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Idealized Design: Creative Corporate Visioning

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Corporate visions are frequently illusions or delusions. To be effective, a vision should consist of an operationally meaningful description of the organization its stakeholders would have if they could have any organization they wanted—without constraints. It should be a consensus formulation in which all the stakeholders or their representatives have had a hand. Such a description is an *idealized design* of the organization involved. How such a vision/design can be formulated and used, and its effects on the organization are discussed here.

Key words—design, corporate vision, learning, organization structure

INTRODUCTION

THE VALUE of a corporate vision is coming to be widely recognized by a variety of corporate executives and academics. By a vision they usually mean a description of what an organization would like to be at some future time, usually five or ten years out. More precisely, corporate visions are usually descriptions of what their executives would like their organizations to be at some time in the future. Corporate visions have seldom been formulated by a cross section of corporate stakeholders.

Moreover, corporate visions are usually expressed in very general and non-operational terms. They often consist of a listing of desired properties of the organization involved; they seldom consist of a design of an organization that has these properties. Corporate visions are more like the vision a family has of the home it wants to build than the vision of the architect who produces a design that incorporates the family's vision and can be used to construct a house that manifests that vision.

Most corporate visions are based on the false assumption that its authors know what they or their organization will want to be in five or ten years. The fact is that individual and collective aspirations change continually, especially in response to unanticipated changes in their environments. Even if this were not the case, how could one possibly have a good idea of what one would like to be in a future environment that cannot be characterized accurately at this time? Moreover, how can those who formulate a vision know what they will want their organization to be in the future if they do not know what they want it to be right now? If they knew what the organization would be now, assuming that it could be whatever they wanted, and if they knew how this differed from what it is right now, why would they need to know what they wanted it to be way out in the future? Whatever we want something to be right now includes what we expect of it in the future.

Idealized redesign is a way that an organization's stakeholders can prepare a vision of what they want their organization to be right now, assuming that it could be whatever they wanted. Once such a design is completed, planning can be directed at closing the gaps between what the organization actually is and the idealized design [2]. There is no more effective way for an organization to create its future than by

continuously making its present closer to ideal. The benefits derived from idealized redesign lie not only in implementation of the plans that it leads to, but also in the learning and creativity that result from engaging in the process. In idealized design, process is one of the most important products.

THE NATURE OF IDEALIZED DESIGN

There are two types of idealized design: constrained and unconstrained. Consider each in turn.

Constrained idealized designs

A constrained idealized redesign of a system begins with the assumption that the organization involved—for example, a corporation or any of its parts—was destroyed last night. It no longer exists, but its environment is assumed to remain as it was, untouched. If the redesigned organization is a part of a corporation—for example, a division or a department—this means that the rest of the corporation is initially assumed to remain as it was; only the unit involved having been destroyed.

The assumption that the organization's environment remains unchanged eliminates the need for forecasting its future environment. To be sure, assumptions about the future are always involved in making current decisions. Those people who are addicted to forecasting claim that assumptions about the future are nothing but forecasts in disguise. They are absolutely wrong! There is a fundamental difference between 'forecasts' and 'assumptions about the future'. We carry a spare tire in our cars not because we forecast that one is going to go flat on our next trip, but because we assume one is possible. As a matter of fact, if we were to make a forecast about flat tires on our next trip, it would be that one will not occur. Assumptions are about possibilities and these are usually indefinitely plural; forecasts are about probabilities and these are usually definitely singular.

Assuming destruction of the existing system, those involved design the organization that they would ideally have right now if they could have whatever organization they wanted. This design is subject to only three constraints.

(1) The organization designed must be technologically feasible; it may not incorporate any technology that is not currently available. This requirement does not preclude new uses of available technology, but it does prevent the redesign process from becoming an exercise in science fiction. For example, the designers cannot use mental telepathy as a way of communicating between organizational units, but they can use a corporately controlled communication satellite or optical fiber network. (There is no requirement that the elements of the design be economically feasible.)

(2) The organization designed must be operationally viable. If the organization designed were to come into existence, it must be able to survive in the current environment. It need not be capable of coming into existence, but it must be capable of surviving if it did. Therefore, it must conform to current laws and regulations, pay taxes, and, if publicly owned, produce annual reports, and so on. This requirement assures the conceptual feasibility of the design, not its practicality. Obviously, practicality is not required of an idealized design.

(3) The design must be one that is subject to continuous improvement from within and without. This means that the organization designed must be (a) capable of rapid and effective learning and adaptation, and (b) subject to change by those who hold a stake in it.

Because idealized designs are capable of being improved and of improving themselves, they are neither ideal nor utopian. An ideal or utopian system is one that claims to be perfect and, therefore, is not subject to improvement. Then why call the process idealized design? Because the product of such a design is the best ideal-seeking system that its designers can conceive of at the time.

Unconstrained idealized designs

Whether the organization being redesigned is an autonomous system or a part of one, its design is constrained by the nature of the system(s) that contain it, its environment. It is

apparent, for example, that what a corporation can do is constrained by the governments of the countries in which it does business, and what a subsidiary can do is constrained by its parent organization.

Because of these constraints it is desirable to prepare two separate versions of an idealized design, one constrained by its containing system(s) and the other not. The constrained design assumes no changes in any of the organization's relevant containing systems. Even under this assumption, however, most organizations can be radically redesigned.

In unconstrained idealized design the designers are permitted to change any of the containing systems but only in ways that would affect the performance of the organization being redesigned.

It is preferable to prepare the constrained design first. Surprisingly, the unconstrained design is seldom very different from one that is constrained. This reveals that most of the obstructions between the current organization and where its redesigners would ideally like to be lie within the designers and the organization, not in its environment. For example, a government agency in Mexico wanted to incorporate in its idealized redesign the use of a foreign research group. However, government regulations precluded the use of such groups. The agency was about to exclude this feature from its design when it discovered that universities—even those federally funded—could employ foreign consultants, and government agencies could employ these universities. Therefore, the agency was able to include the use of a foreign research group in its idealized redesign, and subsequently used one through an arrangement with a local university.

Most organizations can be significantly improved without changing any of their containing systems. Nevertheless, further improvements are almost always possible with changes in one or more of their containing systems.

IDEALIZED DESIGN AND LEARNING

Several years ago one of Mexico City's prominent planners showed me six alternative transportation plans for that city. He asked if I could suggest a way of determining which one was best. I told him that such an evaluation would be a waste of time because none of them would reduce the congestion in the city; in fact, they would increase it. He was both shocked and offended. After putting himself back together he asked me to explain what he considered to be an outrageous assertion. I pointed out that his plans were based on transportation ideas that had been tried in many other cities and under more favorable conditions than existed in Mexico City. Nevertheless, they had always failed. The reason was that increases in the supply of transportation creates new demands for it that exceed the old demand that it satisfies. In transportation, supply has a greater effect on demand than demand has on supply.

He said that if this were true, his city's transportation problems would be unsolvable. I disagreed and pointed out that he had not considered reducing demand rather than increasing supply. He challenged me to suggest a way of doing so that would be acceptable in a democracy. I suggested that a substantial part of the federal government of Mexico be moved out of Mexico City and be dispersed throughout the country. Since the government directly and indirectly provided most of the employment in the city, even a move of part of the government could reduce its population considerably and this, in turn, would reduce congestion more than any of his plans for additional supply. I also pointed out that the dispersion of the federal government could distribute development of the country more equitably than was then the case. (Several times as much was spent on education per child in Mexico City as was spent in the rest of Mexico.)

The planner reacted by saying, "That's true, but the federal government can't be moved." I pointed out a number of cases in which other governments had been moved. He claimed that each of these was significantly different from Mexico. I was not convinced. This exchange of reasons and challenges continued until it was clear that we were getting nowhere. Finally, he said I would never understand why my suggestion was infeasible because I was not a Mexican. That was that!

After an awkward pause, he asked if I had any other alternatives in mind. I said that I did and suggested changing the working hours in Mexico City. Since most Mexicans employed in that city have a two- to three-hour break for the midday meal, many either return home or go somewhere distant from their places of work for

lunch. By reducing this interval to no more than one hour the demand for transportation would be considerably reduced.

Once again the planner said that such a change was not possible. When I asked why, it led to another argument that ended with his repeating that I could not understand because I was not a Mexican.

This cycle was repeated several more times. The meeting eventually ended with both of us frustrated and unaffected by the other. However, shortly after this exchange, José Lopez Portillo became president of Mexico. In his inaugural address he said he was going to initiate geographic dispersion of the federal government and reduced the length of the midday break for government employees. Some government agencies were subsequently moved out of Mexico City, but not enough; and the midday break was reduced, but not enough. Nevertheless, it became apparent that these changes were possible, but they were precluded from the Mexican planner's consideration because of the incorrect assumptions that he had made about his own culture.

One of the most important things that individuals or groups can learn is how much control and influence they can exercise over the systems of which they are a part, and others of which they are not a part but with which they interact. They can learn this by distinguishing between self-imposed and externally-imposed constraints, and by learning how to affect the latter. Idealized design facilitates such learning. Here is a case in point.

Kodak had a computing center serving its corporate headquarters. It also had two larger computing centers that served its line units. The manager of the headquarters unit, Henry Pfendt (now retired), involved his subordinates and several of his internal customers in an idealized redesign of his center. Much of that design was subsequently implemented, leading to significant improvement in the center's operations.

As the constrained design was being implemented, an unconstrained design was being prepared. Not surprisingly, it combined the three computing centers into one. Dissemination of this design led to another idealized design effort that involved all three centers jointly. This effort produced a design of an integrated center that was then proposed to corporate management. The proposal was approved and an integrated center was formed. It yielded further improvements in performance.

Meanwhile the telecommunications unit that served corporate headquarters and reported to the same manager as Henry, decided to emulate his effort. It initiated its own idealized redesign. This also led to significant improvements in its operations and to subsequent preparation of an unconstrained design. Like its predecessor, the unconstrained design combined several telecommunications departments into one, and led to a joint design effort by the relevant units. This too resulted in a proposal to combine their activities. The proposal was presented to and accepted by corporate management.

Next, the centralized computing and telecommunications centers jointly prepared an idealized design that combined these two functions within one organizational unit. Their proposal to this effect was also accepted by corporate management and was implemented.

Finally, the integrated computing-and-telecommunication-services unit conducted studies to determine whether even its improved performance was as good as might be obtained by using the services of external suppliers. The result is now well known. Kodak entered into joint ventures with IBM and Digital to provide the company with computing and telecommunication services. This resulted in further improvements in the services provided, and it did so at reduced costs.

Years of experience with the existing computing and telecommunication service systems at Kodak did not produce as much learning about how their services ought to be provided as did involvement in idealized redesign of those systems.

Participation and learning

Idealized design facilitates widespread learning because it encourages involvement of all the stakeholders in the design process and it enables them to participate productively in it. In the past, experts were usually considered to be the only ones qualified to design and plan for a system. However, the current focus on total quality management makes it clear that quality improvement requires meeting the expectations of all those who hold a stake in the system [4]. Their expectations cannot effectively be incorporated into a system's redesign and plans

without their involvement in the design and planning processes.

The requirement for expertise in conventional system design and planning derives from the fact that these processes have been, and still are, preoccupied with determining what is wrong with the system involved and how deficiencies can be eliminated. The recognition and removal of deficiencies was assumed to require deep knowledge of the system involved. The practice of TQM has made it appear likely that every stakeholder in a system can recognize and remove some of the system's deficiencies, and therefore contribute to continuous improvement.

Much more important, however, is the growing recognition of the fact that removal of deficiencies, getting rid of what one does not want, provides no assurance of getting what one does want. For example, one can easily get rid of a television program one does not want by changing the channel, but one may well get a program that one wants even less. In the 1920s when the United States tried to get rid of alcohol abuse by prohibiting the production, sale and use of alcoholic beverage, it did none of these things, but it did create large-scale organized crime. Prohibition became a greater social problem than the problem it was intended to solve. An idealized design is an explicit formulation of what its designers want and, therefore, it avoids the risks associated with such improvement programs, continuous or otherwise, as focus on the removal of deficiencies.

It is well known that there is nothing as practical as a good theory. What is equally true but not nearly as well known is that, with the possible exception of a good theory, there is nothing as practical as an idealized design. Idealization both encourages and facilitates efforts to realize its product. In my opinion, the only other stimulus to organization change that is as strong as idealized design, is a state of emergency, a crisis. However, crises generally move organizations away from what they do not want; idealized designs move them toward what they do want.

Every stakeholder of a system, including those who know little of how it operates, can make important contributions to its idealized redesign. They can incorporate their reflections on both the efficiency and the effectiveness of the system. Effectiveness goes beyond efficiency: effectiveness is value-full but efficiency is value-free. Increases in effectiveness usually require fundamental structural changes in the organization as a whole, but increases in efficiency often require changes of only the behavior of existing parts of the organization involved.

Participation in idealized design is usually fun. Therefore, it is usually easy to obtain and maintain. In addition it provides those who care about a system with an opportunity to think deeply about it, to share their thoughts with others who also care about it, and to affect its future. This encourages the development and exploration of new ideas, and facilitates personal and corporate development.

Not all who engage in idealized design need concern themselves with the whole organization or even the same parts of it. Internal stakeholders should initially prepare an idealized redesign of only the smallest part of the organization of which they are a part. Their design of this part assumes that the idealized design of the immediately larger unit that contains it is fixed, hence their initial design is constrained by the idealized design of their containing unit. Furthermore, their design should not contain any features that would affect the performance of another unit at the same or a higher level of the organization with the approval of that unit or the lowest level of management at which the affecting and affected units converge. Identification of these interactions and policing of the resolution of those that require it is usually the responsibility of a planning group.

Subsequently, each part of the organization prepares an unconstrained design in which it proposes changes in the design of any of its containing units that would improve its performance. These changes are reviewed by the units affected and may be incorporated into their designs.

For example, machine operators who engage in idealized design concern themselves with the operations, layout and equipment in their shop, not with the behavior of the corporation as a whole. Janitors in the same shop consider different aspects of it, such as the design and location of its lavoratories. When the janitors and operators review each other's work they usually find either that critical aspects of the shop's activities have been left out, or that both have ignored critical interactions of activities that have been

included. This enables them to combine their efforts and produce a more comprehensive and coordinated design than either group can produce separately.

As this process is repeated with different groups in a corporation, understanding develops of how the parts interact and how these interactions affect overall corporate performance. This enables those who engage in idealized design to learn how the decisions they make and the activities in which they engage affect the performance of the corporation as a whole. There is an immediate and substantial payoff to the corporation when its parts focus on improving corporate, rather than their own, performance.

It can be proven rigorously that when each part of an organization improves its performance independently of other parts with which it interacts, the performance of the whole may well suffer. This follows from the fact that the performance of a system is not the sum of the performances of its parts taken separately, but is the product of their interactions. Idealized design enables its participants to learn what these interactions are and how they can be improved.

Development. The learning that takes place in idealized design increases its participants' ability to improve the quality of their work lives and of their outputs. As already noted, involvement in the design process enables its participants to increase their understanding and knowledge of the system of which they are a part. This, in turn, enables them to increase their ability to contribute to its improvement. Therefore, in my professional experience, participation in idealized design has always produced both individual and organizational development.

For me, development is an increase in one's ability and desire to satisfy ones own legitimate needs and desires, and those of others. A legitimate need or desire may be defined as one, the satisfaction of which does not prevent any other need or desire, one's own or others', from being satisfied.

Development is not a matter of how much one has, but of how much one can do with whatever one has. Therefore, Robinson Crusoe is a better model of development than J. Pierpont Morgan. Development is more a matter of learning than earning. Because one individual or group cannot learn for another, a government or a management cannot develop those who are governed or managed. They can only encourage and facilitate self-development. This is best done by mobilizing the members of an organization into what might be called a 'crusade for (its) development.'

Historically, crusades have been of two types: against something—for example, an enemy or competitor—or for something—for example, putting men on the moon or gaining the largest share of a market. To put it another way, some crusades are directed at undoing something already done, and others at doing something not yet done. Negatively oriented crusades are more common. Corporations mobilize more frequently and more effectively against an external threat—as, currently, against Japan—than for an internally generated concept of a desirable state—as currently, for health services available to all.

What brings about positively oriented crusades? The Spanish philosopher Jose Ortega y Gasset provided an answer:

> Man has been able to grow enthusiastic over his vision of . . . unconvincing enterprises. He has put himself to work for the sake of an idea, seeking by magnificent exertions to arrive at the incredible. And in the end, he has arrived there. Beyond all doubt it is one of the vital sources of man's power, to be thus able to kindle enthusiasm from the mere glimmer of something improbable, difficult, remote [5, p.1].

A vision can launch a positive crusade, and idealized-design can produce a vision that does so.

Consensus. Idealized design tends to generate a consensus among those who participate in it because it focuses on ultimate values rather than on means for pursuing them. The more ultimate the values, the more agreement they generate. In general, people disagree less about ideals than about shorter-range goals and ways of pursuing them. This is reflected in the fact that the Constitutions of the United States and now the (now defunct) Soviet Union were surprisingly alike. Most of their many disagreements derived from their differences over choice of means, not ultimate ends. This eluded us at the time because we characterized their differences as ideological. Contrary to what many believe, ideologies have less to do with ideals than with

means for pursuing them. For example, the ideological disagreement over who should own the means of production concerned the selection of a way of pursuing the ideal of plenty. Both nations accepted this as an ideal.

The idealized redesign of Paris [6] prepared in 1971–1974 was forwarded to the cabinet of France with the support of every one of its many political parties. These ranged from the extreme right to the extreme left. Nevertheless, they agreed on what Paris ideally ought to be. This may have been the first time these people agreed on anything.

In an idealized-design exercise conducted in a large American corporation, initial designs were prepared separately by each of the eight members of the corporation's executive committee. These executives, who frequently disagreed on issues considered by their committee, were amazed at how much their separately prepared designs agreed. This had a major impact on their subsequent behavior. The hostility among them was greatly reduced and their inclination to cooperate was significantly increased.

When agreement is reached on ultimate values, differences over means and short-range goals can often be easily resolved. Furthermore, when such differences cannot be resolved, experiments that can resolve them can and should be designed into the system. The conduct of such resolving experiments tends to stimulate a cooperative atmosphere in which differences among participants come to be treated as minor hurdles rather than as non-negotiable conflicts.

Commitment. Participation in the preparation of an idealized design and the consensus that emerges from it generate a commitment to the realization of that design. I have noticed that people develop stronger commitments to ideas and ideals that they have had a hand in formulating than to those they have not. Such commitments considerably reduce the number and difficulty of problems associated with implementation of designs and plans.

Implementability. The idealized-design process enlarges the designers' conception of what can be implemented. In conventional planning the implementability of a plan as a whole follows from consideration of the implementability of each of its essential parts taken separately. Therefore, a plan is believed to be no more implementable than its least implementable part. This belief is both costly and wrong.

An idealized design and the plans based on it are not like chains, no stronger than their weakest link. They are systems, set of interacting decisions. This means that the design and plan as wholes have properties that none of their parts do, and their parts acquire properties by being parts of the whole that they do not have when considered separately. Therefore, it is possible to have an implementable plan at least some of whose parts, when considered separately, are not implementable. It is also possible to have an unimplementable plan all of whose parts, when considered separately, are implementable.

For example, the plan for Paris (previously referred to) included two changes that, had they been proposed separately, would surely have been dismissed as infeasible. The first was that the capital of France be moved out of Paris, and the second was that Paris be converted into a self-governing open city not subject to the government of France. In view of the mission of Paris that was incorporated into its idealized redesign—that it become the informal capital of the world—these two changes not only became feasible, but they were absolutely necessary. For this reason the then-current government of France committed itself to both changes. However, a subsequent government, seeking to differentiate itself from the one that prepared and adopted the design, broke these commitments.

CREATIVITY AND IDEALIZED DESIGN

Creative behavior involves three steps. First, identification of self-imposed constraints; second, their removal; and third, exploration of the consequences of having done so. Self-imposed constraints take the form of assumptions made about what can or cannot be done. Most of them are assumed to be imposed by external sources. In my experience, this is not true; most of them are self-imposed. (Recall the Mexican transportation planner and his assumptions about what could not be done because of the Mexican culture.)

It is difficult to identify self-imposed constraints. This is reflected in the difficulty of solving puzzles because a puzzle is a problem that is difficult to solve precisely because of a self-imposed constraint. This explains why we are usually surprised when we are shown a

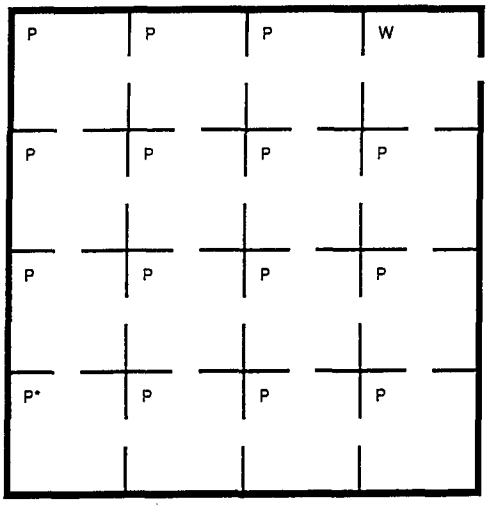

Fig. 1

solution to a puzzle that we were unable to solve. Unfortunately, knowing that creativity and puzzle-solving require identification and removal of a self-imposed constraint does not, by itself, make identifying such constraints one bit easier.

Consider a block of sixteen cells (Fig. 1) that is occupied by a warden (W) and fifteen prisoners (P). The one entrance and exit to the block is in the warden's cell. Every cell has a door to each of its contiguous cells. They are usually kept locked. One prisoner (P*) who occupies the bottom cell on the left is a homicidal maniac. He must kill anyone he can reach but if he sees a dead person, he passes out for at least twelve hours.

One morning a visitor to the cell block finds the homicidal prisoner (P*) gone but every other prisoner and the warden dead in their usual cells. What path did the maniac take to get out?

One usually begins to try to solve a puzzle by trying what appears to be the most obvious solution, as is done in Fig. 2. Unfortunately, it leads to a dead end in the warden's cell. If the maniac were to continue down the last row of cells, he would not be able to get out without seeing a dead person and passing out. The same is true for the equally obvious route shown in Fig. 3. No solution can be found as long as we incorrectly assume that the prisoner cannot revisit any cell in the block. He can revisit one cell, his own. Once we become aware of this, the solution becomes easy (Fig. 4).

Identification of self-imposed constraints is difficult because we are generally unaware of them. However, there are ways of avoiding them or raising them to consciousness. Among such creativity enhancing procedures are lateral thinking, brain-storming, synectics, TKJ, conceptual block-busting and idealized redesign which, I believe, is the most effective [3].

Idealized redesign of a system releases creativity because it removes many of the constraints that inhibit creativity. Many, if not most, self-imposed constraints derive from concern with implementability. Implementability, however, is not a requirement imposed on idealized design. Therefore, since it starts with the assumption that the existing system was destroyed last night, and it imposes a very few and not very

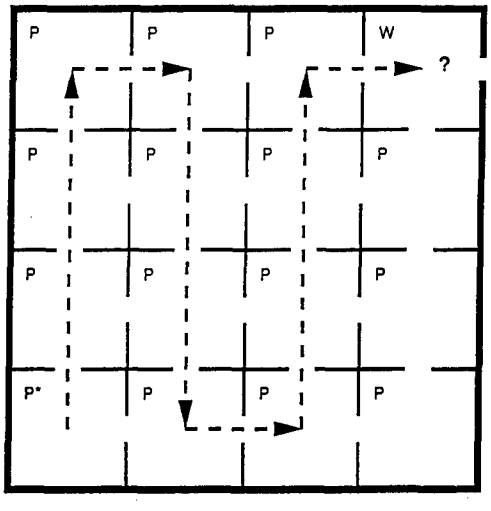

Fig. 2

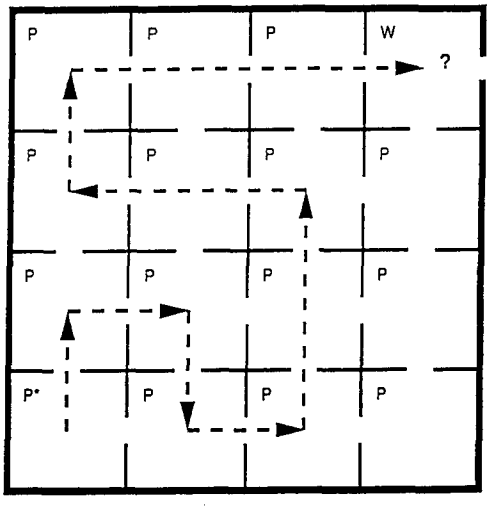

Fig. 3

restrictive constraints, it tends to liberate the imagination and stimulate the desire to innovate and invent.

Thus, in the early 1970s, a group of executives and staff members of a major bank were engaged in an unconstrained idealized redesign of their institution and the system that contained it. They were focusing on the problem created by the rapidly increasing number of checks that had to be cleared and the cost of doing so. Therefore, they unanimously agreed that the idealized design should incorporate an electronic funds transfer system that would replace checks.

One of the members of the group then suggested that if the banking system required that all payments be made electronically, there would be a complete record of everyone's income and revenues in banks. Another pointed out that records of multiple bank accounts could be assembled if every bank account number included an identification number assigned to its holder; for example, one's social security number. It was then observed that if this could be done, banks could prepare income tax returns because they would also have a complete record of expenditures since, if all income went into banks, all expenditures would involve withdrawals from them.

"Wait a minute," one of the participants said. "If the system knew how much we spent and what we spent it for, wouldn't it be better for the government to tax expenditures and consumption rather than income?"

This question released a flood of creative ideas. It began with the observation that if a person were taxed only for consumption, there would be a considerable incentive to leave money in the bank, to save. This would be a larger incentive than interest on savings because the tax rate would be higher than the interest rate for most. Because of this, it was argued, banks should not charge interest on loans, only a small service charge for making them. Borrowers, however, would have to pay consumption taxes on what they used.

As details of a possible consumption-based tax system were developed the designers became convinced that it would be better than the current income-based system. As a result, the electronic funds transfer system that was eventually designed and implemented is able to accommodate such a tax system if and when it

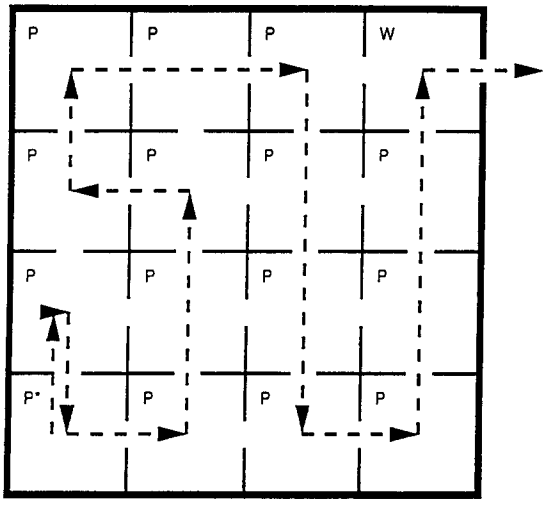

Fig. 4

is realized. In conventional system design the emergence and development of such an innovative idea as a consumption-based tax system is very unlikely.

ORGANIZATION OF THE IDEALIZED-DESIGN PROCESS

The idealized design of any organization or organizational unit should minimally involve the manager of that organization or organizational unit, his or her immediate superior and his or her immediate subordinates. However, the design group can augment itself as it sees fit. It is quite common, for example, for these groups to invite participation of a sample of their internal and/or external consumers, supplier, and/or agents. Functionally defined units frequently invite participation of managers of related functionally-defined units. A manufacturing unit may invite the managers of purchasing and marketing departments to participate. A CEO may invite members of the corporation's board to participate.

Many of the corporations that initiate an idealized design process prefer to do so in stages, working from the top down. In such cases an idealized redesign of the corporation as a whole is prepared by the executive office and those who report directly to it. When a first draft of this design is completed, it is distributed to units on the next lower level for comments and suggestions, and they are asked to initiate idealized redesigns of themselves. This process is continued until, ideally, the bottom is reached.

If unrestricted participation of an organization's stakeholders is not possible, it may be reasonably approximated using a procedure developed for designing the National Scientific Communication and Technology Transfer System [1]. A small group of professional planners served as the core of the design team. They prepared the first design. While doing so, an advisory group was set up with as wide a representation of stakeholders as possible. The initial design was presented to this group. Its comments and suggestions were noted and incorporated into a second version of the design. This version was sent to the members of the advisory group along with a request that each of them send copies to other stakeholders whose reactions to the design they thought would be of value. The comments and suggestions received were synthesized by the design team and reviewed by the advisory group. Then a third version was prepared. This process was continued until the comments received added virtually nothing to those received earlier. Then a final version of the design was prepared.

This process makes it possible to involve very large numbers of people in the design. Unfortunately, only a small portion of this design was ever implemented. This was clearly a case in which the principal benefits were derived from engaging in the process rather than consuming its product.

CONCLUSION

When an individual or group is confronted with a problem, there are four different types of response to it:

(1) Absolution: ignore the problem and hope it will go away.

(2) Resolution: by trial and error (experience), present or past, select a course of action that will produce an outcome that is good enough; that satisfices.

(3) Solution: by research (including experimentation): find a course of action that optimizes the outcome, that is, produces the best that one can currently conceive.

(4) Dissolution: redesign the system that has the problem so that the problem is eliminated. Idealized design enables the system to do better in the future than the best it can do today.

Learning and creativity are enhanced more by design than by research; more by research than trial and error; and more by trial and error than by nothing. It is through design that people have the greatest opportunity to realize their potential. Through design people create the world they are going to live in. Therefore, it is through design that people behave as they believe their God did. God is not worshipped for His or Her research or trials-and-errors, but for the products of His or Her design.

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