THE PROSPECTS OF A UNIFIED THEORY OF ORGANIZATIONS

Olaf Helmer

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The RAND Corporation
1700 MAIN ST. • SANTA MONICA • CALIFORNIA

SUMMARY

Despite the success of numerous sporadic efforts in the study of organizations, there is at present no unified theory of organizations. This would require a clear-cut conceptual apparatus and a methodology for prediction. To achieve the former within the foreseeable future it might be wise to tie into the existing terminology of game theory; the latter may require taking a new look at the psychological problems involved and introducing something like an operations research approach to them.

THE PROSPECTS OF A UNIFIED THEORY OF ORGANIZATIONS

There has been a lot of talk in the last decade or two about organization theory as the up-and-coming thing. Yet the trouble with organization theory to date is its continued non-existence. This is true despite the fact that numerous sporadic efforts in this general area have succeeded in providing a variety of insights into the mechanism of all kinds of organizations.

When I state that there is no organization theory at the moment, I mean that the two basic requirements for a theory are as yet absent. One is the existence of an adequate and unified conceptual framework, within which meaningful statements about the subject matter at hand can be formulated without danger of misunderstanding. The other is a systematic method of proceeding from premises to conclusions and, thereby, of achieving the goal of any scientific theory, which is both to explain and to predict the phenomena observable in its realm of concern.

As for the inadequacy of the conceptual framework, even the basic concept of an organization, which after all should serve to demarcate the subject matter of this supposed theory, is extremely vague. The notions which people working in this general area have with regard to this concept seem to be quite uncertain and frequently at variance with one another.

With regard to the second desideratum of a theory, namely the availability of systematic modes of inference, the situation if anything is even worse. Progress in the study of organizations as a rule is intuitive rather than systematic. Progress reports,

consequently, no matter how profound they may be in their insights, all too often have the standard form prevalent in most of the social sciences: verbalistic essays appealing to the intuitive understanding of the reader, relying on persuasiveness rather than convincingness.

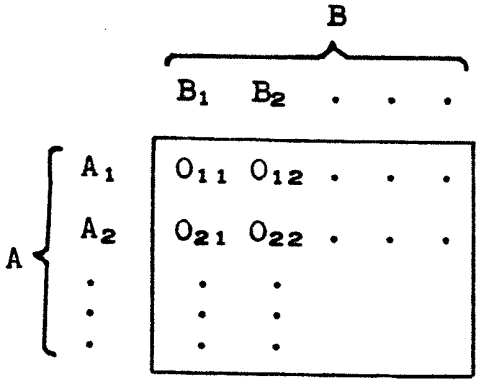
This situation leaves much to be desired, and I would like to discuss some possible remedies, with regard to both concepts and methods, and thereby hope to clarify the prospects and the importance of eventually achieving something like a unified theory of organizations.

Let me first state the theses whose validity I want to argue. One is that the concepts of organization theory may well be clarified by tying into the existing conceptual apparatus of game theory and expanding it appropriately. The second is that the study of organizations would be furthered most effectively by an approach through operations research. My third thesis is that organization theory potentially occupies a crucial position in two respects: firstly, because the notion of an organization is a central one for all of the social sciences including especially political science, which is concerned both with a nation's internal political organization and the organization of nations; secondly, because organization theory, in view of its affinity to game theory, stands at the scientific crossroads of completely mathematized theories on the one hand and still primarily intuitive endeavors on the other (in consequence of which the extension of mathematical methods to organization theory may

constitute the opening wedge toward a similar process for a large sector of the social sciences).

But let us return to our first problem, that of an adequate conceptual apparatus. My suggestion for organization theory to take advantage of the existing very precise conceptual framework of game theory is based on the fact that both theories are concerned with the interactions of the decisions of a group of people acting under given constraints. The difference between the two fields is that organization theory requires certain concepts in addition to those of game theory, or, to put it the other way round, game theory may be viewed as merely a very special part of organization theory, in the sense that a game of strategy may be considered a particular kind of organizational activity.

To make this clear, let us look at the simplest case, namely that of a group of two persons with conflicting interests in a decision-making situation, and let us see what game theory on the one hand and organization theory on the other have to say about it. Let us call the two persons A and B, and let us assume that each independently has to make a choice between several alternatives; then the various possible outcomes resulting from their decisions may be tabulated as follows:



where A_1, A_2,... are A's alternatives, and B_1, B_2,... are B's. Both game theory and organization theory are interested in what actions A and B are likely to take under these circumstances. What motivates them, among other things, are the utilities which each attaches to the various outcomes. These form what in game theory are called the players' payoff matrices:

$$\begin{pmatrix} U_{11} & U_{12} & \cdot & \cdot & \cdot \\ U_{21} & U_{22} & \cdot & \cdot & \cdot \\ \cdot & \cdot & & & \\ \cdot & \cdot & & & \\ \cdot & \cdot & & & \end{pmatrix} \quad \text{and} \quad \begin{pmatrix} V_{11} & V_{12} & \cdot & \cdot & \cdot \\ V_{21} & V_{22} & \cdot & \cdot & \cdot \\ \cdot & \cdot & & & \\ \cdot & \cdot & & & \\ \cdot & \cdot & & & \end{pmatrix}$$

Now in game theory we assume that the players are solely motivated by these utilities. Their choices of action, or strategies, are determined so as to maximize their expected utility, under the sole assumption that the opponent is a rational player similarly motivated by his utility preferences. As soon, however, as other motivations than just the utility preferences with regard to the outcome enter the picture, we are transcending the realm of game theory and are entering the

domain of organization theory. Let me illustrate this by a trivial numerical example. Suppose the players, A and B, have just two alternatives each, and depending on which each chooses, they will each be paid certain amounts of dollars, as follows:

$$\begin{array}{cc} & \downarrow B \downarrow \\ A \rightarrow & \begin{pmatrix} 1 & 11 \end{pmatrix} \\ A \rightarrow & \begin{pmatrix} 0 & 10 \end{pmatrix} \end{array} \qquad \begin{pmatrix} 1 & 0 \\ 11 & 10 \end{pmatrix}$$

If this game is played just once, and if the players, as is assumed in game theory, have nothing to go by but their utility preferences and the assumption that the opponent also is rational, then each will play his first strategy—arguing that, no matter what the opponent's choice, he will get one dollar more than if he played his second strategy—and the result therefore will be that each will receive one dollar.

Had the players approached this situation as an organization, on the other hand, they might both have selected their second alternatives and secured ten dollars apiece. But this would have presupposed an expectation of cooperation, which in turn would have to be based on the presence of some relationship between the participants exogenous to the immediate decision situation as described. There might, for instance, be a contractual arrangement between the two; or, more commonly, their experience with previous similar situations may have built up a tacit atmosphere of mutual trust in which it has become entirely rational to expect cooperation; or again, there may be spoken or unspoken threats, possibly in terms of lines of

authority, calling for cooperation or else. Whatever the details, the point is that in addition to the direct utility preferences, which are the sole concern of game theory, organization theory takes into account various possible relationships between the persons involved, especially their attitudes toward one another.

What I have been saying touches only rather superficially upon the relationship between game and organization theories, but it may suffice to establish the suggestion as reasonable that the organizationtheoretical vocabulary take game theory as its starting point and supplement it with concepts having to do with interpersonal relations and attitudes.

Now a few words about methodology. Organization theory, no matter what form it will eventually take, belongs among the social sciences, which, by virtue of the intangible, vague, and imperfectly observable nature of their phenomena, are set aside from the so-called exact sciences. In this connection I would like to make a general remark. There still seems to be an unfortunate attitude prevalent, according to which the social sciences constitute a sort of second-class realm of sciences which will never attain the purity, at times culminating in axiomatization, of the exact sciences. This attitude has done a great deal of harm. On the one hand it has produced an inferiority complex among the social scientists and put them on the defensive to such an extent that many among them have rationalized their intuitive procedures as a necessary concomitant of the essentially vague nature of their subject matter.

In many non-social scientists, on the other hand, this attitude seems to have led to a prolonged state of resignation, a feeling that nothing can be done about a social science until that happy day in the distant future when it will suddenly turn out to have matured and someone will construct a neat unified theory with basic terms and axioms and definitions and theorems.

This artificial dichotomy between exact sciences with exact terms, exact derivations and exact predictions on one side and inexact sciences with vague terms, intuitive insights and virtual unpredictability on the other, this all-or-nothing attitude, in my opinion has retarded the development of the social sciences immeasurably.

The reason for this defeatist point of view regarding the social sciences seems to me traceable to a basic misunderstanding of what it is that constitutes scientific endeavor. It is not, as apparently has been assumed by so many, the precision and reliability with which future events can be predicted—in this respect the social sciences indeed fall short of the exact sciences—but rather the objectivity, the independence of one person's intuitive perception, the intersubjectivity of findings, which distinguish science from intuitive guesswork however brilliant.

This has nothing to do with the intuitive spark which may be the origin of a new discovery; mathematics, the most exact science, needs that as much as any. But once a new fact or a new law has been conjectured, it must be capable of objective confirmation by anyone.

To suggest that such standards be applied to the investigation of social phenomena is no idle academic oratory. Operations analysts, during the war, had to get results in areas involving vague terms and incompletely understood phenomena—in particular, in many cases, social phenomena. They had to do this in the absence of well-established theories. They handled their task, as we know, not by going to one of the extremes of either relying solely on intuitive judgment or of erecting a complete well-tested "exact" theory, but by examining the narrow context of the phenomenon in question, abstracting from all inessentials, and constructing what is usually called a mathematical model of the situation—although I would prefer to call it a scientific model, which not only avoids the frightening vision of differential and integral equations but also happens to be more apt in many cases. (Let me point out parenthetically that the construction of models of this kind is a standard procedure in engineering applications too, which is a field much less "exact" than many a representative of the so-called inexact sciences may realize.)

A scientific model may be viewed as a highly tentative miniature scientific theory. Its construction, it should be noted, relies heavily on intuition, especially in the inclusion or omission of potentially relevant factors, but once it has been constructed it is there for all to see and to test out objectively. Its saving grace, frequently, lies in the fact that some of the inputs are parametrized, thus affording the

opportunity of adjusting the model until a sufficient approximation to reality has been achieved.

These rather general remarks seem to me to apply particularly to our present subject, the study of organizations. The construction of scientific models of organizations should be somewhat facilitated by the opportune tie-in with the ready-made models of game theory. While both game theory and organization theory concern themselves with interacting groups of variously motivated people in decision-making situations, the models of game theory need to be enriched to allow for the comparatively greater sophistication of organization theory. In particular, in line with the expanded vocabulary discussed earlier, it is necessary to include in the models, in addition to utility preferences, such factors as attitudes toward other persons in the group, mutual trust and fear, possibly learning ability and attitudes toward risk, and perhaps above all a measure of the power of influence over others. Furthermore, while a game model deals with just one fixed competitive situation with well-determined outcome possibilities, an organization model must be capable of handling a continual recurrence, a flux, of situations calling upon the members to make decisions in the light of their preferences, capabilities, and attitudes.

The study of organizations, if approached via the well-tried method of scientific-model construction and using game theory as a stepping stone, offers great opportunities to operations research. Not only are enormous payoffs to be

expected from applications to industrial, business, research, and military organizations; but in view of the applicability of organization theory to the international political field, one could only wish that the State Department, like the War Department during the hot war, would enlist operations researchers to tackle the supposedly intangible and furnish what help they can in the conduct of the cold war, namely by viewing the nations of the world as an interacting group of variously motivated entities in a flux of decision-making situations, that is, as an organization.