



University of Navarra

Working Paper

WP No 5

July, 1974

ORGANIZATIONAL THEORY:
A CYBERNETIC APPROACH

Juan A. Pérez López*

* Professor of Accounting and Control, IESE

IESE Business School - Universidad de Navarra

Avda. Pearson, 21 - 08034 Barcelona. Tel.: (+34) 93 253 42 00 Fax: (+34) 93 253 43 43

Camino del Cerro del Águila, 3 (Ctra. de Castilla, km. 5,180) - 28023 Madrid. Tel.: (+34) 91 357 08 09 Fax: (+34) 91 357 29 13

Copyright© 1974, IESE Business School. Do not quote or reproduce without permission

ORGANIZATIONAL THEORY: A CYBERNETIC APPROACH

Abstract

The purpose of this study is to build a dynamic theory of organization in order to describe the characteristics of a control system that will ensure that the “learning process” does not destroy the organization.

The introduction sets forth the problem from the starting point of Barnard’s organizational theory. It shows that the theory we are trying to build is related to the explanation of the behavior of one of the variables defined by Barnard when dynamics is introduced into the framework.

A dynamic analysis of organizations, i.e. an analysis that takes into account the relationships between “learning” and the achievement of equilibrium, belongs in the realm of cybernetics. Chapter I shows that both stable and ultrastable systems are “incomplete” models of a human organization and indicates how a generalized model can be built. Chapter II is devoted to actually building the model, and Chapter III shows that the new model constitutes, in fact, a generalization of Barnard’s theory in the sense mentioned above.

Chapter IV introduces the elements that are needed in order to explain the process of equilibrium of the generalized system, and Chapter V analyses the process itself. It is found that equilibrium in the generalized system is defined at three different “levels”. An organization, in order to survive, must accomplish goals at all three levels. Two of them correspond very closely to those defined by Barnard in his theory. The third has appeared due to the introduction of dynamics and, at the same time, it becomes apparent that it is the one that explains the survival of organizations.

We also show how the new system helps to clarify relationships between individual goals and organizational goals.

ORGANIZATIONAL THEORY: A CYBERNETIC APPROACH

Introduction

Most actions by individuals take place in the context of an organization of one kind or another. Organizations have a good deal of power to influence people's lives because they reward certain actions while discouraging others. Roughly speaking, it seems that any organization acts upon individuals by offering "rewards" in exchange for "actions" to be performed by the individual. The individual himself is assumed to judge whether or not the "exchange" is fair in his own terms. If he does not like it, he can always stop belonging to the organization and "go elsewhere".

It seems a purely ethical question whether or not an organization should be concerned at all with what happens to an individual when he adapts his behavior to "organizational norms", that is to say, when he performs the actions which the organization requires him to perform. In other words, it seems a "question of value" whether or not an organization should take into consideration any consequences of the actions performed by its members other than the consequences they have for the accomplishment of the organization's goals.

Nevertheless, the question may readily be brought into the realm of "questions of fact". All we need to do is ask, "What *will happen* to an organization which *evaluates the actions of its members exclusively in terms of organizational effectiveness*?" Alternatively, "what will happen to an organization that attempts to control motivation simply by rewarding its members' actions according to how they contribute to the organization's goals, without any other kind of evaluation?"

A first answer to the question may be stated in terms of the framework developed by Barnard in his book *The Functions of the Executive*. Barnard introduces a powerful distinction between what he calls "organizational effectiveness" and "organizational efficiency". Barnard makes it very clear in his analysis that any organization must ensure "efficiency" if it wants to survive. *The distinction recognizes that organizational action must be evaluated on two different "scales of value"*. One scale evaluates the organization's actions from the point of view of their contribution to the organization's objectives (effectiveness). The other evaluates the organization's actions from the point of view of their contribution to satisfying the motives of individual members of the organization (efficiency). In Barnard's framework, however, the same distinction between effectiveness and efficiency is also made at the level of individual action. At this level the distinction is between the "contribution of the individual action to the achievement of an explicit goal of the person who acts" (effectiveness) and "unsought consequences of the action insofar as they are relevant from the point of view of the individual's motives" (efficiency). So, in Barnard's

organizational theory, we can see that “organizational efficiency” implies both “individual effectiveness” and “individual efficiency”. More explicitly, the action of an individual cooperating within an organization must accomplish three different conditions:

- a) It must be organizationally effective.
- b) It must be individually effective.
- c) It must be individually efficient.

Conditions b) and c) are the ones that define organizational efficiency in Barnard’s sense.

On that basis, achieving organizational efficiency means not only providing for a suitable reward (effectiveness of individual action) but also anticipating other effects of individual action on individual motives (efficiency of individual action). In Barnard’s theory, “motivation” is a concept which cannot be explained merely with the help of a “reward attached to an action by the organization”. There is another element that is also relevant for explaining “motivation”, one that Barnard refers to as the “individual efficiency” of an action. These concepts play a very important role in Barnard’s theory, although one of them, individual efficiency, is only residually defined.

Going back to the original problem, we can see that Barnard’s theory gives a categorical answer to our question: An organization must be efficient in order to survive. Being efficient means that it must satisfy individual motives to cooperate. For those motives to be satisfied, individual action must be both effective and efficient. Organizational rewards are meant to ensure that individual action is organizationally effective and at the same time individually effective, *but on condition that the action is also individually efficient. To ensure that action is individually efficient, the organization must take into account the impact of individual action on any other individual goals apart from the explicit ones that are affected by organizational rewards.*

In a “static” theory of organization, that fact is easily overlooked. By definition the efficiency of individual action is related to the “unsought consequences of action”. When a person decides to participate in an organization, he is explicitly motivated by the effectiveness of his action. The “unsought consequences” become evident “a posteriori”. In other words, a person may decide that his needs will be satisfied by a certain action whose degree of effectiveness is fairly predictable. Once he has performed the action, it is not a matter of judgment any more; the degree of satisfaction of needs which that person has actually achieved is entirely obvious. The “unsought consequences” have been felt regardless of whether or not they were perceived at the time of making the decision. So, in a static approach to organizational theory, an individual’s free decision to participate ensures that, at the time of making the decision, the individual “thinks” that the organization’s demands are congruent with his goals. The problem appears in a dynamic context because of the fact of “learning”; that is to say, in any dynamic theory of organization, one of the “variables” whose behavior explains an organization’s survival or disappearance is the “learning” process that takes place in individual members of the organization. That “learning” process may make them aware of a lack of congruence between organizational demands and the satisfaction of individual needs.

The purpose of this study is to build a dynamic theory of organization in order to describe the characteristics of a control system that will ensure that the “learning process”

does not destroy the organization. In Barnard's terms we could say that our purpose is to analyze the motivating element included under the heading "efficiency of individual actions" and how it behaves when actions are repeated.

CHAPTER I

Cybernetic theory of organization

Cybernetics analyzes the process of equilibrium in organisms from a dynamic point of view, i.e. it analyzes the "achievement of equilibrium through a process of 'learning' generated by experiences".

The use of cybernetic models to understand organizational behavior has had to overcome many limitations. An account of the attempts has been given by McGuire in his book *Theories of Business Behavior*¹ in the following terms:

"Most of the theories of the firm that use cybernetic ideas and terms describe the enterprise essentially as a 'closed loop' control system. Schematically, this kind of system includes a number of interdependent variables. It usually possesses some sort of feedback process whereby the mechanism is instructed by informational governors that it has missed or reached its goal. The most common applications of cybernetics to the firm have also borrowed heavily from –and become merged with– the notion of homeostasis, which was originally employed to describe the processes by which an organism attained the relative stability it needed for survival."

Further on he adds:

"Cybernetics as applied to the firm may take several forms... In all its forms, however, it retains the one big disadvantage which all borrowings from the physical to the behavioral sciences possess: that man's behavior and his institutions are considered to be analogous to the behavior of machinery or matter.

"The concept of the firm as a response mechanism is not, of course, limited only to cybernetics and homeostasis, for to some extent this idea prevails even in traditional economic theory. However, by itself the notion of a self-adjusting or deliberately adjusting organism is meaningless, for even in the case of the thermostat it is evident that outside forces must establish the command position toward which the mechanism tends... Unless the explanation is given of how the command position itself originates it must of necessity be incomplete. Thus, the application of cybernetics to the concept of the firm, although providing a framework that may be useful, omits what many behavioral scientists would consider the most salient feature of the firm in this context –namely, *how equilibrium is established.*"

McGuire's criticism of applications of cybernetics to the analysis of organizational behavior is a very common one. What is not so common is the way he makes explicit the root of such criticism. It is true that most applications of cybernetics to the theory of organizations

¹ McGuire, J.W., *Theories of Business Behavior*, Prentice Hall, 1964, pp. 24-25.

simply describe the organization as a closed-loop control system without ever going into the problem of “how the command position itself originates”. In other words, these applications attempt to describe the process whereby equilibrium is achieved in an organization as analogous to the process whereby, say, a thermostat maintains a certain temperature in a controlled device. They do not address the problem of exactly what it is that is assumed to play the role of the thermostat in an organization.

The fact is that cybernetic models nowadays are far richer than the ones used in most applications of cybernetic approaches to organizational theory. The “closed-loop” control system and the concept of homeostatic equilibrium, explained as a consequence of the actions of the control system, constitute the most elementary model of cybernetics. That model is now approached as a particular case of what Ashby calls “ultrastable systems”. The cybernetic analysis of ultrastable systems cannot be criticized on the grounds that it does not take into consideration the problem of “how the command position (which ensures stability through reactions to feedback) originates”. The problem analyzed in Ashby’s book *Design for a Brain*² is that of finding the mechanisms that explain self-organization in a stable system, i.e. how the system develops the capability to react in the “right way” to disturbances perceived through feedback. In Ashby’s words, the problem that he approaches can be stated as follows: “A determinate ‘machine’ changes from a form that produces chaotic, unadapted behavior to a form in which the parts are so coordinated that the whole is stable, acting to maintain its essential variables within certain limits. How can this happen? For example, what sort of a thermostat could, *if assembled at random*, rearrange its own parts to get itself stable for temperature?” (page 70).

Ashby’s cybernetic model developed in *Design for a Brain* is the model of an organism (ultrastable system) which achieves stability through “learning”. “Learning” is the process whereby the system achieves “internal organization”, which ensures “stability”, i.e. ensures that the organism will react in the “right way” to any particular feedback. So (in Ashby’s words) the process is as follows:

“Two systems of continuous variables (called “environment” and “reacting part”) interact, so that a primary feedback (through complex sensory and motor channels) exists between them. *Another feedback*, working intermittently and at a much slower order of speed, goes from the environment to certain continuous variables which in their turn affect some step-mechanisms...., the step-mechanisms affect the “reacting part”; by acting as parameters to it they determine how it shall react to the environment” (page 98).

So, in applications of cybernetic models to organizations we must distinguish as to whether the model applied is that of a “stable system” or that of an “ultrastable system”. In the first case, organizations are conceived as entities which act in a thermostat-like fashion: that is to say, “feedback” is the quality that triggers organizational action in order to correct errors in the achievement of goals. Organization is thus conceived as a self-regulating mechanism. In the second case, organization is approached as a self-organizing, self-regulating mechanism, and a double feedback must then be accepted in order to explain the process. The conceptual differences may be better understood in terms of the different concepts of organizational control implicit in these models. In the first case (organization as a “stable dynamic system”), the aim of the control function appears to be that of ensuring the accomplishment of organizational plans. “Feedback” is assumed to convey information about

² Ashby, W. Ross, *Design for a Brain*, Science Paperbacks, Chapman Hall Ltd., 1966.

deviations from plans, and the control system must specify actions to be performed in order to correct those deviations. In the second case (organization as an ultrastable system), the aim of the control function appears to be twofold:

- 1) Ensure that plans are consistent with objectives
- 2) Ensure that plans are accomplished

In other words: the concept of organization as an ultrastable system makes it immediately apparent that organizational control must cope with the problem of how plans are defined.

The ultrastable system as a model of organizations may also be criticized on the grounds of incompleteness. We must analyze very carefully what makes the model incomplete because this study is intended to overcome that limitation. The incompleteness of the ultrastable system as a model of organization can be seen in relation to the same problem as was mentioned in the critique of the model of organizations as stable systems. Analysis of ultrastability shows that a new element, “learning”, must be accepted in order to explain self-organization. But, and this is the important point, the *analysis of an ultrastable system is the analysis of a system which achieves self-organization automatically by a process of trial and error*. So, in terms of the thermostat machine, we can say that the shortcomings of the model of ultrastable systems are not related to the fact that the model does not take into consideration the building of the thermostat itself, but to the fact that it assumes that “the thermostat” is built automatically by a process of trial and error. More strictly, we can define an ultrastable system as a system that has built-in mechanisms that ensure that, *by a process of trial and error*, the system will learn how to react to environmental disturbances in such a way as to maintain equilibrium.

The process of equilibrium in an ultrastable system is explained by Ashby in terms of a secondary feedback which “goes from the environment to certain continuous variables, which in their turn affect some step mechanisms... The step mechanisms affect the ‘reacting part’; by acting as parameters to it they determine how it shall react to the environment.” The explanation assumes that the secondary feedback sends information about the state of some “essential variables”.

That information changes the “reacting part” (which is the system responsible for the overt behavior) whenever the information which is sent affects the step mechanisms. Those mechanisms are affected when any of the essential variables is sent “outside of physiological limits”. Unless that happens, the ‘reacting part’ remains unaffected and the behavior of the whole system can be explained in terms of the “reacting part” alone.

Ashby’s analysis is perfect insofar as he is looking for an explanation of living realities which, in our experience, behave as ultrastable systems. He is searching for the properties that *must be present* in the mechanisms (that nature has given to those organisms) in order to account for their adaptive behavior. The trouble is that “nature” has not given anything to organizations, apart from their members. Therefore, the equivalent of those mechanisms must be built into organizations *on purpose*. Failure to do so will be reflected in a failure to achieve adaptive behavior. An organism may die because it does not have a “program” to cope with disturbances in the value of its essential variables. An organization may die because it *does not know* that its essential variables are disturbed.

Finding a model richer than that of the ultrastable system is not difficult in modern cybernetics. All we need to do is consider the “minimum definition” of organization in cybernetics, namely, the scientific construction that explains the process of equilibrium of two “coupled” ultrastable systems.

It can be argued whether or not human beings behave as ultrastable systems. It is the most fundamental issue in ethics because it boils down to the question of whether or not nature gives human beings enough wisdom to make it impossible for them to destroy themselves, to direct their actions against their own interests. Historically, the issue has been dealt with in terms of whether human beings can only react to “blind fate” or whether they are masters of their own fate through a responsible use of freedom. From the point of view of our immediate interests, however, we can avoid that issue because, even if we assume that human beings naturally behave as ultrastable systems, organizations must *learn* to behave as ultrastable systems. That is so because there is no natural explanation for the fact that an assumption about equilibrium naturally achieved by organizational members should be considered equivalent to an assumption about equilibrium naturally achieved by the organization itself. The fact is that the empirical consequences of a “bad organizational design” arise from the way it tends to alienate organizational members as they learn about their own interests. Indeed, that very alienation is the symptom by which we commonly recognize that the organization is badly designed.

So, the theory that is built in our study is a theory which takes the concepts for describing an organizational member from the cybernetic description of ultrastable systems. The theory itself develops a theory of organization that is congruent with that model for organizational members. We will also see that this organizational theory is the one that generalizes Barnard’s theory in the sense we mentioned above.

CHAPTER II

Building the model

We can describe the process of equilibrium in an ultrastable system in the following terms:

- A) An organism chooses an action in terms of an explicit goal. The action depends on information sent through a primary feedback about the “main variables”, the state of which defines the degree of achievement of that goal. The action is designed to change the values of the “main variables” so that they match those represented by the words “explicit goal”.
- B) In the process some “essential variables” may appear to be disturbed. The organism perceives that circumstance through a secondary feedback, which affects the choice of actions.
- C) The organism *learns* to achieve its explicit goal, while at the same time the “essential variables” are kept within “physiological limits”. That means that the organism will subordinate achievement of the “explicit goal” to the constraint specified by “not sending the essential variables outside physiological limits”.

Cybernetics is mainly concerned with describing mechanisms that account for that kind of behavior. We will not be concerned with such mechanisms in our analysis. Rather, we will approach the problem of finding the consequences of that kind of behavior from the organizational point of view. In other words, we will describe “organizational mechanics” rather than “organizational mechanisms”. So, our theory will be a first step in a cybernetic approach to organization (i.e. the approach that deals with mechanisms which ensure that a particular mechanical process takes place).

Our research will stop when we discover the variables and relations that constitute the *minimum framework* to explain organizational behavior when organizational members behave as ultrastable systems.

We have seen that ultrastable systems are systems that change their behavior oriented toward some explicit goal whenever they perceive a relevant disturbance in the values of certain essential variables other than those defining the explicit goal. So, in order to formalize the dynamic structure of an ultrastable system we need to think in terms of, *at least*, a two-goal structure. That is to say, whenever we analyze the behavior of an organism as if such behavior were oriented toward the achievement of a goal, we are assuming that the organism is a stable system. Ashby is well aware of the theoretical importance of his approach to organisms as ultrastable systems. Although an organism may be approached either as a stable system or as an ultrastable system, the latter approach is more useful because it makes it possible to distinguish among phenomena that are treated as equivalent under the former. In Ashby’s words (page 95):

“Can a ‘machine’ be at once determinate and capable of spontaneous change? The question would be contradictory if posed by one person, but it exists in fact because, when talking of living organisms, one school maintains that they are strictly determinate while another school maintains that they are capable of spontaneous change. Can the schools be reconciled?”

“The presence of step-mechanisms in a state-determined system enables both schools to be right, *provided that those who maintain the determination are speaking of the system which comprises all the variables, while those who maintain the possibility of spontaneous change are speaking of the main variables only*. For the whole system, which includes the step-mechanisms, has one field only, and is completely state-determined. But the system of main variables may show as many different forms of behavior as the step-mechanisms possess combinations of values. And if the step-mechanisms are not accessible to observation, the change of the main variables from one form of behavior to another will seem to be spontaneous, for no change of state in the main variables can be assigned as its cause.”

So, any person who maintains the determination of behavior must know all the variables of the system in order to apply his framework. *Unless he knows that, his statements about the behavior of an organism as a stable system are meaningless*. That is the meaning of our assertion above about the usefulness of the different models. To take a very familiar example, many people assert that maximization of profits is the goal of business firms. The statement is meaningless unless it gives a definition of profit including *all variables* which have an influence on that profit throughout the whole life of the firm. On the other hand, *any definition of profit* may be open to question on the grounds of incompleteness, in the sense that it may not include all relevant variables (and their behavior through the life of the firm). The example is particularly fitting because it shows that traditional economics is implicitly using the stable-system model in its approach to the behavior of the firm.

The issue is important from the point of view of our study because our reasoning from now on will be based on a most important distinction in the concept of “goal” and, consequently, in the concept of “motivation”. Some people may think that the distinction we make is a purely theoretical one and of no importance from a practical viewpoint. Our argument, so far advanced, is that the distinction is equivalent to the fact of *implicitly using a stable-system model* (no distinction is required) *or an ultrastable-system model* (which is based on that distinction). It is true that both models can be used, but it is also true that what they demand of the “user” in terms of knowledge is different. The stable-system model is a particular case of the ultrastable-system model, so some variables which are included within the “*ceteris paribus*” condition when applying the stable-system model *are made explicit* within the framework of the *ultrastable-system* model. It is true that the behavior of a person may be analyzed in terms of achievement of a goal, *if that goal is “adequately” defined*. Such analysis shifts the difficulties to the stage of goal definition, and that is the main motivation behind this study; human life is the process whereby a person learns about “what he really wants”.

So, we take the following as the basic motivational postulates underlying the mechanical processes described by an ultrastable system:

1. Motivation is the force that attracts an organism toward a particular behavior (action).
2. Motivation is explained by the attraction which an organism feels toward the consequences that follow from its actions. Those consequences fall into two groups.
 - Consequences which are explicitly sought (level of main variables)
 - Consequences which are implicitly wanted although they play no role at the explicit level (level of essential variables).
3. Motivation toward an action changes through learning, insofar as consequences become apparent through experiences arising from that action. Such learning ensures that the motivation toward better actions will necessarily grow with experience.

The description given in 1, 2 and 3 above translates what was said in paragraphs A, B and C about the dynamic process of equilibrium in an ultrastable system into categories that will be more familiar in the analysis of organizations. The essential elements of the process are:

- a) Evaluation of an action from the point of view of an explicit goal
- b) Discovery through experience of the value of that action from the point of view of “remaining goals”.

If behavior is observed in terms of achievement of the explicit goal, the consequences of learning (b) above are made apparent by changes in the action chosen to achieve the explicit goal. The usual description of the process talks about “changes of the explicit goal” instead of “changes in the action chosen in order to achieve the explicit goal”. The difference may seem to be one of terminology, and that is partly true, although the expression “changes in the explicit goal” is highly confusing and lends itself to misinterpretations. For instance, if we accept that the term “goal” is meant to indicate “satisfaction of a need that is felt by an organism” (and that is the meaning we attribute to the

term), it is meaningless to talk about “changes in goals”. However, many people use the term “goals” to refer to “*what*” causes the satisfaction of a “need”. That meaning of “goals” is included in our concept of “actions”. It is clear that learning produces changes in “what” is sought in order to satisfy particular needs, but learning does not bring about any changes in the needs themselves. Learning can make apparent that “what” satisfies a particular need is unsuitable because of its dysfunctional consequences in terms of the remaining needs. So, the organism’s motivation toward that particular “what” will change, although the motivation toward the satisfaction of that particular need remains the same as before. For instance, a person is hungry, and so he feels a certain motivation to eat the food that is given to him. Let us suppose that he learns that the food given to him is poisonous. That knowledge will change his motivation to eat *that food*, although his motivation to satisfy his hunger is in no way affected by that knowledge.

Postulates 1, 2 and 3 constitute *necessary* conditions to explain adaptive behavior, that is to say, changes in behavior which may be observed in terms of the system of the main variables. In other words, they constitute necessary conditions to explain why an organism behaves in different ways in the “same circumstances”, when “same circumstances” are judged to be identical in terms of the main variables only. Those postulates also constitute *sufficient conditions* for explaining adaptive behavior because they assume that changes in motivation due to “learning” are always “for the better”, that is to say, that those changes increase motivation toward the “right action” from the point of view of both “known consequences” and “unknown consequences”. The postulates describe a kind of system (ultrastable) for which it can be asserted that “experience” *necessarily* leads to “wisdom”. We have said before that the question as to whether or not human beings behave as ultrastable systems is at the core of ethics. Any person who asserts that the model of ultrastable systems is adequate to explain human behavior is thereby asserting that “experience” is the only cause of “wisdom”. Many authors have emphasized that the problems of our civilization are due to a lack of ethical knowledge. They usually assert that our civilization is a highly sophisticated one in devising ways of doing things but at the same time our present approach to ethics is very naive. It does not seem difficult to trace back that naïveté to the fact that our current ways of thinking are highly influenced by philosophies whose implicit model of man is that of an ultrastable system. That model penetrated into the realm of those philosophical systems through the hypothesis that “experience” is the *only* cause of “wisdom”. That hypothesis is inconsistent with the development of ethical knowledge as such. Ethics becomes irrelevant if that hypothesis is true because the usefulness of ethical knowledge is precisely that of *orientating experience* in such a way that wisdom is achieved. Ethical analysis has as its starting point the deep realization that not all experiences bring about positive learning. That there are some experiences which tend to destroy the person who acts, and it is an unfortunate possibility that the person himself may become “addicted” to those experiences.

The above digression is somewhat relevant to our study because we are going to build a model of an organization whose members are ultrastable systems. Our analysis may therefore seem a highly mechanistic one, given that our model of a human being in an organization is going to be that of an ultrastable system. However, for anyone who is concerned with ethics this study also has some importance. In abstract terms, what we are going to do is find the variables which must necessarily be used to explain behavior in a system which is not ultrastable but which can achieve equilibrium by adapting its behavior to that of some ultrastable systems (the meaning of “adaptation” in this context is practically what our study is about). That system, which could be called a “freely-adaptive-system” because its equilibrium depends on the extent to which it evaluates its actions sacrificing present satisfactions for the sake of future satisfactions *of the same nature*, is most probably an adequate model for a human being. It is clear that in order to develop the model it is

necessary to do first what this study is meant to do. That means that a better organizational theory lies in the future, and that that theory can be developed following a methodology identical to the one we are going to follow. That theory will conceptualize organizations as a set of “freely-adaptive-systems”, that is to say, organizational members will be represented by the variables of the model which in this study we are going to develop for organizations. In fact, we are leaving aside the problems of human existence to concentrate on the problems of organizational existence, but it is by no means surprising that in the process we should learn about the problems of human existence itself. The first person who applied this methodology in a formal way was Plato in *The Republic*. In the Second Book of *The Republic* Plato sets forth the methodology that he is going to follow in his search for the “meaning of justice”.

“Then perhaps there would be a larger justice in the city and easier to understand. If you like, then, let us enquire first what it is in cities; then we will examine it in the single man, looking for the likeness of the larger in the shape of the smaller.”

Our analysis will look for those relationships which are relevant in order to define and explain organizational consistency. Most probably we can approach the analysis of human consistency on the basis of an analogous set of relationships. In other words, the hypothesis that the process of equilibrium in organizations and human beings is isomorphic will probably be most fruitful.

CHAPTER III

Individuals as ultrastable systems

We have seen that motivational processes in an ultrastable system must distinguish between motivation toward some explicit consequences of action, and motivation toward the remaining consequences of action. For instance, we can say that a person is “motivated to satisfy his hunger”. Usually we take for granted that he is at the same time motivated toward many other things, for instance, to preserve his own life. It is also taken for granted that we can analyze the decision problem of selecting an alternative among those available to satisfy his hunger without considering the impact his choice may have on the satisfaction of other needs (for instance, that of self-preservation). Often, such an analysis is valid, that is to say, in many cases we can approach the problem of satisfying a particular need as if it were an isolated problem. The fact remains, however, that this approach is only an approximation to the real problem because, in fact, problems are never independent, even though for practical purposes they may sometimes be approached as if they were. The implicit hypothesis underlying such an analysis is that all the alternatives are equally “functional” from the point of view of the remaining goals. In that case, we can say that a person is motivated toward an action because he predicts that its consequences will satisfy his explicit needs more than any other action. At the same time, he also is motivated toward that action because he estimates that the action will have no dysfunctional consequences for the remaining needs.

An ultrastable system is one that is capable of correcting the motivation toward an action as it becomes aware of the impact that the action has on needs other than the explicit ones.

In order to formalize our analysis we introduce the following variables:

- Effectiveness of an action:* Motivation felt toward the action because of its consequences in terms of satisfying certain needs.
- Efficiency of an action:* Motivation felt toward the action because of its consequences in terms of satisfying the decision maker's other needs.
- Consistency of an action:* Changes in the efficiency of the action brought about by the learning that takes place as the consequences of the action for the decision maker's other needs become evident through experience.

At this point it is important to make it clear that the definitions of these variables constitute a framework for the analysis of motivation based on the following distinctions:

1. The motivation toward an action includes a component that does not change with experience, namely, the consequences of the action that can be perfectly predicted and evaluated by the decision maker "a priori". This element defines the "effectiveness" of an action.
2. Another component of the motivation toward an action concerns consequences of the action that cannot be perfectly predicted or evaluated by the decision maker "a priori". This element changes as the decision maker learns through experience. It is common to the whole "family" of actions which the decision maker judges as "not having dysfunctional consequences that could be predicted a priori". Experience usually brings differentiation later on (as the decision maker learns that some of those actions bring "unexpected" punishments, whereas others bring "unexpected rewards").
3. Consistent actions are actions that the decision maker comes to appreciate more as he learns about their full consequences.

An ultrastable system is one that has a built-in mechanism which ensures consistency, that is to say, a mechanism which systematically discards action alternatives that have been found to have decreasing efficiency after they were tried. In elementary organisms "consistency" is related to the existence of "memory". In the case of humans, the trouble is that "memory" can be used very selectively and humans usually try to forget things that they do not want to remember. Ancient philosophers introduced the concept of "reason" to account for "good use" of memory, and in that sense they defined man as an "animal endowed with reason". "Selective use" of memory is probably one of the most important elements in explaining the existence and dynamics of freedom. It seems that animals are "compelled" to act on the basis of the whole content of their memory, whereas man acts on the basis of an "evoked set", which is a part of what is contained in his memory. Freedom seems to be related to man's ability to select the "evoked set" that will influence his evaluation of his actions. Some philosophers have pointed out that self-knowledge is the essence of wisdom. It seems that that concept has much to do with the development of self-awareness about the consequences of past actions insofar as they have affected memory³.

³ (*) We can see that with this approach some "ethical concepts" are opened to operational interpretation. Take, for instance, the concept of "pride". We could define "pride" as that attitude in a "freely adaptive system" which tends to eliminate from the "evoked set" all those elements in memory which show that previous actions were wrong, that is to say, the attitude which tends to define the relevant content of memory in such terms that past mistakes are left out of the picture.

Barnard's organizational theory approaches the individual who belongs to an organization in a way that makes the distinction between "effectiveness of individual actions" and "efficiency of individual actions" explicit. Barnard is aware of the importance of the "efficiency of individual actions" insofar it is a necessary element in the survival of organizations.

We have seen above that Barnard's framework is based on the concepts of "organizational effectiveness", "organizational efficiency", "individual effectiveness" and "individual efficiency". We have also seen that provided that a person is motivated to act in terms of both "individual effectiveness" and "individual efficiency", and given that "organizational efficiency" is that which ensures a person's willingness to cooperate in the organization, it follows that an organization will be "efficient" insofar as it ensures both "individual effectiveness" and "individual efficiency".

The relationship among these concepts underlies much of what is said by Barnard in *The Functions of the Executive*. In fact, whenever he talks about ensuring cooperation, very often he is thinking in terms of ensuring the "efficiency of individual actions". However, Barnard does not seem to take full advantage of his distinction between "individual effectiveness" and "individual efficiency". That may be because of the lack of precision in Barnard's theory when the distinction is established. Barnard says, "The statement... is one of facts so obvious that they are neglected. They are among those of first importance in this study. They lead to distinctions in the meaning of the words 'effective' and 'efficient', both in relation to personal action and to organizational action." Barnard is clearly well aware of the importance of the distinction he has identified. Further on, however, he defines the two concepts in relation to personal action in the following terms: "When a specific desired end is attained we shall say that the action is effective. When the unsought consequences of the action are more important than the attainment of the desired end and are dissatisfactory, effective action, we shall say, is 'inefficient'. Moreover, it sometimes happens that the end sought is not attained, but the unsought consequences satisfy desires or motives not the 'cause' of the action. We shall then regard such action as efficient but not effective."

"Accordingly, we shall say that an action is effective if it accomplishes its specific objective aim. We shall also say it is efficient if it satisfies the motives of that aim, whether it is effective or not, and the process does not create offsetting dissatisfactions. We shall say that an action is inefficient if the motives are not satisfied, or offsetting dissatisfactions are incurred, even if it is effective. This often occurs; we find we do not want what we thought we wanted."

The description shows that Barnard has identified two very important concepts, but the meaning that he attributes to them is somewhat confused, so that the relationship between the concepts cannot be made clear. This is important because logical consequences which necessarily follow from the distinction cannot be developed. (In philosophical terms we would say that the distinction in Barnard does not achieve the level known as "format distinction".) The confusion in Barnard comes from the fact that an action may be inefficient if either of the following two things happen:

- a) Motives are not satisfied.
- b) Offsetting dissatisfactions are incurred.

However, the failure in each case is due to "causes" which are formally different. In the second case Barnard is talking about "motives" that are different from those included in

the first case. Our distinction is established at this level, the level of “motives”. Let us call them a-Motives and b-Motives. Our analysis of stable and ultrastable systems shows that failure to satisfy a-Motives reveals lack of stability, and that fact is formally different from the fact of satisfying b-Motives for a system that is able (by whatever means) to satisfy a-Motives. Precisely, introducing b-Motives is equivalent to approaching a system as ultrastable. A system which satisfies a-Motives without satisfying b-Motives lacks ultrastability. On the basis of our previous analysis in cybernetics it becomes very clear why Barnard cannot approach organizational equilibrium from a dynamic viewpoint. We have seen that the concept of “learning” is formally related to changes in the choice of action to solve a certain problem because of the consequences the action has for the remaining problems.

Our concept is based on an analysis of a two-problem solving process where the two problems have different formal properties. One of the problems is “operational” and the other is “non-operational”. The “operational” problem furthermore subordinates its solution to its impact upon the non-operational problem. A “secondary feedback” is needed to ensure that the solution to the operational problem does not cause dysfunctions in terms of the non-operational problem. That problem-structure is the one implicit in ultrastable systems. It is also the one implicit in any problem-solving process that uses a homomorphic model to evaluate action alternatives available to the problem-solver. (The importance of that problem-structure from an anthropological viewpoint seems very important because we have every reason to believe that the human mind works with homomorphic models of reality.) Barnard approaches the individual as a problem solver of two problems, but he does not recognize any formal distinction between the two problems. So the meaning of “learning” cannot be adequately introduced in terms of Barnard’s framework because, from Barnard’s viewpoint, there are two different meanings of “learning”.

- a) What is learned when an effective action (in Barnard’s sense) fails to satisfy the motives of that action.
- b) What is learned when an effective action satisfies the motives of that action but at the same time produces “offsetting dissatisfactions”.

In the first case the individual learns that his “model” of reality is “incorrect” (predicted satisfactions do not take place as expected). In the second case the individual learns that his “model” of reality is “incomplete” (important consequences of action were left out of the model).

It would be possible to develop a theory capable of handling both meanings of “learning”. The author suspects that any such theory would constitute the logical generalization of the theory built in this study. He has failed in his attempts to develop such a theory directly. The number of variables increases and some of the relationships among them become difficult to interpret. In cybernetic terms it is a theory meant to analyze the process of equilibrium in a system that has to learn how to achieve both stability and ultrastability.

Our analysis of organization will therefore be based on the distinction at the individual’s level of those three “values” of an action, namely “effectiveness”, “efficiency” and “consistency”. Our hypothesis about the individual being an ultrastable system means that the individual will behave “consistently”, i.e. experience will decrease his motivation toward any action that is inefficient.

We must now introduce the equivalent concepts at the organizational level. Our theory will establish the meaning of those concepts when applied to an organization in terms of their meanings when applied to individuals.

CHAPTER IV

The control system of an organization

An organization consists of a set of individuals who coordinate their actions in order to accomplish some common purpose. That common purpose has to do with the satisfaction of individual needs, and is usually defined in terms of some “objective” that involves changing the organization’s environment into a “better one”, where “better” is to be understood in terms of satisfaction of individual needs.

Actions are coordinated by a mechanism which is usually called the control system. The control system consists of a set of rules which specify:

- a) Tasks to be performed.
- b) Immediate rewards which will follow from the accomplishment of those tasks.

The control system in an organization must be evaluated from three different points of view:

- a) Its *effectiveness*, which measures the contribution of individual tasks to the organizational purpose.
- b) Its *efficiency*, which measures the impact that the immediate rewards (given away to ensure task accomplishment) have on the organizational purpose.
- c) Its *attractiveness*, which measures the impact of the control system on individuals. In other words, attractiveness measures how motivated an individual is to accept the control system.

The distinction we have made can be easily understood and immediately deduced from our description of a control system. However, it is a crucial distinction and it reveals that a great deal of confusion in the existing literature has arisen due to the lack of these clear-cut concepts. Most people agree about the meaning of effectiveness when applied to a control system. More or less everybody recognizes that it is meant to express the relationship between a task and the goal it is intended to accomplish.

The confusion has arisen between the concepts of efficiency and attractiveness. Anthony (in *Management Control Systems: A Framework for Analysis*, page 27) is aware of the different meanings of the term “efficiency” when he writes:

“Efficiency, however, is used not in the sense of Barnard, but rather in its more usual engineering sense: the optimum relationship between input and output. The more units of outputs are obtained from a given input, the more efficient is the machine or process. Koontz, Simon and others also use Barnard’s definition of effectiveness, but not that of efficiency.”

It is clear that Anthony, Simon, Koontz, etc. are using the same concept of “efficiency” as we have defined here (resources that have to be committed in order to motivate individuals to perform their tasks). The crux of the matter is that Barnard discovered a most important organizational relationship, which he baptized with the name of “efficiency”. It is what we have called “attractiveness”. “Efficiency (says Barnard) relates to

the satisfaction of individual motives.” “Attractiveness measures the impact of the control system on individuals” is our definition. The underlying realities meant by “efficiency” in Anthony’s and Simon’s sense are the ones we mean by “efficiency”. Likewise, the underlying realities meant by “efficiency” in Barnard’s sense are the ones we mean by “attractiveness”. The point is that both concepts are of prime importance in organizational theory because both are needed in order to analyze organizational equilibrium.

It is worth noting that the above-mentioned authors are well aware of the importance of that concept within their frameworks. We emphasize this point because it is important to realize that we are introducing concepts that help to explain the behavior of organizations, and that without those concepts no explanation is possible. To any person fond of physical analogies we could illustrate what we are attempting to convey by saying that there is a formal analogy between the concept of “acceleration” and that of “effectiveness”, the concept of “force” and that of “efficiency”, and the concept of “attractiveness” and that of “mass”. So, there is a formal analogy between the difficulties we would have in explaining the dynamics of physical bodies without the concept of “mass” (using only the concepts of “force” and “acceleration”) and the difficulties we have encountered in our attempts to explain organizational dynamics using only the concepts of “effectiveness” and “efficiency” without including “attractiveness”.

The concept of “efficiency”, as it has been established above, is formally identical to that of the “cost” of an activity that is undertaken in order to achieve a certain degree of effectiveness. It is true that in most cases “efficiency” is defined as the relationship between what we call “effectiveness” (output) and “efficiency” (input, i.e. costs incurred in order to obtain output). But the implicit assumption made whenever efficiency is defined in terms of that relationship is that of a “common measure” applicable to both what is “produced” and what is “consumed”. That assumption simplifies the whole question because the individual contribution to the organization maybe expressed as the difference between what he “produces” and what he “consumes”. From that point of view, an organization is “alive” whenever it motivates its members to be efficient, i.e. whenever it “spends” less resources on inducing cooperation than are generated through cooperation. Our definitions make it clear what the real nature of that “common measure” is: the organizational purpose. Conversely, whenever the relationship between effectiveness and efficiency is measured, *that measurement represents an implicit definition of the organizational purpose*. The point is immediately apparent in our framework, but it is so important that it deserves some comment because its importance is by no means so obvious. Let us take, for instance, a doctor working in a hospital. The effectiveness of his contribution is measured by how well he performs his function of healing people. His efficiency is measured by the resources that the organization must give him in order to motivate him to perform his function. There is no doubt that judgments can be made about both his effectiveness and his efficiency. Those judgments may be “institutionalized” by the hospital by establishing “standards”. They may even be reduced to a “number” through some “sophisticated” system of standards. Let us suppose that the hospital has arrived at a “number” that expresses the “ideal” combination of effectiveness and efficiency to be achieved by a doctor working in that hospital.

That apparently innocent “number” means:

- a) An implicit definition of what the institution means by “healing people”.
- b) An implicit definition of what the institution considers to be “the rewards that motivate doctors”.

- c) An explicit definition of the level of rewards that must be achieved for each level of performance by a doctor in terms of “healing people” as understood by the organization.

The hospital may present itself, in any statement of principles, as being committed to the welfare of the community and so forth. In fact, it will be committed to performance of those things which are implicitly accepted as being the relevant ones for evaluating each organizational member’s “contribution”.

In our theory we will not go into the problems of measurement. Accordingly, we will only accept an “organizational purpose” that evaluates both “effectiveness” and “efficiency” of individual contributions, without going into the problems of that evaluation. From that point of view our theory constitutes a first step in the analysis of organizational dynamics. We will not take into consideration the distinction between the “explicit goal of an organization” (i.e. the way an organization measures contributions to its purpose) and the “implicit goal of an organization” (i.e. the relevant aspects of organizational interactions that are not measured in an explicit way). That distinction constitutes the support for the distinction between “Formal control system” and “Implicit control system”, which is closely related to the distinction between formal and informal organizations in Barnard’s sense.

The attractiveness of a control system depends on how much the task-rewards complex attracts individuals. We may very well assume that “rewards” are the characteristics that influence the effectiveness of individual action but have no relevance from the point of view of the efficiency of individual action. That is to say, “rewards” has to be understood to mean the satisfactions that the individual “expects” to achieve when participating in the organization. The concept of “rewards” must not be taken in the restricted sense of remuneration; it also includes “working conditions” and, strictly speaking, everything that affects the effectiveness of individual action, that is to say, everything that is *explicitly sought* by the individual when he decides to participate in the organization. The key element in defining “rewards” is “explicitness” from the individual’s viewpoint. In other words, “rewards” are the satisfactions that the individual explicitly evaluates when he decides to participate.

In fact, we can see that the meaning of rewards established above matches our most common intuitions about control. Organizations attempt to control their members by offering them something which they value. For something to be valued, however, it must be known. Something which is not known cannot generate motivation. The unknown thing may be highly motivating if it were known, but “a priori” it cannot be used to motivate. Knowledge has to come first.

But the consequences of the action the individual takes in order to achieve those rewards will have some influence on future individual efficiency, owing to the learning process that will take place in the individual.

Here, we will introduce a new concept to refer to the changes in individual efficiency brought about by application of the control system. That new concept we will call consistency of the control system. Consistency of a control system measures the changes in its attractiveness due to the process of learning that takes place in individuals when they perform the actions specified by the control system.

We will now see that the concepts of effectiveness, efficiency, attractiveness and consistency, defined for the control system that gives form to a particular organization, include all the elements needed to explain the process of adaptation in a freely-adaptive-system. The analysis will show the conditions of equilibrium for such a system.

CHAPTER V

The freely-adaptive-system: a model of organization

In an ultrastable system we need to distinguish two levels of equilibrium. One is the level of the “main variables”, that is to say, the variables that are relevant for defining stability. The other is expressed by other “structural variables” which, in the case of organisms, are assumed to be automatically kept within “physiological limits”. “Learning” is the automatic adjustment of the mechanism of choice whereby the organism enhances its ability to achieve equilibrium at both levels simultaneously.

In our picture of organization, the level of “stability” is defined by the balance between the two variables of the control system called “effectiveness” and “efficiency”. An organization is “stable” if it “spends” less resources to motivate task performance than it gains through task performance. That “positive balance” between “effectiveness” and “efficiency” is a necessary condition for the existence of organization.

We can see that the level of “efficiency” is dependent upon that implicit motivation of individuals which we called “efficiency of individual action”. That is to say, “efficiency” measures the resources that must be spent in order to achieve a level of “attractiveness” that ensures that the individual will accept organizational norms. But “attractiveness” depends on two elements: effectiveness of individual action and efficiency of individual action. Organizational efficiency influences attractiveness through the effectiveness of individual action. The greater the efficiency of individual action, the less need to create motivation via effectiveness of individual action in order to achieve a certain level of attractiveness (the level required to ensure cooperation).

So, the degree of efficiency of individual actions is the “key” element in explaining organizational efficiency. Roughly speaking, the efficiency of individual actions represents the “efforts” that individuals must make in order to belong to the organization. Those “efforts” can only be measured in relation to individual needs other than the ones that the organization satisfies via “organizational rewards”.

The concept of “learning”, at the individual’s level, means introducing dynamics into the efficiency of individual actions. That is to say, our model takes into consideration a new kind of relation, the relation that exists between organizations and individual goals “outside the organization”. The model shows that that relation is the most important one in the long run because it is the one that “controls” the level of organizational efficiency.

For instance, a person who wants to earn money may be motivated to participate in an organization and accept organizational norms in order to receive a salary. The salary affects the effectiveness of the individual’s action. The organization “controls” the individual in the sense that it can change the effectiveness of the individual’s action by simply changing the salary the individual receives from the organization. But the decision to belong to the organization is made by the individual on the basis of two different elements:

- a) The money he wants to earn.
- b) The sacrifices he has to make in order to earn that money.

Those “sacrifices” are satisfactions which the individual must sacrifice when behaving as the organization demands. They may include such things as “getting up early in

the morning”, “driving a few miles every day”, “not seeing his wife some weekends”, etc. At the time of making his decision, the individual calculates the “expected cost” of all those “sacrifices” and makes his decision on the assumption that the salary is worth those sacrifices. In the terms we have been using, we would say that he evaluates the individual efficiency of the behavior that the organization demands of him.

Once the individual has started work, experience will show him the “actual cost” of the sacrifices (he will receive “feedback” about the individual efficiency of the behavior he has adopted). That “feedback” may modify his original decision. In our terms, we would say he has learned, and that learning may modify his motivation to continue with the kind of behavior the organization demands of him⁴.

Thus, the “structural variables” of an organization are the ones that determine the “attractiveness” of its control system. The existence of an organization depends on its ability to attract individuals who are ready to accept its control system. We will not elaborate the point further because it has been very well developed by Barnard. Our statement is equivalent to Barnard’s affirmation that an organization must be “efficient” (in Barnard’s sense of “efficiency”) in order to survive.

Our analysis, which has made us aware of the new model needed to explain organizational equilibrium (what we have called a freely-adaptive-system), has uncovered a new level of behavior which must be taken into consideration in organizational analysis. That new level is the level that explains changes in “attractiveness” due to the learning that takes place in organizational members as a result of experiences associated with the accomplishment of organizational norms. It explains how an organization continues to exist over time. That is to say, it explains why an existing organization may disappear (it was “attractive”, but its members learned and it became “unattractive” for those same members) or grow stronger (its members find it even more attractive as time goes on than it was initially). It is no surprise that our theory should have clarified the meaning of “survival” in Barnard’s theory. By “survival” Barnard meant “continued conditions for organizational existence”. In our theory we have “conditions for existence” and “what causes those conditions to disappear, grow or be maintained”.

In synthesis, we have found that in order to analyze equilibrium in an organization we need a framework which has three different levels:

- a) Level of organizational effectiveness.
- b) Level of organizational attractiveness.
- c) Level of organizational consistency.

⁴ It is important to note that our theory does not imply any assumption about *what* makes individual actions efficient. We accept, indeed, that what determines the efficiency of individual actions is highly “subjective”, and we do not care, in this analysis, whether or not any general rule is found to judge the efficiency of actions from an individual point of view. The only elements we need to support our theory are the existence of the efficiency of individual actions as a component of the motivation to act, and the changes in motivation due to experiences that “teach” the individual about the actual efficiency of his actions (learning). Both elements can be immediately recognized in the most elementary analysis of human actions. Any framework which does not include those elements is thereby limited to applications where they are irrelevant, i.e. actions whose individual efficiency the individual knows perfectly “a priori”. Among other things, that condition can only be met by actions that the individual has experienced repeatedly.

These levels show the threefold meaning of the vague term “organizational purposes”. Thus, we have.

Organizational effectiveness: It depends on how well a particular action furthers achievement of the organizational goal. Operationally it is measured by the difference between the contribution that completion of the individual task makes to the organizational goal and the “cost” of motivating the individual (measured in terms of the organizational goal). In business firms it corresponds to the common concept of “profit”, expressed by the difference between the income obtained from an activity and the cost of the activity.

Organizational attractiveness: It depends on how motivated the individual is to belong to the organization. It is measured by the evaluation of an organizational norm and the attached reward *from the point of view of individual needs, as it is made by the individual himself.*

Organizational consistency: It depends on the changes in “attractiveness” brought about by the process of learning that takes place in organizational members as they undergo the experiences that follow from accomplishing organizational norms. It is measured by the degree of congruence (*which the individual himself discovers*) between belonging to the organization and the satisfaction of personal needs. This level of analysis is required when analyzing organizational equilibrium because

- a) Individuals discover what they actually want through experience.
- b) Organizations command actions that lead to particular experiences.

In fact, this level of analysis is required in order to ascertain whether or not a particular organization is generating experiences that tend to destroy its members’ motivation to belong.

It is a fact that some organizations tend to elicit in their members a “loyalty” that grows with time, whereas other organizations elicit “alienation” among their members, who continue to belong to the organization simply because they have no other alternative for satisfying immediate needs. This is the phenomenon known in current literature as the “identification of individuals with the organization”. Our model explains that kind of process.

In fact, we will say that an organization is consistent to the extent that it elicits “identification” in its members. The process is explained by the fact of “learning”. Through “learning” the individual “discovers” that the congruence between organizational demands and personal needs is greater than he expected “a priori”.

An organization, to survive, must accomplish goals at all three levels, thus:

It must be effective: An organization must generate more resources than are needed to motivate membership.

It must be attractive: If it is to exist at all, an organization must create enough motivation in its members to “persuade” them to cooperate.

It must be consistent: Otherwise it will not survive. It will last only so long as it is able to compensate losses in attractiveness, due to inefficiency of individual action, with greater rewards. But in this case, offering greater rewards means upsetting the balance between effectiveness and efficiency of

the control system. There will come a time when the organization will need to employ more resources to motivate people than it obtains through cooperative action. At that point the organization will disappear.

If organizations were designed by nature to achieve stability through a process of learning they would have to be immediately sensitive to any rule of the control system which affected the efficiency of individual actions. It is clear that, if the efficiency of individual actions is not kept within certain “physiological limits”, organizations will be destroyed through “inefficiency”, that is to say, organizations will need more resources to motivate individuals than they obtain through cooperation. Applying the model of an ultrastable system to an organization would mean that the organization would have to be automatically aware of the impact that any control system norm might have on aspects of individual motivation that do not depend on “rewards”. Organizations are not automatically aware of those impacts, but they can learn about them if they want to. An organization may be “blind” or “open” to perception of changes in individual motivation. That “blindness” or “openness” is usually expressed by the organizational attitudes known as “organizational values”. “Organizational values” are represented by the criteria an organization applies in making changes to its control system. “Organizational values” are meant to ensure that the control system is *consistent*, i.e. that the actions prescribed by the control system have increasing individual efficiency when individuals learn about the consequences of those actions from an individual point of view. That means that “organizational values” constitute the conditions that must be accomplished by any *effective* action if it is to be prescribed by the control system.

It is important to note that our framework gives an operational meaning to the construct that we have called “organizational values”. That is to say, they are not just any kind of subjective preferences of whoever it happens to be (management, owners, etc.) but a *hypothesis about a causal relationship that operates in the future*. The nature of that causal relationship is a very specific one: the impact on individual motivation of the learning process associated with task performance. If we assume that individuals are ultrastable systems we can immediately close our reasoning in the following way:

“Given that, in the learning process, the individual discovers the appropriateness of any action from the point of view of his individual needs, “organizational values” will ensure an organization’s continued existence to the extent that they forbid the performance of any task that does not satisfy the individual’s needs, even though that fact may not be known to the individual at the time when, attracted by organizational rewards, he decides to perform that task.”

An immediate corollary of the above theorem is that an organization will be successful insofar as it knows better than the individual himself what actions by the individual will satisfy the individual’s needs.

Some readers may find the above statements a little amazing. To show that they are not, it suffices to make explicit certain deeply rooted beliefs that are taken almost as self-evident truths in our culture. One of the most elementary organizations is that constituted by a family. It is so elementary, so “natural”, that it is no surprise that nature should have endowed it with an almost automatic mechanism for adaptation. Authority, in a family, is almost automatically oriented to reward the actions of the weakest members (the children), not according to how the actions contribute to any purpose (effectiveness), but according to how they contribute to motivating the children to discover behavior which the parents think is better for the children themselves. To the extent that the parents’ “beliefs” are true, the family

will be successful and the children will get an education. But, regardless of whether those “beliefs” are right or wrong, nature has made it easy for parents to “think” in terms of their children’s needs as if those needs were their own. To the extent that organizations are less natural than families, that readiness to take the needs of other people into account is less evident. An organization can easily be seen as a simple “conflict of interests”, where it is assumed that everybody looks after his own interests and nothing else. Our model shows that this superficially “realistic” approach conceals a tremendous lack of scientific awareness of the implicit hypotheses that have to be accepted if an organization is to be conceived as no more than a “conflict of interests”. Organizations are based on the fact of cooperation rather than on conflict; organizations grow because motivation to belong depends not only on the resources that the organization distributes among its members; and, consequently, an individual’s motivation may grow due to a process that has nothing to do with obtaining a larger share of those resources at the expense of other individuals within the organization. To initiate such a process, the organization must help individuals to discover the individual value of tasks that are also effective from an organizational viewpoint. Organizations are naturally meant to take advantage of the hidden potentialities represented by the attractiveness of particular tasks for particular individuals, which is actualized when individuals clearly experience the satisfactions that flow from performance of those tasks.

We have called our model a “freely-adaptive-system” because what we have called “organizational values” are not automatically imposed upon an organization. They depend on the extent to which the organization sacrifices present achievement (represented by the difference between effectiveness and efficiency) to future achievement. If we call a process that selects an action according to the anticipated consequences of that action “automatic”, then we have to use a different term to refer to the process that “corrects” that “automatism”, taking into account unanticipated consequences. We have called it “free”. Some people may wonder how the new process that attempts to take unanticipated consequences into consideration can be possible. It may seem that unanticipated consequences cannot be operative because, if they were, they could be included among the anticipated consequences, and, in consequence, within the automatic process. That line of reasoning underlies all deterministic approaches to the analysis of organisms and/or organizations. The confusion has to do with a basic mistake in the concept of knowledge (and thus also with a basic misinterpretation of what we have called anticipated consequences). Even the most unsophisticated analysis of human knowledge reveals that there is a difference between “anticipating an experience” and “predicting an experience”. (I can predict that if I go to a particular place in Egypt, I will see the pyramids. I can scarcely anticipate that experience because I have never been there before. I can “imagine” certain aspects of the experience because I know what a pyramid looks like, I have seen pictures, etc. But there is a big difference between that “vicarious anticipation” and the anticipation of a person who has been there many times). Motivation depends on the degree of anticipation of an experience, and that constitutes the “automatic” process. Human beings are endowed with the ability to modify that automatic process on the basis of their ability to predict experiences that can only be very “vicariously anticipated” but whose importance is recognized even to the extent of sacrificing that automatic motivation in order to ensure achievement of (or in order to avoid) those other “predicted experiences”. □

References

Mc Guire, J.W., *Theories of Business Behavior*, Prentice Hall, 1964, pp. 24-25.

Ross Ashby, W., *Design for a Brain*, Science Paperback, Chapman & Hall Ltd., 1966.