omission are more important than errors of commission, the type of accounting that pervades in the Western world makes note of only errors of commission. When a manager does something wrong, it will eventually appear in the books, however hidden or disguised it may be. But if a manager doesn't do something s/he should have done, it never appears in the books. So Kodak's failure to buy Xerox doesn't show up in its books. But its costly purchase of Sterling Drugs does.

Suppose you are a member of an organization that holds making a mistake against you, and in which the only mistakes that are recorded are errors of commission. Then all you have to worry about is not doing something you shouldn't have done. In such an organization, what is the best strategy for a manager who wants to

We measure errors of comission..., continued

maintain his or her personal security? *Don't do anything.* This is the reason why managers and organizations resist change.

A learning and adaptation support system is needed

If organizations are to adapt to change rapidly and effectively, errors of both types must be recognized and identified, their causes must be determined, and they must be corrected. Only by so doing can the likelihood that errors will be repeated be reduced. Furthermore, every time an effort is made to correct an error and it fails—that is, a *second-order error* occurs—and we correct this effort to correct, we increase our ability to learn: *we learn how to learn.*

Every decision is made for only one of two reasons. Either we do it to make something happen that we think will not otherwise happen, or we do it to prevent something from happening that we think will otherwise happen. Whenever the decision is made to do something or not to do something, the expectation and the assumptions on which the expectation is based should be made explicit. For example, if you want to increase advertising, record the increase in sales you expect and when you expect it.

All expectations are based on assumptions that should be made explicit. For example, if you increase advertising, you undoubtedly assume that certain responses from competitors will or will not occur. Then the decision should be monitored to determine whether the expectations are realized and the assumptions are correct. Whenever what actually happens deviates from an assumption or expectation, a correction in the decision should be made. When this is done, learning or adaptation takes place. These are the elements of a *learning and adaptation support system.* There are such systems in operation now. General Motors recently put one into place.

Make a mistake, get a prize

I've heard of a corporation that gives an annual prize for the best mistake made during the last year. Isn't that wonderful? The best mistake is defined as the one from which the organization learned the most. I once heard the CEO of a major corporation say to the vice presidents who reported to him, "If you didn't make a serious mistake last year, you didn't do your job, because you didn't try anything new. But if you ever make the same mistake twice, you won't be here the next year."

He had it right. There needs to be a high tolerance for mistakes, but no tolerance for failure to learn from them. This is the only way one can learn.

A summary of the five kinds of changes required

To conclude, here is a quick summary of the five kinds of changes that are required for an organization to be an effective competitor in the new century:

1. Utilizing a different kind of planning, called interactive planning, in which you plan backward from where you ideally want to be to where you are.

2. Democratizing the organization so people can use all they know and develop a new capacity for doing things.

A summary of the five kinds of changes required, continued

3. Using an internal market economy to facilitate the management of interactions and to maximize freedom of choice among the parts.

4. Organizing multidimensionally to create a type of organization that doesn't require continuous reorganization; making it possible to adapt to change by reallocation of resources.

5. Using a learning and adaptation support system that identifies errors, diagnoses and corrects them, and learns how to learn from errors more effectively.

For further reading

Ackoff, R. L. 1999. *Re-Creating the Corporation.* New York: Oxford University Press. This book also contains many additional references.

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Editorial assistance for this article was provided by Laurence Smith and Cathy Kingery.