DIMENSIONS OF ORGANIZATION BEHAVIOR

Thesis for the Degree of Ph. D. MICHIGAN STATE UNIVERSITY William B. Eddy 1962



This is to certify that the

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ABSTRACT

DIMENSIONS OF ORGANIZATION BEHAVIOR

by William B. Eddy

Research and theory yield a variety of conflicting hypotheses regarding principles of effective administration of complex organizations. A possible reason for this divergency is that the total effect of an action that is input into an organizational system depends to a large extent upon the qualitative and quantitative characteristics of the system at that time. It was suggested that effective management must involve strategies of administration in which decisions about methods are made on the basis of information about the exigencies of the situation as well as about the characteristics of the possible methods.

Factor analyses of operational company and departmental data were carried out in order to see if this approach would yield information regarding the dimensions along which the organization and its sub-units varied. Results supported the possibility of multivariate methods being useful in the analysis of organizational data and yielded factors which, within the limits of the data available, suggested some independent factors of performance. On the basis of the factor loadings, interview data, and other information about the organization the factors were given tentative interpretations and were evaluated in terms of some of the dimensions suggested by theorists.

It was concluded that objective operational data when treated analytically hold promise of providing useful information about the nature of an organization's performance on relevant dimensions of over-all behavior.

DIMENSIONS OF ORGANIZATION BEHAVIOR

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The ultimate completion of this project is offered as an expression of appreciation to my wife Lyndall whose technical and moral support contributed greatly to the well-being of both the study and the author.

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For Lyndall

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INTRODUCTION

A basic characteristics of society is that a good deal of human behavior involves the coordinated activity of a number of individuals toward the achievement of one or more ends deemed "desirable" or "important" according to some human value. In those cases where the coordination is more-or-less formalized and the structure of the aggregate of individuals is functionally differentiated, we use the term <u>organization</u>. An organization may be defined as, ". . . the arrangement of personnel for facilitating the accomplishment of some agreed purpose through the allocation of functions and responsibilities." (Gaus, J. M., 1936 as quoted by Selznick, 1948) The success or effectiveness of the organization is usually evaluated against the attainment of specific ends.

In the 20th century the characteristics of society are determined in large part by the interacting influences of many organizations-governmental units, labor unions, business and industrial firms, educational institutions, non-profit and voluntary associations, and others. Likewise, a large part of the activity expended by individuals involves their participation in one or more organizations for the purposes of income, recreation, civic improvement, etc. It has been pointed out that the present-day industrial society, probably more than other periods in history, is characterized by a complex and highly differentiated structure in which specific functions are allocated to a wide variety of specialists. (Smelser, 1959) The coordination and integration of these functions can, then, only be attained through the development of appropriate administrative techniques.

١ . The recognition of the importance of organizations is certainly not unique to this paper. As a matter of fact, it is common to the introductory sections of a wide variety of writings in the behavioral sciences dealing with the administration of private and public enterprise. For example:

The mounting interest of social scientists in the study of the structure and dynamics of bureaucracy has several sources. Most apparent is the unprecedented growth in modern society of large-scale formal organizations within which must be developed hierarchical administrative and operating social machinery, if their tasks are to be achieved. (Blau, 1956, p. 5)

Complex organizations constitute one of the most important elements which make up the social web of modern societies. . . The way to the understanding of modern man and the society in which he lives leads, therefore, to the study of complex organizations. (Etzioni, 1961, p. vii)

Many observers have extolled the virtues of getting things done via organizations. Often in the areas of private enterprise, labor, government, or civic activity all that is deemed necessary in order to build a better mousetrap, clean up the rivers, or develop the underdeveloped countries is to put together a good organizational structure and reap the benefits. "Getting organized" is held to be synonymous with getting in a position to do a job. Many writers have observed that Americans are a nation of joiners. They have organizations for every conceivable purpose and most of them belong to more than one.

The proliferation of organizations has not gone unnoticed by social critics. There is, for example, considerable concern with maintaining the rights and identity of the individual against group pressures toward conformity and subservience. According to McGehee and Thayer (1961), Kurt Lewin's original interest in group dynamics grew out of a desire to find ways to facilitate democratic group decision-making in which the autocratic role of the leader could be minimized. Other writers who have been heard on this topic include William White,

David Riesman, and Aldous Huxley. Some individuals have been more concerned with satisfactions and rewards accruing to members of the organization. There is interest in moralistic and legalistic aspects of labor relations, wage and salary administration, and mental health in industry.

Other observers, mostly behavioral scientists and organizational practitioners, have concerned themselves less with evaluating organizations and more with peering into their inner workings in attempts to understand their functioning. This group has come to be called organization theorists. These theorists and their theories stem from a wide variety of scientific traditions and schools of thought. The aspects of organization which they choose to emphasize and the explanations they offer are often very different; however, because of the somewhat common theoretical background of the social sciences and the wide circulation of writings there is also a considerable degree of overlap, particularly among the basic concepts. In general, most, if not all, theorists seem to be asking the question, "What are the laws or principles governing the behavior of the organization as it goes about the task of working toward some end?"

In beginning a study of organization theory it seems both appropriate and necessary to examine the experimental and theoretical background developed by social scientists. It will become apparent that these scientists have usually approached the problem of understanding organizational performance from a theoretical or conceptual framework. A major difficulty is that this approach places no limitation on the number or kinds of variables that will be utilized. The resulting complexity and abstractness of organization theory seems to defy the development of research designs that will allow the testing of hypotheses. One of the most noticeable aspects of the general field of organization theory is the rarity of experimental evidence.

It will be the aim of this paper to make a contribution to the body of organization theory, i.e., to the understanding of functioning organizations. The general problem under consideration is this: wide variation in degree of success or effectiveness is often found between organizations, and within one organization over time. It is assumed that a significant proportion of this variation is a result of the behavior of people who are members of the organization. (It may be true that other portions of the total variation are due to conditions outside the organization, such as market conditions, and to chance factors such as the weather.) A goal of the psychologist who studies organizations is to understand the human-related variations and their causes. Another goal may be to use this information to institute actions which will result in changes in the direction of greater success or effectiveness of operation. The research described herein aims at better understanding of some of the possible sources of variation, with the expectation that the information gained may be useful in introducing constructive changes.

We begin from the position that the question is not <u>whether</u> the human variable is important, but <u>why</u>, and <u>how</u>? Specifically, in what ways does the organization as a "psychological field" affect the behavior of the individual? We suspect that important components of this field probably include the work group, the supervisor, the job, personnel policies, working conditions, and rewards and satisfactions. Mediating between the environment and the behavior of the individual are needs, attitudes, abilities, and perceptions. The organization is, in a real sense, a "system" with all parts interdependent. It is difficult to locate the independent variables with which to begin an analysis without some rationale or theory which is able to specify the nature of the relationship between the variables.

Therefore, the first step will be to examine organization theory both historically and as it has evolved to the present time in an effort

to isolate some of the hypotheses of the theorists about what they believe to be the major causes of variation in organizational effectiveness and what variables they use as the building stones of their theories. Consideration will be given to the extent to which these theories are able to be validated by gathering empirical data available or procurable in an organization. A major concern of the review will be the question of the feasibility of testing the hypotheses of the theorists, given the present stages of knowledge and extent of availability of organizational information.

Theories of organization

The complete history of the development of organization theory would be the subject of several volumes in itself; no attempt will be made here to give a comprehensive historical review. March and Simon (1958), Stogdill (1959), and Dale (1952) give brief histories. The purpose in discussing several past and present organization theories in this paper is to attempt to come to some understanding of the general trends of thinking about organizations and the kinds of concepts used by the different theorists in their attempts to explain the functioning of organizations.

Speculation about the principles of organization is probably as old as the history of human group behavior. The first complex organizations were governments and military groups, and the first theorizing concerned these units. Plato's <u>Republic</u>, Thomas More's <u>Utopia</u>, and Machiavelli's <u>Prince</u> represent concerns with methods of organizing and governing groups toward the attainment of some goal or goals.

It remained for Max Weber, German economist-lawyer-sociologist, to first describe comprehensively the structure of the unit we now call an organization. Weber was interested in the growth of large-scale public and private organizations which he termed "bureaucracies"-bodies divided into "bureaus" or differentiated functions. (Weber, 1946

and 1947) The major characteristics of Weber's "ideal-typical" bureaucratic structure (as summarized by Blau, 1956), are as follows: (1) the regular activities required for purposes of organization are distributed in a fixed way as official duties--there is specialization and division of labor; (2) the organization of offices follows the principle of hierarchy in that each lower office is under the control and supervision of a higher one; (3) operations are governed by a consistent system of abstract rules which define relationships, responsibilities, and standards of performance; (4) the official conducts his office in a state of formalistic impersonality, uses rational standards, and does not allow personal considerations to interfere with his decisions; (5) employment is based on technical qualifications, with protection against arbitrary dismissal and promotion based on seniority or achievement. These policies develop loyalty and esprit de corps and consequent "identification" by the employee with the organization, thus motivating him to exert greater effort in advancing its interests. Requirements of the bureaucracy are that individuals have the skills necessary to do their jobs, and that discipline be used to keep the worker from making decisions that benefit himself at the expense of the organization.

Weber's analysis is a functional one; that is, the social structure of the organization is explained by demonstrating how each of the elements contributes to the over-all operation. The key to effectiveness lies in a "rational" strategy of administration in which the organization is set up and run in such a way that it can coordinate and control the specialized activities of its sub-groups in an efficient manner in order to cope with the complexity of tasks in the operation of the total organization.

The Weber theory has strongly influenced much of present-day organization theory, and is particularly noticeable among writers who v prescribe administrative techniques for setting up efficient organizations.

Gulick and Urwick (1937) are names which have been identified with what March and Simon call "theories of departmentalization" and Gouldner calls "structural functionalism." The total organization is set up in pyramid fashion with lines of control established according to the activities or functions that are deemed necessary to the general purpose of the organization. Ernest Dale, in his American Management Association Report on <u>Planning and Developing the Company</u> <u>Organizational Structure (1952)</u> discusses such topics as determining the objectives and dividing the work accordingly, delegating responsibility, the span of control, the mechanics of organization, and preparing the organization chart and manual. Texts in business administration and industrial management stress the correct arrangement of elements within the organization according to principles such as authority, specialization, decision-making, etc., under the hypothesis that adherence to these rules leads to a more efficiently functioning enterprise.

In addition to Weber, other sociologists such as Durkheim, Cooley, Mead, and Simmel made early contributions to the study of groups and organizations. Social relations were the focal point of their writings, and they established a vocabulary of concepts such as <u>role</u>, <u>authority</u>, <u>norm</u>, and <u>communication</u> which have served as tools for their followers.

Another early influence was the "scientific management" idea developed by F. W. Taylor (1911), the Gilbreths, and others. It began as a particular methodology for the arrangement of work tasks and grew to assume the proportions of a theory of management. The major concern was with the performance of a particular worker on a particular series of tasks, often the operation of a machine. Specifically circumscribed work procedures were devised which promised to increase production and the worker's rate of compensation if followed exactly. There was relatively little regard for individual differences of workers

involved. Concepts such as "task arrangement," "time and motion study," "therblig," and "fatigue" give an indication of the variables that were considered relevant. The scientific management movement and its present representations such as methods, systems, and programs analysis are predicated on the hypothesis that if the structure of the organization can be correctly arranged in terms of specific tasks to be accomplished the organization will be efficient.

As scientific knowledge and experience with organizations began to accumulate variations on the relatively mechanical theories of Weber and Taylor began to emerge. At this point in the history of organization theory it becomes difficult to sort the various writings and theories into clear categories representing different schools of thought. As the body of knowledge accumulates, new writings tend to be attempts at improvement of some particular phase of the older theories. Nevertheless, new and promising ideas have arisen which have markedly influenced present day thinking about the functioning of organizations.

Chester Barnard, an administrator of wide experience, was one of the first to emphasize what have come to be regarded as "nonrational" or "informal" aspects of organization behavior. (1938) He viewed organizations as cooperative systems of consciously coordinated personal activities or forces. His interest was in how the leader can successfully implement the cooperative system to perform in desired ways. It must have been quite obvious to Barnard, as to all administrators, that people do not necessarily conform to the behavior patterns prescribed by the formal organization. Instead, they may behave according to their own self interest. It is the task of the executive, through organizational processes such as communication, to coordinate the physical, biological and social factors to reach particular goals. Loss in effectiveness is due to lack of objectivity and to the introduction of biases into executive decision-making. It is interesting to note that

even today practitioners are not completely satisfied with the applicability of current organization theory. After hearing presentations by a group of social scientists at a symposium at the Foundation for Research on Human Behavior (Haire, 1959), eleven representatives of firms subsequently presented papers giving their own views on "organization theory in action." (Haire, 1962)

A number of other important theorists have elaborated the concern with achievement of rational behavior within organizations. Etzioni points out that ". . . finding a balance between rational and nonrational elements of human behavior is a cardinal issue of modern life, society, and thought. It is also the central problem of organization theory. " Theorists who have been concerned with this question include Merton and Gouldner. Merton discusses <u>dysfunctions</u>, those consequences of formal organization that interfere with adjustment and create problems in the process. Formal bureaucracy, for all its rationality and impersonality, may not be perfectly stable. For example, discipline, a requisite of formal organizations, may also have negative effects in that it may induce workers to cover up their mistakes, thus decreasing effectiveness. (Merton, 1949)

Most theories of organization are also theories of leadership in the sense that they generate hypotheses about how the organization should be manipulated by those in positions of "authority" in order to increase effectiveness (e.g., <u>Barnard's Functions of the Executive</u>). There are, however, some "purer" leadership theories which bear fairly directly on particular methods and manifestations of the act of leading. It is not the purpose there to review theories of leadership, but, rather, to point out that emphasis placed on leadership is tacit recognition of the important effect upon the organization's functioning of those individuals in positions to make decisions and initiate changes in the organization's structure. There have been many books written

which tell the administrator how to become an effective leader. Some writers have combined theories of leadership and organization. (Bass, 1960) In modern psychologically-oriented theories of organization, leadership assumes an even more important role because of its implications for the motivation of group members. These theories will be considered later.

Industrial sociology gained prominence when Mayo, Roethlisberger, Dickson, et al., found work behavior which was not determined by the rules and procedures of the formal organizational structure. They placed the blame on "informal" social behavior. This variation in behavior was assumed to lie at the group rather than the individual level, and was explained in terms of subtle group norms and pressures within the social structure. Thus the informal organization was superimposed upon the formal organization structure, and one of the "new looks" in organization theory emerged. Collectivities of people are not machines, and do not necessarily behave as robots. (Roethlisberger and Dickson, 1946)

Individual psychological theories of organization have, until recently, been rarer than sociological and social-psychological ones. Personnel psychologists, while not advancing any formal theories of organization have, however, followed an implicit theory. Proper selection and placement of individual members of the organization according to the abilities, interests and personality traits required for their jobs is one means of increasing over-all effectiveness. Other methods include training, counseling, assessment, and other post-hiring techniques. Thus, the matching of job demands with worker qualifications has been one of psychology's early contributions to increasing organizational effectiveness.

Most early theorizing about organizations was by sociologists who were mainly interested in the properties and structural

characteristics of the groups themselves. More recently, however, social psychologists have begun to develop hypotheses about the functioning of organizations as well as small groups. Mason Haire (1954) points out that the beginning of industrial social psychology can best be dated from the Hawthorne studies and their emphasis on the work group. From that point interest in employee attitudes and group pressures on productivity emerged. Another source of theoretical influence came from Kurt Lewin and his students and their investigations of group dynamics, climate of groups, and group leadership. Moreno's sociometry has also been a part of the background of social psychology. It has contributed a method of systematic observation and quantification of the interaction process as well as hypotheses about interpersonal relations. The development of industrial social psychology was spurred by industry's demand, during and after World War II, for the assistance of social scientists in solving some of their situational problems. Topics under study by social psychologists today include motivation, group structure, conflict, cooperation, attitudes, perceptions, and communications.

In recent important discussions Thibaut and Kelley have investigated relative rewards and costs of membership and their influence on the members' degree of participation in the group. (1959) Bales has developed an analysis of group process using a set of dimensions which subsume different kinds of interaction. (1950)

Cartwright and Zander have examined "working hypotheses" which have been suggested for the enhancement of group effectiveness, and have stated the major ones in social-psychological terms. (1953) Effectiveness may depend upon:

- 1. the extent to which a clear goal is present;
- 2. the degree to which the group goal mobilizes the energies of group members behind group activities;

- the degree to which there is conflict among members concerning which one of several possible goals should control the activities of the group;
- the degree to which there is conflict among members concerning means that the group should employ in reaching its goals;
- 5. the degree to which the activities of different group members are coordinated in a manner required by the group's task;
- 6. the availability to the group of needed resources, whether they be economic, material, legal, intellectual, or other.

It is added that the list should also contain many items specifying required group structures and processes, such as effective communications, competent leadership, clear lines of authority, and participation in decisions.

As they continue their emphasis of the importance of goals in group effectiveness, Cartwright and Zander acknowledge the necessity of dealing with the concept of human need. The problem has been one of how to link individual goals with group goals in a conceptually satisfactory manner. Alternative approaches have been to view group goals as (1) a composite of similar individual goals, (2) individual goals for group members, (3) dependent upon a particular interrelation among motivational systems of individuals, or (4) inducing agents or motivational forces acting upon individual members.

Within the past five years a number of important new psychologically-oriented theories of organization have emerged. In general, they have been attempts to improve the applicability of the older theories by revising them in accordance with new principles and data which have come to light through experience and research. These theories place less emphasis on describing the structure of the organization than on attempting to understand the principles determining the behavior of its members.

Among the more elegant of the newer theories is that developed by March and Simon. (1958) In this system a psychological, cognitively-oriented theory is developed in which the interaction between cues or stimuli in the individual's present situation and his internal state (learning, memory, experience) accounts for behavior. The human is pictured as ". . . a choosing, decision-making, problemsolving organism that can only do one or a few things at a time, and can attend to only a small part of the information in its memory and presented by the environment." The organization presents the member the difficult task of making decisions in an extremely complex situation in which he is bound to do a less-than-perfect job because there are too many cues to evaluate fully, and because accurate prediction of outcomes is not always possible. So, the organization member is forced to develop decision-type behaviors (called "actions") as he copes with the situation. "Action programs" are built up by exploring the outcomes of procedures and come to be regularly applied to particular situations. Thus, the individual does not face each new situation with an attempt to create a solution that will yield the optimal level of attainment, but rather, he brings into play the action program which seems most applicable because it has yielded "satisfaction," though probably not optimal satisfaction, in the past. Thus, the individual in an organization is pictured as a rather limited organism attempting to cope as best he can with an extremely complex situation. What he does, in a sense, is to reach a compromise with the situation and with himself in which he solves his problems with ready-made solutions (programs) which are far from perfect, but are nevertheless, probably better than those he could continually manufacture on the spur of the moment. The equivalent of the structure of the organization are the action programs which are the most stable and least likely to change and are shared by the members.

Another newer theory is that of Chris Argyris. (1957) His major tenet involves the conflict between the person and the organization. In order to reach its goals the organization must demand the members' conformity and adherence to rules. On the other hand, the individual has predispositions toward self-actualization and achievement. In the unavoidable friction that must result from this conflict in goals both the individual and the organization are losers. The conflict may be minimized and thus individual satisfaction and organization effectiveness increased by leadership methods which utilize understanding of human motivation.

The theory developed by McGregor is similar to Argyris' in that it pins loss in effectiveness to the man-organization conflict. Human needs are seen to lie upon a hierarchy of importance (according to Maslow), with physiological needs being most important and social, ego, and self-fulfillment at less basic levels. However, when physiological needs are regularly met, as they ordinarily are for the industrial worker in Western society, they cease to be motivators of behavior. Rather, the higher level needs come into play. This is precisely the situation in modern organizations, yet traditional management methods are well designed to thwart the higher level needs by reliance on arbitrary authority. This is what McGregor calls "Theory X." He suggests, instead, an approach in which the member may contribute to his own self-development by participating in developing the goals and procedures under which he and the organization will perform. This new approach (Theory Y) is based on the premise that if objectivity and maturity are introduced into the man-organization interaction it is possible for a course of action to be selected which will benefit both.

Still another approach, similar to the two just discussed, is that of Rensis Likert. (1961) His Newer Theory, generally similar to McGregor's Theory Y, is based upon a decade of research at the

University of Michigan Institute for Social Research. The approach has been to describe the leadership behavior of effective managers. and with the aid of other research findings, draw conclusions regarding the nature of effective leadership techniques. The key is found in the principle of "supportive relationships." Management is most effective when the individual member perceives his experience in the functioning organization as contributing to or maintaining his personal worth and importance. Likert goes on to explain how an organization may be effectively structured in order to take account of the supportive principle. Since the effectiveness of an organization depends upon the coordination of the contributions of each of its members, the application of the newer theory must be viewed in a social-psychological context, as an interaction-influence system. The key to effectiveness lies in highly effective work groups in which the members would be thoroughly involved in the goal-setting, problem-solving, and decision-making at the appropriate levels. Likert also stresses the necessity of collecting appropriate data on psychological as well as economic factors throughout the organization in order that decisions can be made on the basis of the best possible information.

The final work to be discussed, that of Stogdill (1959), probably fits the definition of a model better than a theory. Starting from the point of view that the structure and operations of a group may be described in terms of the behaviors of its members in interaction, Stogdill develops a description based on a physical system model, with <u>inputs</u> (member performances, expectations and interactions), which result in, and are mediated through, the group structure and operations (its function, status, purpose, norms, responsibilities, and authority) and result in <u>outputs</u> which are viewed as achievements (broadly defined as productivity, morale, and integration). Stogdill cites a vast amount of social science research literature to develop the relationships among

his variables. The theory is extremely complex, and it is difficult to derive any simply stated broad principles. Generally, Stogdill purports that by viewing an organization or group as a physical system in unstable balance, with individual expectations (motivations) as the energy source, it will ultimately be possible to predict and thus control output by varying the operations and structure, which are in turn controlled by varying the inputs. The model is an attempt at synthesis of both sociological and psychological theories of group performance. Here the structural-functional model advanced by Weber does not have to be taken as invariant, instead its origin and purpose may be explained, and at the same time the effects of the structure upon the individual may be treated more directly than, for example, in the March and Simon model where it is viewed rather obliquely in terms of shared personal action programs.

It should be pointed out that in the preceding discussion of theories of organization it has been possible to give only the barest outline of each author's approach. It is in no sense true that the value of any of the contributions must be assessed only in terms of the ultimate validity of its major hypotheses. The value of page upon page of insightful discussions of the functioning of organizations by astute observers such as Barnard or McGregor and the hours of research underlying such works as those by Stogdill and Likert are completely missed in a discussion such as this. An attempt has been made to give only what seems to be the theorist's basic orientation to the problem of understanding the relative effectiveness of organizations and to indicate some of the important variables and the hypotheses with which he relates them. It should also be pointed out that no attempt has been made to include the writings of all the important organization theorists.

Basic issues

An examination of the various theories cited up to this point indicates that there may be some underlying dimensions which form the basis for most discussion of organizations.

1. Orientation toward achievement. Although touching upon individual satisfactions, social values, etc., most of the theories cited here are primarily concerned with understanding the process by which organizations attain their goals.

2. <u>The individual-organization interaction</u>. Most of the theorists would subscribe to the view that the performance of an individual, as a part of the group, affects the performance of the organization. At the same time, the structure and processes of the organization exert influence upon the individual and affect his behavior. However, the particular aspect of the interaction which the theorists emphasize may vary a great deal. Thus the structural-functionalists pay greatest attention to the nature of the organization itself; sociologists and socialpsychologists are more interested in the social processes mediating between the individual and the organization; the current clinicallyoriented psychological theories pay particular attention to human needs and perceptions.

3. <u>Situation versus personality trait as cause of behavior</u>. Closely akin to the previous point is the question of whether the variability in human behavior in organizations is to be explained primarily by relying upon the personality characteristics the member brings with him, or anchoring the explanation in the social situation. It is probably safe to say that the trend has been toward the situational, even by psychologists. The epitome of this position is Merton's discussion of how the bureaucracy may actually influence and change the personality

of its employees, the concept of "trained incapacity." The interest in individual differences has been greatest among the personnel psychologists and those interested in unique traits of leaders. This category might also have been called "level of analysis," with individual decisions at the most microscopic level and total structure the most macroscopic.

4. Formal versus informal organization. The writings of Barnard, Mayo and others have demonstrated the existence of group behaviors not specified by, and often at variance with, those prescribed by the formal organization structure. This recognition has led to the insight that a description of the "legal-rational" structure of the organization does not tell the full story of its process.

5. <u>Rational versus non-rational basis of human behavior</u>. The classical models have been based largely on economic theory which supposes decisions aimed solely at maximizing gains (in this case, for the organization). More recent theories have emphasized the "non-rational" basis of human behavior, i.e., the intrusion of affective and motivational considerations into the decision process. March and Simon, for example, propose a model in which the human's motivational and cognitive characteristics allow him to approach, but rarely attain, optimal solutions. Stogdill's discussion of "slippage" demonstrates how the member's responses may be appropriate from a personal point of view, but inappropriate from the organization's point of view.

6. <u>Individuality versus conformity</u>. In addition to the social critics who have observed the danger of the group constricting the individual, some of the theorists have a commitment to the potential value of the individual and his ability to make a contribution to the operation of the organization. Theory X, as described by McGregor, is based on the assumptions that the average human dislikes work, will

avoid it if he can, and really prefers to be directed. Although none of the more formal theories discussed here express so dire a picture of the human potential (although it may be quite a valid picture of the beliefs of some managers), there are obvious differences in the degree to which theorists feel it is necessary and desirable to control the worker, and what contribution he, as a unique individual, can make to the organization by being creative, rather than by simply following his carefully circumscribed work procedures.

7. <u>Methods of leadership and supervision</u>. The application of the theories requires actions of particular kinds to be taken by individuals in upper echelons of the organization in order to improve the effectiveness of the organization. Suggestions for supervision vary from complete structuring of the total organization as well as the positions within it to a <u>laissez faire</u> approach, with the responsibility on the individual.

Mason Haire, in summing up two groups of papers on organization theory, relates what he sees to be some of the underlying issues. A group of academicians were concerned with the conflict between personality and organization, forms of structure for effective organizations, the decision process, the ecology of organizations (i.e., the social, economic and legal context in which they operate), and viability or survival. Haire detected the following recurrent themes and "myths" in a group of papers presented by business executives: authority commensurate with responsibility, the line-staff distinction, centralization and decentralization, objectives of the company in organization planning, and assumptions about the "nature of man." (Haire, 1959, 1962)

The seven major concerns of organization theorists listed above and those described by Haire may be summarized as demonstrating preoccupation with the variation in human behavior in organizations and with the sources of this variation. The application of a theory

depends upon controlling this variation and directing it toward desired goals. Thus theories of organization are primarily concerned with methods of control. One series of methods of supervisory control emphasizes arrangement of the elements and interrelations within the organization, the other emphasizes concern with the motivations and feelings of the individual members. Earliest attempts represent, of course, the structural method. These approaches, in their orientation to the over-all organization, were positive or active in the sense that they took definite and direct steps toward arranging things for the accomplishment of the task at hand. On the other hand, the newer, more psychologically-oriented methods have tended to be more negative or reactive in that they often strive only to counter the harmful effects of the dominating structure. The theory of Peter Blau represents this position well. Blau acknowledges the suppressive effects of formal structure and the relevance of social phenomena in influencing behavior. He then goes on to suggest a theory of "adjustive development."

Bureaucratic processes continually endanger the conditions for optimum performance; necessary reductions in staff give rise to feelings of insecurity despite explicit personnel policies; the anxieties engendered by evaluation on the basis of results may not be relieved by social cohesion; and so forth. The main task of the new administrator is to keep vigilant watch over these conditions of adjustive development, which are perpetually threatened, but without which, if the hypotheses advanced here are correct, efficiency in the bureaucracy suffers. (1954)

Now if it is true, as had been suggested, that structural theories are more active or positive and human relations theories more negative or reactive in their approach to the organization, it may be noted that just the opposite is true with regard to their conceptualization of the member as a human being. As McGregor suggests, structural theorists tend to be less optimistic about the motivations of the individual and his ability to make a unique contribution. However, Bennis' assertion that classical theories have addressed themselves to organizations without

people, and that human relations theories consider people without organizations is only generally true. Actually, Weber's writings contain recognition of the importance of human motivation (<u>esprit de corps</u>), and human relations practitioners certainly would not advocate a vote by the employees on every policy decision made by the board of directors. So the difference is largely one of degree, but it is nevertheless there.

It should be pointed out that the structure-human relations dichotomy is somewhat of an oversimplification. In practice, it is probably not possible always to classify a particular action clearly into one category or the other. For example, a training program might involve the establishment of structure in terms of job procedures, rules, evaluations, etc. But the program might also reinforce the employee and motivate him by offering him an opportunity for advancement, recognizing his potential, or giving him personal attention.

It is interesting to note that the general principle underlying the structure-human relations dichotomy has come up before, although sometimes in different terms. The Ohio State group under Fleishman has, for some time, been gathering data regarding leadership behavior. Studies utilizing questionnaire items dealing with styles of leader behavior have yielded two empirically derived scales or dimensions. One has been called <u>initiating structure</u>. Items in this scale reflect the degree to which the supervisor facilitates or defines group interactions toward attainment. That is, he emphasizes deadlines, assigns people to particular tasks, plans activities in detail, etc. In other words, the supervisor behaves according to classical methods. The other scales called <u>consideration</u>, reflects human relations or Theory Y methods. The supervisor helps employees with problems, stands behind them, treats them as equals, etc. A rather striking finding, in view of previous theorizing, is that the scales are independent--an individual's

score on one scale is not indicative of his score on the other. Furthermore, the relationships between a supervisor's score on the two scales and his effectiveness as a leader is far from simple. Whether or not the initiating structure or the consideration approach is more effective seems to depend to a large extent upon the expectations of the supervisor, his boss, and his subordinates. Also it appears to depend upon the nature of the task at hand, the conditions under which it must be performed, and the kind of evaluation used. So, seemingly, neither of the two major approaches is clearly always the best. (Fleishman, 1951)

Another growing body of literature adds support to the above theses. One major tenet of the human relations approach, at least in its earlier stages, was that the higher level of morale or satisfaction presumably obtained by a human-oriented approach would necessarily lead to more effective work performance. However, articles by Brayfield and Crockett (1955), Herzberg (1957), Katz and Kahn (1953), and others have thrown serious doubt on this hypothesis. In some studies morale and productivity seem to be independent, and at times the relationship is negative.

Research by Herzberg, Mausner and Snyderman indicates that satisfaction and dissatisfaction on the job may be caused by different factors. Data gathered from middle-level management individuals indicates that satisfaction was induced by the realization of selfactualizing goals such as recognition, achievement, and intrinsic job interest. Dissatisfaction was induced by "contextual factors" such as supervision, working conditions, and pay. While it would be overinterpretation of the data to assert that satisfaction is derived from human relations influences and dissatisfaction from structural influences, it does seem reasonable to point out that the results are strong

indication of the complicated relationship between working conditions and attitude. (1959).

The preceding group of studies are substantial proof that, although the concepts of morale and productivity are extremely complicated and are defined in a variety of ways, there does seem to be reason to seriously question the technique of attempting to raise morale in order to achieve a gain in productivity.

The substance of the argument is, of course, that there is good theoretical and empirical reason for suspecting that structure and human relations approaches do not necessarily align themselves at opposite ends of a "good-bad" continuum of motivation. Katzell arrives at essentially this same conclusion by a somewhat different route than the one taken above. He acknowledges all the evidence which indicates the disadvantages of Theory X approaches--restriction of output, conflict, rigidity, etc. He then cites a number of recent studies which tend to hint, if not prove directly, that conditions derived from a Theory Y orientation do not necessarily correlate with higher worker productivity. Further, they do not necessarily even correlate with higher satisfaction! Katzell concludes that at the present level of knowledge it is not possible to prescribe any single cure-all theory, neither Theory X nor Theory Y, nor a new combination of the two. It is his point that current theories of organization are simply not in shape to give formulas for organizational success. There are several reasons for this problem, but the major one is that they have not been induced from a substantive body of facts as have scientific theories, rather they have been deduced from assumptions. It is suggested that a more fruitful approach to understanding is a descriptive one in which the relevant dimensions of a productive organization are identified, relationships between them determined, and their effects under different conditions discovered.

Further evidence is offered by Stogdill. In reviewing a large body of both laboratory and field research he concludes that, generally, a moderate amount of structure benefits both productivity and satisfaction. Complete lack of structure not only incapacitates the group as a producing unit, but leaves the members unable to structure their role expectations so that they can define their own functions. ". . . The group . . . must maintain balance and control if it is to survive." On the other hand, too much structure restricts output and satisfaction. The point is made that when groups are first formed, even small groups, the members seem to find it necessary to develop some structure in order to function. A certain amount of time must be spent with concern directed inward at the group maintenance function in order for a group to "get organized" enough to do its job.

Granted the subordination of the individual's personal aspirations in the interest of the group, he tends to seek two conditions in order to act for the benefit of the group. First, he attempts to determine what he is expected to do and with whom he is expected to cooperate. Second, he seeks a sufficient but not excessive degree of freedom for initiating action and interaction in order to carry out his own duties and cooperate with other members when necessary to do so. Members appear to be able to tolerate an almost unbelieveable amount of personal frustration in a group if these two conditions are fulfilled. A group is ordinarily able to offer few other rewards which will compensate a member for the frustration of these two expectations relative to his contribution to the group. (Stogdill, 1959, p. 132)

Synthesis

And so, we find ourselves with a variety of theories, some of which advocate the necessity of one of two major concerns in organizations, structure and human relations, others which stress the inevitable conflict between them, others which suggest their independence, and still others which argue for their necessary interdependence. Bennis argues that the problem of the duality of the individual-organization relationship has permeated much of the thinking about leadership. He sees the newer theories such as those of Argyris and McGregor as "revisionistic." They have withdrawn somewhat from the extreme position of classical human relations theory (as developed from the work of Mayo, Carl Rogers, and Lewin) which assumed that the demands of the person and the organization were similar and that conflict was unnecessary, and have advocated a somewhat firmer approach for the leader. Bennis contends that ". . . effective leadership depends primarily on mediating between the individual and the organization in such a way that both can obtain maximum satisfaction." (1961)

What is needed is a model in which the varied findings regarding the relationships between the four variables of structure, humanrelations orientation, attitude, and performance can be dealt with.

Perhaps the issue will be made clearer if it is acknowledged that the theories and sub-theories of management discussed by the theorists are essentially methods of <u>control</u>. They are techniques of human motivation designed to control the individual and collective behaviors of people, and to direct them along desired paths. Viewed in this manner it becomes clear that control is not only a technique of organization, but control is a necessary requirement of organization. Without it there is only potential, only the independent behaviors of individuals. The random, uncoordinated behavior of an aggregate of individuals who had nothing in common but physical proximity would accomplish little.

Control can be understood as a neutral term and does not necessarily represent tyranny, but in a democratic society we have tended to be uncomfortable with the concept and have tempered it with ideas like "democratic leadership." As Blau points out, this term contains a paradox within itself. Democracy, as this society has conceived it, denotes rule from below. One person's supervision of another
cannot be democratic. Blau goes on to assert that "tolerant" management practices, as they are utilized in human relations approaches, in contrast to disciplinarian ones, are neither democratic nor an indication that controlling power has been surrendered. They are simply one strategy for establishing effective control over the behavior of subordinates. (Blau, 1956)

So, the management in all organizations must control; it has no choice if it is to keep the organization together. The only question is which method to use to gain optimum effectiveness. The answer to this question will provide the ultimate answer to the problem of organization effectiveness. Theories and studies cited so far offer no unanimity about the most effective methods of control. Even if we view most of the methods as suggesting an approach lying somewhere on the continuum between structure and human relations methods it is difficult to get much consensus. Is it best to compromise and recommend a medium amount of structure together with a medium amount of human relations?

Perhaps it would be useful to ask what the two methods have to offer. The claims of the structuralists are fairly clear--they offer efficiency. They offer the shortest distance between two points; they offer clearly marked courses of action; they offer rationality. Human relations theorists, on the other hand, offer salvation from the domination of the structure. They offer adjustive development, supportive leadership, loyalty, motivation, and involvement. As a by-product of these conditions the human relations theories offer organizational productivity via effective performance. It is much easier to see why the structural theories do not work than to see why the human relations theories do. Evidence becomes extremely meager when the analysis is pushed to the issue of human motivation. McGregor suggests that structural methods frustrate higher level needs, while Theory Y methods

allow for their fulfillment. Likert asserts that a human relations approach causes the employee to see his job experience as supportive-he gets positive reinforcement from it and is therefore more positively oriented to his job, the organization, and its goals. March and Simon are concerned with the evocation of responses or action alternatives with valued consequences. And Stogdill talks about expectancy and the readiness for reinforcement as accounting for behavior.

Blau's explanation of the effectiveness of human relations methods involves the concept of "withholding the power of sanctions." The lenient supervisor does not enforce all the rules and procedures which he could enforce under the policies of the formal organization. Instead, he lets his subordinates "get by" with minor infractions and thus makes life a little more comfortable for them. The subordinates then exert extra effort in complying with his requests in order to pay him back for his concessions and to avoid the risk of cessation of favors. Authority is actually weakened by the full application of sanctions or punitive measures because they cause members to feel alienated, dependent, and disturbed. In this analysis Blau is able to explain the influence of supervisory practices on both productivity and morale.

There is, however, a somewhat more straight-forward way of looking at the relative effectiveness of supervisory methods. Human motivation may be explained as the seeking of goals for the gratification of needs and expectations. It may also involve avoidance of punishment. Theory X generally relies on threat of punishment. "Don't do what you want to do, but do this--or else!" Human relations theories, on the other hand, seek to get the worker to carry out activities advantageous to the organization because the same activities also have reward value to him. Blau implies that all the possibilities for control are coercive--sanctions or threat of sanctions--while an alternative explanation suggests that one method of control utilizes reward-seeking.

Psychologists have accumulated a good deal of experimental evidence about the effects of reward and punishment upon performance. For example, punishment can affect behavior in a variety of ways, not all of which include increasing performance level. Also, intensity of the stimulus and clarity of the relationship between stimulus and response may have considerable effect upon performance. But psychologists have made relatively little progress in dealing with these phenomena in so vastly complicated an interaction situation as an organization. Managers, likewise, have found it difficult to control their employees through reward and punishment, though they have tried a large number of methods. These methods of control are based on a variety of hypotheses about human behavior or motivation. Each method carries a claim for controlling behavior more effectively.

But it is evident from all the evidence brought to bear on the problem that no one method of control can be shown to be totally effective. The evidence is that individual variability, individual differences in personality traits, group characteristics, kind of task being carried out, situational demands, and other factors interact with the characteristics of the management method to determine effectiveness of performance. In the final analysis, the effect of any method which is input into the system will not be felt until it has been mediated through the total organization and finally reaches a stage where the members perceive it. By that time it has become not a clearly definable procedure, but rather, a set of stimuli which have been conditioned by, interacted with, interpreted through, and integrated into the total organization structure and process. It is obvious then, that management methods of control are unlikely to exert themselves according to simple rules along single dimensions of organization behavior, but rather, by the time their full effect has been felt, may have a variety of effects depending

upon a variety of conditions. These effects include not only productivity in the ordinary sense, but also other individual and collective behaviors which may or may not be related to productivity.

APPROACH TO ANALYSIS

One approach to the problem of understanding the effects of control methods is suggested by Stogdill's work. It will be recalled that he defines "group achievement" as the totality of all the outcomes of the group process. This totality includes the dimensions of productivity, integration, and morale. In an attempt to operationalize his concepts Stogdill gives each of these terms a rather restricted meaning. Productivity is the achievement usually associated with output--a product or service, but theoretically it is defined as an accomplishment or a change of value in what was put into the process. Integration refers to the viability of the structure and operations. Evidences of low integration include griping, hostility, absenteeism, accidents and lack of coordination. Morale represents freedom from restraint in action toward a goal (and not "satisfaction" as the term is commonly used). Stogdill's hypothesis is supported by a number of factor analytic studies which indicate that the outcomes of group operations may be described in terms of goal direction (productivity), integration, and interaction facilitation (morale). Productivity, integration and morale are independent in the sense that they do not "cause" each other to vary, but rather depend upon the inputs and process. The nature of the balance between the elements may be defined by the following hypotheses: productivity and morale are positively related; morale may be related either positively or negatively to integration; integration and productivity are negatively related; morale, productivity and integration may be positively related when the group is strongly motivated in striving toward goal achievement, or when motivation is very low; member satisfaction exerts its primary effect upon group integration rather than upon productivity or morale.

Although the executive in the organization is charged with "optimizing" productivity, little concern is usually given to morale and integration, two equally important aspects of group achievement.

Stogdill's view, it should be noted, is somewhat different than that generally subscribed to. Other authors have suggested that the major dimensions of organization achievement involve economic output and the rewards or satisfactions accruing to the members. By positing a more complicated view Stogdill is able to account for what have been seen as inconsistencies in the relationships between dimensions of organization activity.

If Stogdill's argument is valid, one of the major reasons for lack of clear-cut results in the research and application of control methods is obvious. The criterion problem has been misstated and misunderstood. The evaluation of individual training may involve fairly well-defined criteria, but the evaluation of attempts to change group or organization performance may be an entirely different matter. Someone in a position of authority in a group or sub-group introduces into the system a set of actions based on hypotheses about how these inputs will affect the behavior of the individuals and how, in turn, the behavior of the individuals will affect the over-all performance of the group. How are the effects of the control methods, the inputs, evaluated? The observer may choose some variable indicative of the frame of mind of the members--satisfaction, morale, motivation, loyalty, goal-orientation, etc. He then must take measures which will discriminate between levels of the variable. These may include responses on attitude scales, level of turnover, grievances, absenteeism, communications, etc. Or, the investigator may choose to study productivity. In that case he will probably be interested in efficiency, quality, financial success, and level of output. As indicators of these he will probably use a variety of bookkeeping and accounting figures

which include profit, volume, etc. Or, lacking the necessary information about people or production, he may simply ask knowledgeable individuals in the organization to make ratings. He then subjectively or empirically correlates the inputs with his choice of outputs and draws conclusions about principles of management control. Results are functions not only of the method used, the way it is implemented, and the variable or variables chosen as indicators of group performance but also of the state or condition existing in the organization at the time. The administrator must ask the question, "Change from what to what?"

Without isolating some general factors or dimensions which can be agreed upon as valid indicators of aspects of organizational performance, the chances of clarifying the confusing array of hypotheses about the structure and human relations strategies seem small. Terms like irrationality, role, authority, leadership, dysfunction, sanction, informal organization, morale, adjustment, satisfaction, etc., may be useful conceptual tools, but they are of small value, if not a hindrance, in attempting to transfer the dynamic workings of an organization into objective and measurable data. It may well be that this superstructure of theoretical verbiage often obscures what is still the crucial problem in organization research: definition and measurement of the dimensions of group performance. It is all very well to hypothesize about the effects of various attitudinal and structural variables upon effectiveness, but a theory can never be empirically validated unless effectiveness as well as attitude and structure can be objectively specified and measured. As Stogdill points out, "Although a theory provides a set of concepts and hypotheses that may be used for analytical purposes, neither the theory nor the techniques derived from it can yield a solution to a problem until analytical operations have been performed." (1959)

The idea that the various dimensions of group activity are complicated and difficult to understand is, of course, not a new one. Boyles

has summarized the positions of a number of writers who have been concerned with measuring productivity. Peter Drucker (1954), for example, sees no hope of isolating a unitary dimension of organizational effectiveness, and recommends looking at every aspect of the organization in which performance affects survival and prosperity. Several writers have suggested profit as the most relevant criterion of effectiveness. Dent and others have suggested productivity or volume, but these measures have been found somewhat unsatisfactory because they seem to leave out too much of the complexity of the real situation.

Boyles points out that the relevancy of a criterion might well be a function of who is doing the evaluating. "Union leaders, government tax auditors, employees and stockholders are concerned with different aspects of the organization, hence have a different criterion of effectiveness; or perhaps a different interpretation of the same criterion." (1962)

Stogdill cites the analyses of several writers who have discussed the evaluation of organizational productivity. Troxel points out that an organization creates a great variety of values, both material and nonmaterial, and that units of product produced can be at best only a crude approximation to the total results of group effort. (1954) Other writers have discussed the problems involved in measuring productivity in governmental and other organizations where no material product is produced. Siegel settles upon "output per man-hour of work" as the most useful indicator of productivity available, but cautions that this measure indicates effectiveness with which labor is utilized in combination with other factors, and not labor efficiency per se. (1952) Craig points out that the utilization of monetary measures in place of psychological measures does not represent a final solution of the criterion problem, since the two are interrelated. "Money values are merely market reflections of psychological values." (1951)

Likert places the availability of information about all phases of the organization's operations at the cornerstone of an effective "interaction process system." He blames ineffective management upon the inadequate feedback of relevant and necessary information. According to Likert, most firms regularly collect information dealing with "end results" such as production, sales, profits and earnings.

Much less attention is given, he says, to the <u>intervening vari-</u> <u>ables</u> which influence end results, i.e., internal states such as loyalty, skills, motivations, interaction, communication, and decision-making. It is Likert's contention that these variables can be successfully measured, and he presents an elaborate scheme for integrating the variables. The end-result variables listed by Likert are as follows: production (cost, waste), earnings, absence, turnover, union-company relations, stoppages, and sales. (1961)

Mason Haire concurs about the need for data.

In terms of level of abstraction, the field of organization theory is in a rather peculiar state. We have a group of relatively vigorous models of considerable formal elegance, on the one hand, from the mathematical economists and decision theorists. On the other hand, we have some brilliant, penetrating insights from the naturalistic observations of people like Whyte, Argyris, and Selznik. Between these, however, there is a remarkable gap. . . . We do not have much in the way of systematic behavioral data collected for the purpose of testing hypotheses or quantifying variables used in models. . . (1959)

Glanzer and Glazer reviewed studies dealing with the analysis of small group structure and the effect of structure on performance. There seem to be no clear-cut findings regarding the relationship between structure and efficiency of group behavior. The effect of a particular kind of structure depends in part upon the requirements of the task. In a number of studies the highly centralized structures were less efficient. Morale and satisfaction have been found to be related to location of position, with members in central positions more satisfied than those in peripheral ones. There is little consensus, however, for the psychological basis of this relationship. Glanzer and Glazer conclude that none of the research reviewed has approached the goal of developing a rational system for arranging groups to maximize efficiency and satisfaction. There is seen to be a need for a system of ordering the data obtained and for developing appropriate experimental situations and concepts.

The preceding discussion gives strong indication that what are needed are not techniques of management, but rather, strategies of control. The evidence seems clear that it is unrealistic to expect to be able to apply the same procedures and techniques across all individuals, groups, tasks, and total situations. Rather, different techniques may work better under different circumstances. But how is one to know which techniques to apply when? Control may be implemented in a variety of ways, including the making and enforcing of rules and procedures, inputting particular people and materials into the process, dissemination of information, establishment of rewards, threats, and punishments. Obviously, it is necessary to develop a strategy of control, a course of action determined not only by principles or theories of organization management, but also by continuing feedback from the situation. It is necessary to, in a sense, take the pulse of the organization on a continuing basis to discover the needs or conditions that seem to be influencing the course of the organization's progress.

In order to do this it is necessary to know, first, the major dimensions of organization behavior. Are they morale, integration, and productivity, as Stogdill suggests, or are there more, or fewer, basic dimensions? What is the nature of the relationships, if any, between these dimensions? Does it matter if morale is low, or if balance and control (integration) are lacking? Next, it is necessary to know the "symptoms" or indicators of the standing of the organization or its

sub-units on the basic dimensions. Do we look only at profit to gain an estimate of productivity, or is it necessary to consider other factors? How do we operationally define abstract concepts such as morale and integration? Is it necessary or desirable, or even possible, to gain such information by passing out weekly attitude questionnaires or are there other indicators? Finally, will it be possible to test hypotheses about the proper methods of control to use under specific conditions?

It might be hypothesized, for example, that when integration is low, e.g., role relationships are poorly defined, job descriptions are indefinite, and criteria of performance are non-existent or confused, the kind of control suggested by Theory X might be most appropriately applied. This is a situation in which it is necessary to "add structure." On the other hand, a situation might exist in which integration was extremely high, but the performance levels of individuals was low, uncreative, unimaginative, etc. In this case one might suspect that elements of the structure, social pressures, norms, fears, etc. were constricting performance. The appropriate control measure might be to attempt to provide more individual incentive for performance by loosening the structure, providing feedback about individual performance, or giving employees more part in planning organizational goals and procedures.

We are a long way from the ability to prescribe a formalized strategy of control. It is true, however, that successful managers probably follow strategies as a matter of course. These strategies may be similar to the "action programs" described by March and Simon. They are developed by trial and error and by "feel." But, as March and Simon point out, these strategies are usually considerably less than optimum because of the individual's cognitive limits, the

inadequacy of information, and procedural inflexibility. Also, they may be based on invalid assumptions about motivation. Were these strategies based on an understanding of the consequent interaction between particular methods and specific organizational circumstances, both present and future, they might well be more successful in achieving the criteria of over-all performance established by management.

In summary, a variety of techniques based on observation, theories, and empirical data have been proposed as means of increasing the total effectiveness of organizations. These approaches may be logically divided into two categories, one of which advocates structuring the organization as a whole, its lines of authority, communication, responsibility, etc., and the other advocating behavior toward individuals in a manner that will improve their attitude toward the organization and release the potential of their collective individual behaviors. The evidence regarding the comparative values of these approaches and the many methods they subsume is not only meager but unclear. It is here suggested that one reason for this situation is that data of the sort which would enable the testing of hypotheses derived from organization theories have not been systematically gathered by organizations, and thus have not been available for use. Part of the reason for this probably lies in the fact that theorists have not utilized operationally definable variables in their theories. Another reason may be due to the lack of appreciation on the part of administrators of the practical value of such data in improving the effectiveness of their own performance. This situation has provided the theorist as well as the administrator no means of evaluating the effects of particular methods under specified conditions. If some insight can be gained into the variety of dimensions which describe organization behavior it may then be possible to relate these descriptive dimensions to more specific conditions within the organization and to test the effectiveness of particular techniques of control in changing these conditions.

PROBLEM

In an attempt to lend understanding to the issues under discussion, an empirical investigation was undertaken in which the following questions were asked: (1) What objective measures are available in an organization which might be analyzed in an effort to understand some of the basic dimensions of organization behavior? (2) What relationships exist among these variables, and what conclusions may be drawn from these relationships? (3) Is the information of a sort that might allow testing of hypotheses derived from theories of organization, i.e., the relationship between structure and consideration, or the relationships between productivity, integration, and morale? (4) How are the objective data related to the members' understanding of the relevant dimensions of performance and the criteria for assessing these performances?

(It should be stressed that no claim is being made that performance variables are equated to psychological constructs. That is, grievances + turnover + bids do not necessarily equal morale or satisfaction, but their significance, if they are related to clearly definable dimensions of organization performance, is clearly relevant.)

The approach taken is a behavioristic one with particular emphasis on objective data available in the organization and with derivation of constructs limited to those which can be empirically related to the data. The assumption is that an analysis based on operationally defined aspects of the organization process will be more objective and more accurate, and will help minimize introspection and anthropomorphism.

In a recent article Guion (1961) reminds the reader that subjective ratings, opinions, and judgments may be the "best available criteria," but this in no way indicates that they are good or even acceptable criteria. He goes ahead to emphasize that any practical moves to improve the performance of individual members must be based on thorough understanding

of the functions which the individual in a particular position must perform in order to fulfill the requirements of the organization.

Psychologists have probably not given sufficient recognition to one advantage of carrying out research in organizations. Because of taxes, government regulations, costing problems, and labor contracts most economic organizations keep a variety of complete records about many aspects of the organization process. It may be true that these kinds of industrial operational variables are not the usual substance of psychological investigations, but criterion data rarely are, and perhaps this is a reason for the paucity of criterion studies in the applied field. A portion of the operational data may be readily observed to be directly related to the behavior of the individual (grievances, turnover, waste, etc.). Another portion of the data are more often considered aspects of the production process, but may also be interpreted as the result of the behavior of individuals or groups of individuals (output, costs, etc.). It is suggested that if individual psychological variables can be related to objectively measurable performances, which are in turn related to over-all organizational outputs, the person-organization interaction may be better understood.

Effectiveness and terms related to it, such as <u>achievement</u> and <u>goal attainment</u>, have come up repeatedly in the foregoing discussion, and occur in the literature on organization theory with equal frequency. Although the concept seems indispensable to any discussion of organizations, it contains certain inherent conceptual difficulties. The major disadvantage of the term is that it is an evaluative one involving personal judgment. That is, a decision involving the relative effectiveness of organizations involves some weighing of the many facets of their operation. Thus, is profit to be the major indicator of effectiveness, or are other factors such as return on investment, net worth, expansion, product development, product quality, and share of market to be considered? And if so, how are they to be weighed? And, are personnel satisfaction, wage levels, full employment, and other employee relations criteria

to be considered? Some authors have adopted the position that ultimate survival is the only real criteria of effectiveness, while others, such as Lloyd (1962) sees the major goal of the organization to be to maximize cooperative effort in order to satisfy some human need more efficiently than can any other alternative. Clearly, these are unmeasurable criteria. It is the position of this paper that while a concern with effectiveness is an entirely relevant consideration, and the major reason for the emergence of organization theory, it is difficult to study until some individual within or outside the organization defines it operationally and specifically in terms of one or more of the many possible outcomes of group interaction.

Existing theories have a great deal to say about constructs, but very little to say about the use of objective operational data in describing these constructs. It was decided, therefore, to give consideration to all available objective information which showed any promise of describing some aspect of the performance of an organization. It was assumed that variables such as profit, production, and costs are just as surely indicators of some aspect, yet unspecified, of total organizational behavior as are school grades for an individual or the operation of a lever by an experimental animal. It was also assumed that underlying all the possible sources of variation in an organization there are a finite number of basic dimensions of organizational behavior. That is, several variables might be indicators or symptoms, to a greater or lesser degree, of a particular condition within the organization, such as its standing on a dimension such as efficiency, morale, etc. It is recognized that any group of operational data can be only a sample of the total population of symptoms, perhaps a biased sample. Thus, the over-all dynamics of organization performance cannot be discovered in one study of less than huge proportions. But it was expected that a large enough group of variables could be obtained to demonstrate the existence and nature of some of the dimensions.

In addition to the collection and analysis of variables at the total organization level an attempt was made to carry out a comparative analysis between the production departments within the organization. If the characteristics which seem to describe the variability of the total organization from month to month are valid, the same dimensions should describe the variability between departments within the organization.

One further step in the project involved interviews with department foremen and with higher level supervisory and staff personnel. If, as has been suggested, effective supervisory control strategies require the use of information about the standing of the organization or its sub-units on the relevant dimensions, then the supervisors' perceptions of the dimensions assume crucial importance. Interviews were conducted with the supervisors in an effort to discover (1) whether they perceived any dimensions of organization behavior, and if so, which ones, (2) what relationships they saw between the dimensions, and (3) their evaluations of the significance of the dimensions and their interrelations.

Research Site

The research was carried out in a medium-sized appliance manufacturing firm located in a midwestern community. Products are nationally distributed carrying the company's name, and are also sold under contract to major applicance companies who market them under their own brand names. Competitive pressures in terms both of costs and design have forced the firm into a position in which it is essential to be adaptable and flexible. Fluctuations in consumer demand, unpredictibility on the part of the larger customers, technical advances, and rather frequent engineering changes have put heavy pressure on the production departments. Within the past several years there have been

wide variations in the degree to which the firm has been able to market its products, meet production schedules, and stay within budgeted costs. The ability to show a profit has, of course, also varied.

Major divisions of the organization include finance, engineering, marketing, and manufacturing. Within the manufacturing phase of the operation there are eleven direct production departments and five indirect or service departments. Six of the production departments fabricate and process component parts, two assemble the parts, two manufacture specialty products, and one packages the products. Service departments include tooling, shipping, material handling, maintenance, and inspection. The number of workers in departments ranges from five to fifty. Although there are a number of assembly and sub-assembly lines, the plant is not highly automated, and the maintenance of quality and quantity depend heavily upon the individual and group performance. The departments are necessarily interdependent, but supervisors have some degree of autonomy. The individual foreman must schedule, make decisions, solve problems, and administer in terms both of people and processes.

The firm is the only major employer in a small rural community. Most of the workers and lower-level administrative personnel live in the community, or in similar adjacent communities. There is a good deal of interaction among employees off the job. The employees are represented by a major international union. Its position in the plant is quite strong. Although there have been a few instances of overt labormanagement conflict, strife has not been considered excessive. Contracts have been negotiated without the necessity of strikes. Wages are high when compared with the firm's competitors and other near-by organizations.

Most of the foremen have been promoted from the worker ranks, and have held their positions for an average of over eight years.

The administrative staff personnel have characteristically been with the firm for a number of years, although replacements are occasionally brought in from outside. Incidents of management taking action against employees are rare, and the atmosphere is definitely non-punitive. On the other hand, a psychological consultant to the organization has found evidence of a significant degree of conflict both between and within divisions.

The Scanlon plan was instituted in 1958. Under this arrangement, all employees may share in bonus earnings which result if labor efficiency is increased. Employees are encouraged to submit suggestions for improving efficiency. These suggestions are acted upon by committees set up at departmental and plant-wide levels. An employee's bonus earnings are based on a percentage of his salary, and may vary from zero to fifteen or more percent from month to month.

Members of the research group had been carrying out consultation with the firm prior to the collection of data and were acquainted with many of the personnel. Management was interested in the research project from the beginning and gave its full support. The researchers were allowed free access to company files and were assisted in their search for data by members of the accounting and personnel staffs. Because of the confidential nature of much of the information utilized the raw data is not shown in this paper.

FIRST STUDY

The first phase of the investigation involved an attempt to discover whether the analysis of a group of operational company variables might suggest the existence of a limited number of more basic dimensions of over-all organization performance. Multivariate methods such as factor or pattern analyses have often been used to study underlying dimensions in a sample of responses or characteristics. Usually observations are taken across a group of subjects, and the analysis ultimately allows not only a description of the dimensions underlying the responses, but a comparison of individual subjects' scores on these dimensions. Attempts at a similar approach to the study of organizations have proved discouraging. A comparison of operational data across organizations is difficult to carry out because of differences in kinds of records kept, in the procedures for computing the figures, and in varying conditions affecting the organizations. For these reasons, it was decided to perform the initial stages of the research on one organization over a period of time.

The advantages of studying the empirical history of organizations in order to understand lawful processes in organization development are discussed by Haire (1959). He demonstrates the usefulness of plotting such characteristics as growth in number of employees, but points out the lack of such empirical data in most descriptions of organizations. Studies often involve the investigation of one organization at one point in time, thus allowing no standard of comparison for findings, either across time or across organizations, but place reliance on the author's judgment regarding the significance of findings. Exceptions to this

limitation are found in studies such as those by Walker and Guest (1952), Mann and Hoffman (1960), and Hardin and others (1960). However, in these studies observations were taken only a few times, usually before and after an organizational change, and allowed little insight into the dynamics of the organizations.

Variables

The task in the present study was to locate a group of variables which met the following criteria: (1) those involved in the study should feel that the variables might be indicative in some way of the over-all performance of the organization, (2) quantitative data about the magnitude of the variables at points in time had to be available, (3) data had to be systematically recorded monthly for the preceding five fiscal years (the period covered by the study), and (4) data should show some degree of variability over time.

One group of variables which seemed to meet the criteria were derived from monthly financial statements:

- J 1. Operating profit--total manufacturing profit before taxes and other factors unrelated to production have been taken into account;
- Z. Total number of units manufactured--a sizeable majority of all products are very similar, so this figure is taken as an indicator of level of production;
 - 3. Total number of units manufactured for sale to large contract customers;
- v 4. Dollars derived from sale of contract units;
 - 5. Total number of units manufactured for sale under company's brand;
- 6. Dollars derived from sale of company brand unit--contract brand and company brand figures were included separately because it was felt there might be differences in terms of production and profit;

- 7. Material variance--a comparison of the budgeted cost of material and the actual cost;
- 8. Direct labor variance--budgeted cost of direct labor compared with actual cost;
- 9. Factory overhead variance--total budgeted overhead costs compared with actual costs.

Costs of production are estimated before a product is put into production in order that prices may be arrived at and manufacturing procedures may be established. Thus the "variance" figures in items 7, 8, and 9 above indicate the degree to which the firm was able to manufacture the products within projected costs. Failure to do so could be a result of either miscalculation of costs or substandard performance in one or more aspects of production. Or, it could be a combination of the two.

10. Percentage bonus earned under the Scanlon Plan--employees' share in a constant proportion of any savings due to increased labor efficiency. The figure is derived by subtracting actual cost of labor from the "historical" cost per dollar of product value.

Another group of variables were derived from records containing information about the firm's labor force.

- 11. Number of individuals employed in the "direct labor" category-those whose duties involve direct operation upon the product;
 - 12. Number of individuals employed in the "indirect labor" category--those whose duties are in the manufacturing area, but who perform functions of a service or auxilliary nature;
- \checkmark 13. Number of salaried employees.
- 14. Number of man-hours worked in the "direct labor" category;
- \checkmark 15. and 16. Average hourly wage both with and without bonus.

Variables 11 through 15 are indicative of the relative amounts of labor utilized in each time period, and its costs. A number of "labor relations" variables were also included in the analysis and are listed next.

- 17. Number of labor grievances filed by union members;
- 18. Numbers of "bumps"--under the union contract a worker whose job is eliminated because of circumstances such as a change in procedure or a production cut-back may, under certain conditions, take the job of a worker with less seniority. This procedure may continue in a chain-reaction fashion as a worker who is bumped from his job bumps in turn another employee with still lower seniority.
 - 19. Number of jobs originally eliminated to start the bumping sequence;
 - 20. Number of "bids"--workers may request to be transferred into positions which are open. Seniority is a major determinant of whose "bid" for the job is accepted.

Variables 17 through 20 can be interpreted in a variety of ways.

It will be noticed that all except number 19 involve some action initiated by the employees.

The following ratios were also included:

- Actual level of production divided by scheduled level of production;
- 22. Units of product produced divided by total man-hours worked;
- 23. Difficulty of product "mix"--the proportion of the total production taken up by the most complex and difficult to produce item was used as a rough indication of the relative difficulty of producing the combination of products manufactured in one month;
- 24. Market strength--as a method of accounting for the possible influence of level of consumer demand, industry-wide monthly sales figures for the product were obtained from the industry's trade association.

It should be re-emphasized that the above variables are not necessarily all that could be used. The data were limited by the ability of the researchers and company personnel to think of variables appropriate to the analysis, and by the availability of data which met the requisite qualifications. Several obvious measures had to be omitted for a variety of reasons. Because of labor market conditions, high wages, and probably other factors, the voluntary turnover rate is negligible and does not vary. No records were located which could give a reasonably clear picture of the degree of waste or scrapped material over the period studied. Variables which might be judged to be indicators of over-all performance had to be omitted because no systematic way could be found for quantifying them. Thus the analysis does not include any measure of the incidence of engineering changes introduced after the product has gone into production. There is no evaluation of the effects of major policy changes, administrative decisions, or improvements in plant facilities. Thus no claim is made that the data included comprise a random or representative sample, nor that any conclusions drawn from it will describe fully the performance of the organization. Results can only demonstrate whether this type of research is possible and potentially useful. They cannot answer specifically all the dimensions of organization performance.

It will be noticed that no "psychological data" in the usual sense-questionnaires, tests, etc., have been included in this phase of the analysis. One obvious reason for this is that such data were not systematically gathered by the organization during each of the 60 months prior to the study. Also, it was decided to limit the analysis to variables that could justifiably be called aspects of the day-to-day operation of the firm. These variables are conceptually purer and more amenable to operational definition. Likert has argued that social-psychological measurements should be taken on a regular basis, but he has not shown how to do this systematically. Psychologists have not developed a very good understanding of how to measure changes in a particular psychological property such as an attitude at frequent intervals over long periods of time.

Method and Results

Values for the twenty-four variables were recorded for each of the sixty months from December, 1957 through November, 1962 (five fiscal years). Pearson product moment correlation coefficients were computed between variables utilizing the MISTIC (Michigan State Integral Computer). The resulting matrix is shown in Table 1. The individual correlations indicate the degree to which any two measures varied together from month to month, over the five year period. It may be observed that there is wide variation in the sizes of the coefficients, with a range from +98 to -80. A correlation of approximately .25 or greater is significantly different from zero at the 95% confidence level. One hundred twenty-six, or 46% of the 276 coefficients are significant. By reading down the first column of coefficients one may note the degree to which variable number one, operating profit, is significantly correlated with the other twenty-three variables.

The task of interpreting in any meaningful way all the relationships indicated by the coefficients in Table 1 would be extremely difficult, if not impossible, and would necessarily be very subjective. For this reason factor analytic methods were used to assist in understanding the intercorrelations between variables. Factor analysis has been most often used in the analysis of tests and other measures of personality characteristics. Usually a group of tests or test items is administered to a sample of subjects. A matrix of correlation coefficients between each item or subtest, across subjects, is calculated and this matrix is subjected to a factor analysis. Purpose of the analysis is to isolate underlying structure or dimensions of personality on the basis of the differential responses of the subjects to items measuring these dimensions. A factor analysis of subjects' responses to a group of intelligence

Variables		1	2	3	4	5	6	7	8	9
Operating Profit	1	-								
Total Units	2	48	-							
Contract Units	3	52	76	-						
Contract Dollars	4	58	76	98	-					
Company Units	5	51	54	19	25	-				
Company Dollars	6	56	50	20	24	96	-			
Industry Units	7	36	49	49	50	18	21	-		
Man Hours Worked	8	08	51	41	39	10	11	28	-	
Units/Man Hour	9	40	67	55	55	20	16	46	19	-
Direct Labor Force	10	26	56	44	46	46	44	25	32	-08
Indirect Labor Force	11	08	41	18	23	44	39	04	45	-15
Salaried Personnel	12	-04	19	06	11	37	30	-16	19	- 3 5
Bilt-ins/Total Units	13	-18	-16	-45	- 45	19	19	-03	-13	-18
Actual/Scheduled Production	14	-00	28	19	20	07	-01	11	12	53
Per cent of Bonus	15	14	21	30	28	-05	-05	45	02	51
Material Variance	16	- 0 1	24	16	09	06	09	23	15	18
Direct Labor Variance	17	-03	-09	10	03	-34	-28	23	03	37
Grievances Filed	18	-08	32	11	14	37	33	05	03	-16
Bids	19	10	26	11	09	22	26	13	03	-05
Factory Overhead Variance	20	55	54	62	59	11	14	56	30	66
Bumps	21	- 36	-05	-18	-17	03	-01	-17	13	-20
Actual Job Changes	22	- 35	01	-16	-15	08	03	-13	17	-19
Hourly Wages	23	-18	-15	-06	-16	-39	-29	15	-04	19
Hourly Wage/Bonus	24	03	07	21	17	-24	-20	33	-03	35

Table 1. Intercorrelation of organizational variables.

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
-															
75	-														
70	88	-													
-04 -13	- 04	_02	- 02												
-27	- 37	-50	-25	31	-										
03	-06	-16	-04	01	14	-									
-55	- 56	-67	-15	15	40	20	-								
53	61	60	23	-04	-41	05	-51	-							
24	27	26	21	-01	-23	27	-25	52	-						
-02	-27	-48	-25	17	50	18	51	-23	-03	-					
10	42	46	10	08	-27	-15	-19	25	15	-47	-				
1/ _49	50 _11	- 80	-15	-07	-24 40	-13	-43 57	32 40_	-08 1A	-46	-41	- _44	_		
-40	-57	-70	-30	16	78	24	48	-36	-10	50	-37	-37	- 71	-	
			2.5	- 0			-0	20		20			• -		

test items may show, for example, that the items are measuring several relatively independent underlying factors such as verbal ability, arithmetic reasoning, memory, etc., Kaiser expresses the purpose of factor analysis as follows, "Given an (infinite) domain of psychological content, infer the internal structure of this domain on the basis of a sample of n tests drawn from this domain." (1958)

The problem presently under consideration may be seen to be roughly similar, except that the subject matter consists of one organization's behavior over time on a series of measures, rather than subjects' responses to test items. Presumably, underlying the over-all performance on the twenty-four variables are a finite number of dimensions corresponding to the basic characteristics of the organization's performance.

One's success in inferring the basic dimensions of personality is dependent, according to Kaiser, upon the extent to which the factors derived from the administration and analysis of tests approximate the corresponding unobservable factors hypothesized to exist in the "infinite domain." Likewise, in the present case the correctness of the description of the dynamics of the organization depends upon the extent to which the measures taken describe the underlying factors. Since the underlying factors are unobservable directly, there is no absolute way of testing the validity of the inferences. There are, however, some useful indicators. If there turn out to be fewer dimensions than the number of original variables it may be assumed that the factors are describing phenomena which are common to more than one variable. If several variables are highly intercorrelated, that is they vary together from month to month, presumably this varying together has some meaning which may be interpreted from the operational definitions of the variables and the nature of their relationships. As has been previously noted, a major difficulty in the present study is that only a few of the many

possible indicators of organizational performance have been included. Thus any factors emerging from the analysis must be thought of only as patterns contributing to a description of the behavior of organizations, not as the exact dimensions of organization performance.

The next stage of the analysis of the appliance manufacturing firm involved a principle axes factor analysis of the original correlation matrix, utilizing MISTIC. The advantages of the principle axes method and its utilization on the electronic computer are discussed by Wrigley and Neuhaus (1955). The computer carries out successive sine-cosine transformations until all non-diagonal elements in the matrix are zero, the elements remaining in the principle diagonal being the latent roots. Generally, the method has the effect of accounting for the maximum amount of the total variance in the matrix for each successive factor. The results of the principle axes analysis are not shown since this method was only a preliminary to the rotation of the factors.

Boyles carried out a Quartimax orthogonal rotation of the principle axes factors, again utilizing MISTIC. (See Nauhaus and Wrigley, 1954, for an explanation of the method.) This analysis is discussed in greater detail elsewhere (Boyles, 1962). The Quartimax method seeks to find the orthogonal transformation which maximizes the sum of the fourth power of the elements in the rotated matrix, thus increasing the size of the larger loadings and increasing the number of near-zero loadings. The rotated factors and loadings are shown in Table 2.

Boyles' purpose in carrying out the analysis was to isolate indicators of organizational effectiveness, and his interpretation of the factors is made on this basis. Variables with loadings of .40 or greater on a particular factor were included in the description of that factor. Two loadings which fell between .390 and .395 were also included under the assumption that errors of omission are potentially more serious than errors of commission in exploratory research.

Table 2. Quartimax rotated factors and factor loadings.

				Fa	ctors		
	Measures	Iq	ц	PIII	IVq	vq	VIq
1.	Operating profit	04*	55	-41	-17	-49	11
2.	Total units produced	16	84	12	18	-32	08
3.	Contract units produced	06	94	-10	02	07	06
4.	Contract dollars	12	95	-11	-06	02	09
5.	Company units produced	33	23	-01	01	-86	02
6.	Company dollars	27	22	-08	07	-87	-03
7.	Industry units	- 23	59	05	29	-24	-06
8.	Man-hours worked	12	53	29	18	02	-53
9.	Units per man-hour	-42	66	22	-10	-24	29
10.	Size of Direct Labor Force	73	45	-13	16	-14	-14
11.	Size, Indirect Labor Force	83	23	24	11	-17	-18
12.	No. Salaried personnel	93	03	20	-01	-08	-02
13.	Difficulty of Mix	11	-49	19	23	-47	14
14.	Actual/scheduled prod.	-19	28	54	-22	-06	54
15.	Bonus per cent	-66	39	14	-10	-06	08
16.	Material variance	- 22	17	-01	71	-05	-03
17.	Direct labor variance	-77	12	13	00	[^] 09	-15
18.	No. Grievances	68	08	05	39	-12	32
19.	Bids (no.)	30	06	04	70	-11	39
20.	Factory overhead variance	-51	69	-16	04	-20	-02
21.	No. bumps	41	-18	78	01	09	-16
22.	Actual job changes	43	-14	78	05	05	-16
23.	Hourly wages	-82	-05	-17	31	16	-12
24.	Hourly wages with bonus	-77	27	-04	16	12	.06
	Proportion of variance	25	22	09	08	10	15

* Loadings and proportions are in hundredths, decimals omitted.

Factor Iq may be described as indicating that in periods when the labor force (direct, indirect, and salaried) is largest, production per man-hour, bonus, and wages are low, grievances, bumps, and job changes are high, and factory overhead and labor variance are unfavorable.

Factor IIq is highly loaded with output variables and seems to indicate variability in operation accompanying the company's production of contract units.

Factor IIIq reflects a negative relationship between operating profit, on the one hand, and actual versus scheduled production, bumps, and job changes on the other.

Factor IVq indicates a positive relationship between material variance, grievances, and bids.

Factor Vq is loaded on profit, company units and dollars, and difficulty of mix. (Company units are, in general, more difficult to manufacture than contract units.)

Factor VIq is positively loaded on actual versus scheduled production and bids, and negatively loaded on man-hours worked.

Boyles further checked the reliability of the method by factor analyzing and rotating the fourteen variables indicative of organizational performance and the ten indicative of worker performance separately. The analyses yielded, in general, dimensions similar to those in the original matrix. (See Boyles, 1962, p. 34)

The preceding analysis was primarily concerned with the measurement of organizational effectiveness, and was aimed at measuring this effectiveness in as few factors as possible. For this reason the Quartimax method was the most appropriate rotation. It aims to simplify the description of each row or variable in the factor matrix, and thus strives toward simple structure and a general factor. The present paper is particularly concerned, not with as few dimensions of effectiveness as possible, but rather with the dimensions of over-all organization

performance underlying the various measures, whatever they may be. For this reason another method of rotation was applied by the present author to the original principle axes solution.

The Varimax method has as its goal the maximization of the variance accounted for by columns or factors rather than by rows or measures. According to its developer, Kaiser (1958), the Varimax orthogonal rotation yields factors which are invariant, that is, they are maximally descriptive of the underlying structure of the phenomena being studied, and depend less than Quartimax upon the particular sampling of measures used. Table 3 shows the factor loadings for a six factor solution.

Table 4 shows a comparison of factors and loadings obtained from the Quartimax and Varimax rotations. All loadings below .39 have been omitted for easier comparison, except when there is substantial disagreement between rotations, in which case lower loadings have been placed in parentheses. There is an obvious marked similarity between the two methods, particularly if Varimax factor Vv is matched with Quartimax factor IVq and Varimax IVv is matched with Quartimax factor Vq. This strong similarity would seem to indicate that the structural dimensions underlying the variables are fairly stable. As might be expected from the previous discussion of the characteristics of the two rotation methods, the Quartimax loadings on the first two factors IVv, Vv, and VIv are, in general, slightly larger. But the factors, when compared in terms of their major loadings, are similar

^{*}It will be noted that Factor IVv contains only one variable with its highest loading on that factor. Although the Kiel-Wrigley criterion for choosing the number of factors to rotate (1962) suggests that at least two variables should have their highest loadings on each factor, the Varimax solution was carried one rotation past that point in order that there be six factors to compare with the six Quartimax factors.

			Fact	tors		
Measures	Iv	IIv	IIIv	IVv	Vv	VIv
1. Operating profit	09	50	-47	51	-10	07
2. Total units produced	10	79	08	39	24	19
3. Contract units produced	04	94	- 12	00	06	13
4. Contract dollars	12	93	-14	05	-00	16
5. Company units produced	30	16	-02	88	06	07
6. Company dollars	23	16	-06	90	10	-02
7. Industry units	- 30	56	04	28	25	02
8. Man-hours worked	-04	59	51	09	01	-29
9. Units per man-hour	-40	55	-04	24	01	54
10. Size of direct labor force	66	49	08	22	15	-24
11. Size. indirect labor force	72	27	43	25	10	-13
12. No. salaried personnel	88	06	34	13	04	03
13. Difficulty of mix	09	-54	14	42	28	08
14. Actual/scheduled prod.	-12	16	18	02	-01	82
15. Bonus per cent	-64	33	-05	05	-09	31
16. Material variance	-31	18	04	05	65	-19
17. Direct labor variance	-79	10	05	-11	-09	05
18. No. grievances	66	07	07	13	52	09
19. No. bids	27	03	01	09	81	10
20. Factory overhead variance	-51	65	-25	22	02	08
21. No. bumps	31	-16	83	-06	-02	14
22. Actual job changes	34	-12	85	-02	03	13
23. Hourly wages	-83	-05	-20	-19	20	-18
24. Hourly wages with bonus	-76	24	-17	-15	13	11
Proportion of variance	23	21	10	10	07	06

Table 3. Varimax rotated factors and factor loadings.

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						Fac	tors					
Measures		Dne	Н	wo	Thi	ee.	0 년	ur	۴ų	ive	Six	
	Iq	Iv	ЫI	ΙIν	pIII	VIII	IVq	۸۸	٧q	١٧٧	VIq	٧I٧
1. Operating profit	1	1	55	50	-41	-47	1	l t	-49	51	1	ł
2. Total units produced	1	1 1	84	79	! 	!	1 1	1 1	1	:	1 1	1 1
3. Contract units produced	1	1	94	94	1 1	! !	1 1	ł	1	1 1	1	1
4. Contract dollars	! !	1 1	95	93	! 	I I	!	1 1	1 1	!	!	!
5. Company units produced	!	1	!	1 1	1	1	! !	1 L	-86	88	:	1
6. Company dollars	1	1	1	1	1 1	1 1	1	8	-87	06	1	8 1
7. Industry units	1	1	59	56	!	1	1	1 1	8	1	1	1
8. Man-hours worked	1	8	53	59	(2)	51	1	1 1	1 1	!	-53	(-29)
9. Units per man-hour	-42	-40	99	55	1	1	1	1 1	I L	1 1	(29)	54
10. Size of direct labor force	73	66	45	49	1	1	1 1	1 1	8	1	8	1 1
11. Size, indirect labor force	83	72	 	1	(24)	43	1 1	1 1 1	1 1	! 1	E 1	1
12. No. salaried personnel	93	88	! 1	1	1	1	1 1	1 1	1	1	1	1
13. Difficulty of mix	1	1 1	-49	-54	1 1	8	1 8	1	-47	42	1 1	1
14. Actual/scheduled prod.	1 1	1	1	1 1	54	(18)	8 1	1 1	L 1	1 1	54	82
15. Per cent of Bonus	-66	-64	39	(33)	1 1	1 1	1	1 1	1 1	1	1	1
16. Material variance	1	1	1	1	1	1	71	65	1	!	!	1 1
17. Direct labor variance	- 77	-79	!	1	1	1	1	1 1	1	1	1	1
18. No. grievances	68	66	1	1	8	1	39	52	1	1	1	!
19. No. bids	1	1	1	1	1	1	70	81	1	1	39	(10)
20. Factory overhead variance	-51	-51	69	65	t I	1	1	1	1 1	1	1	:
21. No. bumps •	41	(31)	1	1	78	83	1	1	1	1	8	1 1
22. Actual job changes	43	(34)	I I	1	78	85	1	1	1	1	1	1
23. Hourly wages	- 82	-83	1	1	1	1	1	8 1	ł	8 1	1 1	!
24. Hourly wages with bonus	-77	-76	1 1	1 1	1 1	:	;	1 1	:	1	1	1

* *Factors Iq -VIq = Quartimax factors; Factors Iv - VIv = Varimax factors

and the suggestion that both rotations are describing an underlying structure does not seem too tenuous.

Interpretation

A good deal more evidence must be accumulated from other organizations before the factors obtained in the analysis can be interpreted in such a way as to explain the dimensions involved in all organizations' performance. However, it is possible to discuss the factors obtained in this study in terms of (a) the operational explanations of the variables that are loaded heavily on the factors, and (b) the dimensions that have been hypothesized to exist by theorists such as Stogdill.

Boyles has suggested that Factor Iq reflects the effect of increasing the size of the labor force in order to meet increased production demands. During periods when the labor force (direct, indirect, and salaried) is largest, undesirable consequences such as low bonus, unfavorable labor and factory overhead variances, fewer units per manhour, low wages, more grievances, and more job changes seem to be most pronounced. Thus, one interpretation, stated in terms of the operations of the firm, is that adding new workers to the labor force has a disrupting effect as evidenced by the increase in job changes. This effect is felt in two areas. First, there is lower production efficiency as demonstrated by fewer units per man-hour, less bonus, and unfavorable direct labor and factory overhead variances. Second, there is an increase in the incidence of grievances and bumps. It is interesting to note that the output measures are not highly loaded on factors Iq and Iv, thus giving validity to Stogdill's argument that productivity is only one of several independent dimensions of organizational behavior. Whether the factor measures dimensions such as morale or integration is not quite clear. Perhaps the lowering in efficiency is due to loss of integration brought about by the addition of new and untrained workers into

the labor force thus necessitating a redefinition of roles. The increase in grievances and bumps could be explained in terms of dissatisfactions arising from the disintegration, or it could be viewed simply as a procedural consequence of a changing structure. In other words, grievances and bids could go up because the employees were unhappy with the poorly integrated system, or because the poorly integrated system caused more grievance-prone and bump-prone situations to arise.

Factors IIq and IIv may be seen to be heavily loaded on variables indicative of production and to reflect most heavily the dimension of productivity. Of the two kinds of production which the company engages in, company brand and contract brand, the production of contract units is most closely related to the variability in the other production and output variables. The production of contract units seems to be accompanied by higher operating profit, more units per man hour, increases in the size of the direct labor force, number of man-hours worked, and more favorable bonus and overhead variance figures. The mix ratio is negatively related to the other variables because contract products are generally less complex than company brand products. Demand seems to be a causal variable, since industry units are highly loaded on the factor. It should be noted that this factor does not account for all the variability in level of profit, nor do any of the other factors.

Because the first two factors in both rotations accounted for a major proportion of the variance, those remaining are loaded on fewer variables. Factors IIIq and IIIv are less similar than most other sets. Both contain negative loadings on bumps and job changes. Factor IIIq, however, is loaded on actual versus scheduled production, while Factor IIIv is more highly loaded on man-hours worked and size of indirect labor force. Both factors clearly demonstrate the negative relationship between profit and the incidence of bumps and job changes. Factor IIIq shows the possibility of a negative relationship between maintaining

scheduled production and profit. Factor IIIv demonstrates that the high relationship between "effort" (man-hours worked and size of labor force) and profit demonstrated under Factors IIq and IIv does not always hold true.

Factors IVq and Vv demonstrate relationships between the incidence of two industrial relations events, grievances and bids. Why these two variables should be strongly related to material variance is not clear. Efficiency in the use of materials seems to be relatively independent of other kinds of operational efficiency, such as those described in Factor One.

Factors Vq and IVv describe the relationship between production of company brand products and profits. They fill out the picture of the firm's productivity. The small loadings on the factors, as opposed to the relatively large loadings on Factors IIq and IIv, indicate that periods characterized by change in levels of company brand production are not accompanied by the concurrent changes in cost factors, as is the case when contract units production varies. Perhaps this is the reason why the production of company units is less highly related to profit than is production of contract units, although the pricing of company units allows for a larger profit margin.

Factors VIq and VIv both carry fairly high loadings on actual versus scheduled production, a possible indication of the efficiency of production. The Quartimax solution also shows loadings on man-hours worked and bids, while the Varimax rotation turns up a loading on units per manhour. These factors seem to be somewhat different. Boyles attempted no interpretation of Factor VIq. Factor VIv accounts for a good deal of the variability in the actual versus scheduled production measure and is also loaded on units per man-hour. This factor may indicate that efficiency is a characteristic which is partly independent of both production level and costs.
It may be concluded that the factor analysis of the intercorrelations between the company variables, and the two rotations, indicate the plausibility of the assumption that there are a number of fairly stable dimensions underlying the variability in organization performance. The factors may be interpreted in terms of the operational definitions of the variables on which they are highly loaded. Descriptions of the factors may be made on the basis of either the procedural operations of the firm, or the dimensions of group behavior hypothesized by organization theorists, or both.

SECOND STUDY

The second stage of the investigation involved an analysis of variables indicative of the differential performance of the individual production departments within the firm's manufacturing division. One rationale for this approach was that if there are dimensions of group or organizational performance, these dimensions should occur at the departmental level as well as at the total organization level. This stage, then, is in a sense, a replication of the first stage. Another reason for the departmental analysis involves the desire that the results of such an approach eventually have some application to the management of organizations. This goal involves the need to understand as completely as possible the nature of the dimensions, i.e., their components and dynamics. It was felt that since the individual departments were smaller and less complex than the total organization the factors obtained at the departmental level might lead to better understanding of the dimensions. Finally, if the ultimate goal of the supervisor is to apply control measures based on the exigencies of the situation, then it is important to begin to understand how to investigate the standing of the organizational units on the relevant dimensions.

Departments

There are sixteen production departments in the firm; eleven are involved in direct manufacturing, while five carry on indirect or service operations. Individual data were not available for each direct production department; four units carrying on largely assembly functions were considered sub-units of one larger department. There was, therefore, the following arrangement of departments:

```
Department 1. Fabrication
Department 2. Fabrication
Department 3. Fabrication
Department 4. Fabrication
Department 5. Assembly (contains four sub-departments)
Department 6. Specialty products
Department 7. Packaging
Department 8. Specialty products
Department 9. Indirect or service
Department 10. Indirect or service
Department 11. Indirect or service
Department 12. Indirect or service
Department 13. Indirect or service
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Variables

It should be stressed that there is considerable difference between describing the variability of months over a set of common measures, as was done in the previous stage, and describing the variability of a heterogeneous group of departments. The problem was to find measures which would allow comparison of the thirteen departments. After a search of company records and discussion with management personnel the following measures were obtained for each department for each month of the 1961 fiscal year:

- 1. Actual cost of labor (direct and indirect);
- 2. Budgeted cost of labor (direct and indirect);
- 3. Actual cost of supplies and tools;
- 4. Budgeted cost of supplies and tools;
- 5. Actual cost of scrap;
- 6. Budgeted cost of scrap;

Budgeted costs are arrived at on the basis of past experience in the department and expenditures allowable under the rate and kind of production.

7. Total dollars spent on overtime pay;

It was suggested by company officials that differences between departments in the amount of overtime worked might be an indicator of poorly-run or inefficient departments.

8. Number of suggestions from each department;

The total number of suggestions originating from each department, without evaluation of their quality, might be considered a measure of employees' involvement in the Scanlon Participation Plan;

9. Number of labor grievances filed;

10. Number of bids;

11. Total number of hours worked in each department;

12. Number of employees in each department.

A major weakness of the study is that no measure of productivity could be found which was applicable to all departments. One difficulty involved the fact that each direct production department has a part in the manufacture of most products. A low rate of production in one department is likely to affect the rate of production in other departments. Another difficulty involved the fact that the indirect or service departments do not manufacture any kind of product; their "rate of production" involves the quality of their contribution to the direct production departments or to the total company. Difficulties involved in comparing the performance of a set of heterogeneous groups or departments are, of course, not unique to this study. Usually such comparison is made on the basis of management ratings, or the investigation is limited to those departments whose production is directly comparable. However, in the present paper an attempt was made to discover whether the data which were available would be useful in describing any categories or dimensions of departmental behavior. Any effort to understand the dynamics of a total organization must ultimately take into account all elements of the organization, not just those which are easily amenable to the usual research methods.

In addition to measures of productivity, it was necessary to exclude such variables as absenteeism, bumps, and cost variances, since the data were not available for individual departments.

Before making comparisons of departments on the variables an attempt was made to gain some insight into the reliability of the data. The question was asked, "is there any consistency in departments' ranks or standings on the variables over time, or do they change their relative positions on a particular variable from month to month?" The validity of monthly data as a basis for decisions depends upon whether the standing of a department during a particular month is a reliable indicator of its performance. Correlations were computed between ratios of budgeted to actual labor costs for departments across months. The resulting matrix indicated the degree to which departments maintained their relative standings on budgeted/actual labor costs from month to month. The average correlation between pairs of months was . 225. When corrected by the Spearman-Brown Formula to yield an indication of the reliability of the measure over twelve months the reliability coefficient obtained was .78. (This method of estimating reliability may be viewed as analogous to estimating the reliability of a test from the average item intercorrelations. (Guilford, 1956, p. 453) It may also be viewed as an application of intraclass correlation. (Turner, 1960, and Guilford, 1956, p. 281) Averaging the individual coefficients reduces the relative importance of errors, assuming they are random, and thus increases reliability. Even if the assumptions underlying the Spearman-Brown Formula are not perfectly met the formula will underestimate the reliability rather than overestimate it.)

The reliability of the cost of overtime was also checked. Amounts spent by each department on overtime during each month were intercorrelated. Average month-to-month correlation was .472, and when corrected by the Spearman-Brown Formula the reliability coefficient was .91.

An examination of bids, suggestions, and grievances indicated that monthly data on these variables would not be useful in describing time intervals, since the frequency of occurrence of these events in any one department in a monthly period was often small, with a fairly large number of zero occurrences.

It was concluded that some of the measures were reliable, while others were not, although the lack of reliability of bids, suggestions, and grievances may well be due to the method of measurement rather than characteristics of the phenomena. For this reason the measures were totaled over the twelve months, and yearly data were used in the analysis.

The following variables indicative of the actual performance of the departments were incorporated in the analysis:

- 1. cost of overtime
- 2. number of grievances
- 3. number of bids
- 4. number of suggestions
- 5. cost of supplies
- 6. cost of scrap
- 7. labor cost
- 8. total cost of production (5+6+7)
- 9. number of employees
- 10. number of man-hours worked

Method and Results

Table 5 shows a matrix of intercorrelations between variables, by departments, across twelve months. Table 6 shows the factor and factor loadings obtained by a Varimax rotation of a principle axes factor

^{*}Fleishman and Harris (1962) found odd-even reliability coefficients of .73 for grievances and .59 for turnover when measured over 11 months. Turner (1960) obtained reliabilities of .28 and .30 for grievances and .14 and .45 for suggestions over three to six month periods.

Variables		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Overtime cost	1.		05	35	31	43	28	44	43	36	41
Number of grievances	2.			70	50	70	62	78	77	72	76
Number of bids	3.				82	61	88	94	95	95	96
Number of suggestions	4.					38	86	79	81	87	82
Cost of supplies	5.						30	76	72	53	71
Cost of scrap	6.							80	82	93	82
Labor cost	7.								100	95	100
Total production cost	8.									96	100
No. of employees	9.										96
No. of man-hours worked	10.										

Table 5. Intercorrelations of departmental data.

Table 6.	Varimax	rotation	of	principle	axes	factor	analysis	of	depart-
	mental d	ata.							

Variables	Fac	tors
	Ι.	Ш.
l. Overtime cost	.087	804
2. Grievances	.727	293
3. Bids	.909	334
4. Suggestions	.877	130
5. Supplies	.385	807
6. Scrap	.941	 051
7. Labor cost	.854	508
8. Total production cost	.873	471
9. Number of employees	.949	270
10. Number of man-hours worked	.879	455
Proportion of variance	.632	. 227

analysis. Examination of the correlation and factor matrices reveals the large part played by size of the departments in determining their standing on the variables. Columns 9 and 10 in Table 5 indicate the generally high degree of correlation the other variables have with number of employees in the department and total number of man-hours worked. Factor I in Table 6 reflects this influence. Factor II contains highest loadings only on overtime and supplies. Rotation was stopped after two factors were obtained under the logic of the Kiel-Wrigley criterion. The only reasonable interpretation of the results possible is that department size accounts for a major part of the variability on the data.

Because of the failure of the analysis of raw data to yield any useful results, an attempt was made to minimize the effect of the size factor by equating the departments for size or for budgeted costs on each of the variables used. For each department, measures 1, 6, 7, and 8 were divided by the total number of man-hours worked during the year in that department. Since the number of employees varies from day to day, total man-hours were chosen as a more stable indicator of department size. For measures 2, 3, 4, and 5--actual costs--it was decided to use budgeted costs rather than man-hours as equating figures, since it was felt that the ratio of budgeted to actual cost would account not only for size in terms of numbers of personnel, but also in terms of the volume of business carried on by the department. The following ratios were used in the analysis:

- 1. Overtime cost/hours worked
- 2. Budgeted labor cost/actual labor cost
- 3. Budgeted cost of supplies/actual cost of supplies
- 4. Budgeted cost of scrap/actual cost of scrap
- 5. Budgeted total cost of production/actual cost of production (total of variables 2, 3, and 4 above)
- 6. Number of grievances/hours worked
- 7. Number of bids/hours worked
- 8. Number of suggestions/hours worked
- 9. Man-hours worked
- 10. Actual production cost (scrap, supplies, and labor)

Variables 9 and 10 were included in order to account for any effects of departmental size which might exist even after the attempt to equate the departments.

An examination of the data indicated that the distributions of a number of the ratios listed above were extremely skewed. Therefore, the ratio scores were converted to ranks, (Table 7) and rank-order correlations not requiring the assumptions of rectilinearity and homoscedasticity were computed between the variables for the year. This data is contained in Table 8. It will be noticed that the correlations between the size variables, numbers 9 and 10, and the other variables, have been reduced considerably, although they still have not reached zero.

Table 9 contains the factor loadings obtained from a Varimax rotation of the principle axes factor analysis of the data in Table 8. Three factors emerged when the Kiel-Wrigley criterion was applied. Factor I shows a positive loading on overtime/hours worked and negative loadings on labor costs ratio, total cost ratio, and grievances/hours worked. Factor II is positively loaded on bids, suggestions, man-hours worked and total costs. The third factor has positive loadings on supply and scrap costs and negative loadings on bids and suggestions.

In order to clarify the meaning of the obtained factors a Q-Technique factor analysis was performed on the departmental data. This type of analysis was developed by Stephenson (1936) and Burt (1938) and is summarized by Cattell (1952). Its usual application is the classification of individuals into types or categories according to their scores on a variety of tests. In the present case the purpose of the Q analysis was to classify the departments into groupings according to the similarity of their respective standings on the objective measures. The original data matrix contained variables in the rows and departments in the columns. By transforming the data matrix so that departments appear

	Overtime	Labor ratio	Supply ratio	Scrap ratio	Prod. cost ratio	Grievances	Bids	Suggestions	Hours worked	Production cost	
Depart-	1	2	3	4	5	6	7	8	9	10	
1	7	3	7	7	3	7	11	8	12	12	
.2	3	11	11	12	11	13	3	10	10	10	
3	4	8	6	6	6	11	10	3.5	11	11	
4	1	12	8	5	12	3	1	3.5	1	1	
5	5	2	2	2	2	8	12	12	13	13	
6	9	9	9	9.5	10	3	2	3.5	6	6	
7	10	6	1	3	5	3	9	13	9	9	
8	2	13	4	9.5	13	10	13	3.5	4	3	
9	13	5	13	9.5	8	3	6	3.5	2	2	
10	11	7	3	1	4	9	6	11	3	4	
11	6	10	5	4	9	12	6	9	5	5	
12	12	4	12	9.5	7	3	6	3.5	7	8	
13	8	1	10	13	1	6	6	7	8	7	

Table 7. Departmental ranks on variables.

Table 8. Rank-order interrcorrelations of departmental variablesequated for department size.

Variables		1.	2.	3.	4.	5,	6.	7.	8.	9.	10.
Overtime Cost/Hours	1.		-58	23	-01	-42	-51	-09	08	-13	-06
Labor Cost Ratio	2.			-07	00	91	33	-29	-28	-48	-49
Supply Cost Ratio	3.				79	24	-27	-55	-60	-22	-21
Scrap Cost Ratio	4.					25	-06	-25	-51	-01	-07
Total Production Cost Ratio	5.						08	-38	-50	-55	-57
No. of Grievances/Hours	6.							28	29	29	27
No. of Bids/Hours	7.								22	49	45
No. of Suggestions/Hours	8.									43	45
Hours worked	9.										99
Actual Production Cost	10.										

Variables		Factors	
	I.	· II.	III.
l. Overtime/Hours	880	051	015
2. Labor cost ratio	-762	602	-003
3. Supply cost ratio	211	159	921
4. Scrap cost ratio	-059	-063	926
5. Total Prod. Cost ratio	-600	663	286
6. Grievances/Hours	-730	-338	-161
7. Bids/Hours	-119	-563	-389
8. Suggestions/Hours	078	-422	-676
9. Man-hours worked	-080	-963	-038
10. Total production cost	-027	-945	-071
Proportion of variance	232	326	243

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Table 9. Varimax rotation of principle axes factor analysis of department variables equated for size.

in the rows and variables in columns it is possible to obtain intercorrelations between departments (instead of between variables as in the usual factor analysis). These correlations are shown in Table 10. The correlation coefficient is, in this case, an indication of the similarity of pairs of departments in terms of the variables measured. When the interdepartmental correlation matrix is subjected to factor analysis the resulting factors may be thought of as indicating types of departments. That is, the departments described by a factor are similar to each other in one or more respects. Results of the factor analysis of the transformed matrix and the Varimax rotation, rotated to three factors for comparison with Table 9, are shown in Table 11. The loadings demonstrate which departments are loaded on each factor, the factors being composites of the ten variables. By comparing the factors obtained in the earlier factor analysis of variables shown in Table 9 (sometimes called R-Technique) with those obtained in the Q-Technique analysis it is possible to draw conclusions about the variability between departments. Factors obtained in the first analysis, the analysis of variables, will be referred to as Factors I-III(var), while factors obtained in the analysis of departments will be referred to as Factors I-III(dept).

Interpretation

Factor I(var) shown in Table 9 is positively loaded on overtime and negatively loaded on labor cost and total cost ratios and grievances. Since a low rank on labor cost and total cost ratios would indicate an unfavorable standing, it may be concluded that a high amount of overtime, unfavorable labor and total cost ratios, and a lower number of grievances are indicative of one type of departmental performance. Factor I (dept) in Table 11 contains high loadings on Departments 6, 7, 9, 10, 11, and 12. Reference to the departmental rankings in Table 7 indicates that

Depart- ment Number	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
l.		74	96	08	95	40	68	24	13	23	40	22	18
2.			81	55	57	58	56	28	03	16	60	08	64
3.				26	90	43	65	31	01	19	49	09	17
4.					-14	73	49	30	23	49	81	22	31
5.						12	49	06	-05	01	13	04	-03
6.							88	46	73	87	95	74	45
7.								36	72	85	83	76	21
8.									06	34	61	05	16
9.										91	53	99	19
10.											79	90	08
11.												54	33
12.													20
13.													

Table 10. Intercorrelation between departments, across variables Q-Technique.

Table 11. Varimax rotation of principle axes analysis of departments, across variables.

Department		Factors	
Number	<u> </u>	<u> </u>	III.
1.	170	-976	-120
2.	-011	-674	-680
3.	069	-947	-289
4.	263	039	-836
5.	007	-991	131
6.	729	-200	-650
7.	769	-529	-332
8.	114	-134	-571
9.	977	047	-034
10.	952	-041	-262
11.	578	-225	-746
12.	975	-043	-023
13.	019	-072	-636
Proportion of Variance	337	284	244

Departments 6, 7, 9, 10, and 12 are those which rank highest on overtime, the measure most heavily loaded on Factor I(var). Department 11 shows up in Factor I(dept) and ranks only sixth on overtime, however it ranks 12th on grievances. Reference to Table 7 indicates that Departments 6, 7, 9, 10, 11, and 12 which are loaded on Factor I(dept) rank generally below the median on labor and total cost ratios, and grievances. It would seem that there is a fairly high degree of correspondence between Factor I(var) and Factor I(dept). The Departments in Factor I(dept) are, in general, described in Factor I(var). They have high costs, particularly overtime costs, but also unfavorable labor and total cost ratios. Table 7 indicates a generally high intercorrelation between these variables, part of which may be due to accounting procedures. In summary, departments in Factor I(dept) are indirect production departments or minor production departments. They have higher cost ratios and fewer grievances than do other departments.

The interpretation of Factor II(var) and Factor II(dept) is somewhat more simple and direct. Factor II(var), Table 9 indicates positive loadings on labor and total cost ratios, and negative loadings on bids, suggestions, man-hours worked, and total production costs. It indicates that in departments in which hours worked and total costs are lower, i.e., the smaller departments, the labor and total cost ratios are favorable, there are fewer bids, and fewer suggestions. Factor II(dept) shows the other side of the coin. Departments 1, 2, 3, 5, and 7 load most highly on this factor. They are also the five largest departments in terms of man-hours worked. These departments rank generally unfavorably (below the median) on labor and total cost ratios, and above the median on numbers of bids and suggestions. Departments described in this general factor are the larger direct production departments which have unfavorable labor and total cost ratios and more bids and suggestions, as opposed to the smaller departments which have better labor and total cost ratios, fewer bids, and fewer suggestions.

Factor III(var), Table 9, indicates positive loadings on supply and scrap cost ratios and negative loadings on bids and suggestions. Favorable supply and scrap ratios are associated with few bids and suggestions. Departments 2, 4, 6, 9, 12, and 13 are most highly (favorably) ranked on the supply ratio variable, while Departments 2, 6, 8, 12, and 13 are most highly ranked on the scrap ratio variable. There is, of course, considerable congruity between these groups, and also between these groups and those ranking lowest on bids and suggestions in Table 7. Factor III(dept) contains highest loadings on Departments 2, 4, 6, 8, 11, and 13. Thus there is agreement, though not perfect, between Factor III(var) and Factor III(dept). The departments are characterized by favorable supply and scrap cost ratios, few bids, and few suggestions. They do not seem to be distinguished by size, kind of production, or any other easily identifiable characteristic.

In order to gain a better understanding of the relationships between departmental and company variables used in the previously described analyses, correlations were computed between the monthly total of the departmental variables, across all departments, and the monthly values of the twelve company variables which seemed to be most indicative of over-all company performance. The twelve months of the 1961 fiscal year were used, since these were the months for which both departmental and company data were available. The results are shown in Table 12. Since not much is known about the reliability of the month-to-month data for either the company or for the departments within the production division taken together, the results must be regarded as tentative. It should be pointed out, also, that the company's standing on a variable such as profit is not necessarily to be considered a sum of the departments' contributions to profit; there are a large number of other groups and other conditions within the firm which might affect profit. The only question that can legitimately be asked is, "Within the limitations of the

oetween	c ompany	and

Dept. Variables	Overtime Cost	Grievances	Bids	Suggestions	Budg/Actual Labor Cost	Budg/Actual Supply Cost	Budg/Actual Scrap Cost	Man-hours Worked
Bonus per cent	28	-67	-20	-13	11	17	47	33
Direct Labor Var.	51	36	-09	-52	59	69	-41	04
Factory Overhead Var.	39	22	02	-23	80	58	-51	71
Profit	57	26	23	-18	69	35	-26	35
Total Units Produced	24	07	-06	-18	74	54	-38	73
Contract Units	25	25	-02	-31	75	58	-30	55
Units/Man-hour	06	27	-00	-20	80	62	-25	46
Direct labor force	42	23	-14	-21	54	24	-43	77
Indirect labor force	30	19	-09	-10	40	05	-40	79
Salaried labor force	28	03	-13	07	37	03	-43	87
Mix	-01	34	08	54	-23	-55	-44	-39
Mix	-01	34	08	-54	-23	-55	-44	
Actual/Scheduled Prod.	34	-26	-08	-48	-17	22	50	

Table 12. Correlations between company and departmental variables.

r > .50 is significant at .05 level

reliability of the data, is there any relationship between the totality of the departments' performance and the concurrent performance of the company?"

It is impossible, of course, to discuss each correlation coefficient. On the other hand, it is possible to isolate some of the major trends in the data. The mean size of the correlations is .34 (disregarding signs), and there are 26 coefficients which are significantly different from zero. Departmental bids are significantly related to none of the company variables, while grievances are related only to bonus. Departmental overtime and suggestions are both related to company direct labor variance. Also, overtime is related to profit and suggestions are related to mix. One other departmental variable, the scrap ratio, is related to only two company variables--factory overhead variance and actual/scheduled production. The departmental labor cost ratio is significantly correlated with seven company variables, including units per man-hour, total units, and profit. (The departmental total production cost ratio was omitted from the analysis because of its previously demonstrated high correlation with labor cost ratio.)

Departmental supply cost ratio is related to six company variables in a manner similar to the labor cost ratio. Departmental man-hours worked is also correlated with six company variables, including total units produced and, of course, the size of the direct, indirect, and salaried labor forces.

All company variables correlate significantly with at least one departmental variable, with direct labor variance correlating with four, including labor and supply cost ratios.

It seems reasonable to conclude that the data demonstrate some congruity between the total company's performance and the concurrent performance of the production departments. The relationship is most pronounced between variables which are indicative of the level of

production and its efficiency (such as labor and supply cost ratios, company cost variance, and units produced). The personnel variables such as bids and grievances do not seem to be consistently related to any productivity measures.

THIRD STUDY

The final stage of the study involved interviewing the foreman of the production departments and five management personnel who were closely associated with the manufacturing process. The purpose of these interviews was to obtain information about the subjects' insights into the reasons for variability in organizational performance. A major implication of the hypothesis that effective management involves the selection of valid control measures in that supervisors must be able to understand the symptoms of organizational process if they are to take appropriate actions. Specifically, the interview questions were aimed at discovering the supervisors' perceptions of the reasons for variability in departmental performance and also their reports of the kinds of information they used to evaluate this performance.

Method

Individual interviews were held with all foremen, including the foremen of the four sub-departments and the foremen of two second shift operations. Responses of the foreman of one service department were deleted because the nature of his department was so different from the others that the questions were not relevant. Thus, responses were available for seventeen foremen. Interviews were also held with the five other management personnel whom it was felt had intimate knowledge of the planning and evaluation of the production process. These individuals were the president, the general foreman in charge of the direct production departments, the general foreman in charge of the indirect production departments, the process engineer, and a member of the accounting staff specializing in production costs.

The form and quality of the data gathered by interview differs considerably from the data discussed in the preceding sections, and the analysis applied to the interview data is much less mathematically sophisticated. The problems and disadvantages of using the more usual kinds of psychological measures in the study of organizations have already been discussed. In spite of these disadvantages it was felt that the opinions of key individuals within the organization under study might be beneficial to the present exploratory research, especially if they were tied closely to the theory upon which the present research is based.

A facsimile of the interview schedule is shown in Appendix I. It has been changed to eliminate reference to the firm name or to specific individuals. Not all items were utilized in the present study, either because they were not relevant, or because useable responses were not obtained. Most items apply only to the foreman; the other management personnel answered only questions 16 and 17.

Results

Question 6 was as follows:

"Do you notice that your department seems to do a better job some times than at other times?"

All foremen answered in the positive.

Question 7 asked:

"What do you think accounts for this fact that your department does a better job some times than others?"

Total number of responses, across 17 foremen, was forty-five. Responses to this question were divided into nine categories according to the cause of variability in performance they seemed to indicate. These categories and the number of responses in each are shown in Table 13.

Response Category	Number of responses in category
1. Worker's attitudes, morale, feelings	18
2. Unreliable or maladaptive performance by workers	6
3. Procedural problems; changes in process, schedules,	
and designs	5
4. Interaction between departments, material flow	4
5. Mechanical problems	3
6. Changes in number of employees	3
7. Changes in volume of production	2
8. Foreman performance	2
9. Miscellaneous	2
Total responses	45

Table 13. Categories of Response to Question 7. Factors named as affecting departmental performance.

Question 10 asked:

"Would you tell me, briefly, in your own words, how you judge how well your department is doing from day to day?" The thirty-five useable responses obtained from the foremen were divided into seven categories as shown in Table 14.

Response Category	Number of Responses
1. Subjective assessment, "feel how things are going"	8
2. Volume of level of production	7
3. Morale of employees	5
4. Reports of inspectors, rejects, defects, repairs	5
5. Quality	4
6. Production compared to a schedule or standard	3
7. Feedback from other departments	3
Total responses	35

Table 14. Categories of Response to Question 10. Methods for evaluating variability in departmental performance.

Question 12 asked the foremen:

"What specific things did you consider in deciding how well your department has been doing? We want to know all the different kinds of information you look at when you decide how well your department is doing." (In a previous question foremen had been asked to evaluate the performance of their own departments.)

After listing the variables they used to evaluate their department the foremen were asked in Question 13 to rank the specific items in terms of their importance in influencing their decisions. Question 12 and 13 differ from Question 10 above only in that foremen were asked in Question 13 to give <u>specific</u> criteria, rather than just tell how they decide how well their department is performing. It was felt that a more highly structured question in which respondents were asked to list specific factors might induce a response set, that is subjects might feel called upon to think of valid indicators of performance level, whether they used them in their decision or not. A review of the data yields some evidence for this possibility. Table 15 shows the fourteen response categories derived from the forty-nine separate responses to Question 13 and the frequency with which the responses were given particular ranks. Individual foremen gave from two to five variables. It will be noticed that there are fewer responses indicating evaluation by subjective "feeling how things are going" than in Question 10.

	Frequency with which responses were placed in each rank.								
Response Categories		R	Total						
	1*	2	3	4	5	Frequency			
l. Quality	6	2	-	1	_	9			
2. Production level	3	5	1	1	-	10			
3. Production compared to a	-	-							
schedule or standard	3	3	1	-	-	7			
4. Performance and cooperation									
of workers	2	-	3	1	-	6			
5. Service and cooperation between									
departments	1	1	1	-	-	3			
6. Appearance, housekeeping	1	-	1	-	1	3			
7. Performance in view of problems									
and limitations	1	-	-	-	-	1			
8. Repairs, rejects, scrap	-	2	-	1	-	3			
9. Freedom from mechanical									
problems	-	2	-	-	-	2			
10. Costs	-	1	-	-	-	1			
11. Feedback from supervisors	-	1	-	-	-	1			
12. Runs smoothly without super-									
vision	-	-	1	-	-	1			
13. Grievances	-	-	1	-	-	1			
14. Use of supplies	-	-	1	-	-	1			
Total						49			

Table 15. Responses to Questions 13 and 14. Ranks of variables indicative of departmental performance.

1

*Rank l indicates highest or most important factor

The preceding three tables (13 through 15) contain responses of foremen only and are concerned with their perceptions of the sources of variability in the performance of their own departments and the criteria they use to evaluate this performance. Before reviewing the major groupings of these responses it may be useful to look at Questions 16 and 17, to which management personnel as well as foremen responded. They were asked to list and then rank the variables they consider when ranking <u>all the production departments</u> in terms of overall quality of performance. Question 16 was as follows:

"What things did you consider in deciding how well the various departments are doing? That is, what different kinds of information did you use when you ranked the departments?" (Question 15, dealing with ranking the departments, will be discussed later.)

Two foremen could not or would not rank the departments and would mention no variables relevant for doing so. Table 16 contains the fifteen response categories into which the forty-four responses were sorted. Average number of responses per foreman was 2.93.

Table 17 gives the same data for the five management personnel as is given in Table 16 for foremen. There were thirty responses for an average of 6 per respondent.

The first question discussed, Question 7, asks foremen why the performance of their departments varies over time. It is aimed at understanding the foremen's perceptions of the causes of variability in the performance of their own departments. The nine categories of response include the affects of the members of the department--either their collective attitudes and morale or individual unreliability; problems brought about by changes in procedure, personnel, or volume and kind of production; problems arising from the integration of the several departments; mechanical problems; and foreman behavior. Of particular interest are the emphases placed by the foremen upon the

		Frequency with which responses were placed in each rank.								
Res	ponse Categories			Total						
		1	2	3	4	5	\mathbf{F} requency			
1.	Production compared to a standard	4	-	-	-	-	4			
2.	Quality	3	5	3	1	-	12			
3.	Size and difficulty of foreman's job	2	1	-	-	-	3			
4.	Morale and interest of workers	1	-	-	1	1	3			
5.	General performance	2	-	-	-	-	2			
6.	Cooperation	1	2	3	1	-	7			
7.	Efficiency of foreman	1	-	-	-	-	1			
8.	Level of production	-	1	4	-	-	5			
9.	Comments by workers about their									
	boss	-	1	-	-	-	1			
10.	Cleanliness	-	1	-	-	-	1			
11.	Flow into my department	-	-	1	-	-	1			
12.	Efficiency	-	-	1	-	-	1			
13.	Breakdowns	-	-	-	1	-	1			
14.	Changes taking place	-	-	-	-	1	1			
15.	Interest shown in people as									
	individuals	-	-	-	-	1	1			
	Total						44			

Table 16. Foremen's Responses to Questions 16 and 17. Ranks of variables indicative of differential performance across departments.

attitudes and morale of their workers and upon the phenomenon of change in several possible aspects of the departments' operation.

Questions 10 and 12 are aimed at understanding the units of information or symptoms the foremen utilize in assessing the progress of their departments. In question 10, in which respondents were not required to list specific variables, there were a number of statements implying the ability to "feel" how well things were going, i.e., there seemed to be cues which were not easily identifiable. Another important variable mentioned was volume of production, either as a raw indicator or when measured against some standard such as time, quota, etc. In all questions

	Frequency with which responses were placed in each rank.								
Response Categories			Total						
	1	2	3	4	5-8	Frequency			
1. Production compared to a standard	2	-	_	-	_	2			
2. Production level	1	2	-	-	_	3			
3. Quality	1	1	_	-	-	2			
4. Cost of production	1	1	-	-	-	2			
5. Adapting to change	-	1	-	-	-	1			
6. Rejects and rework	-	-	2	-	-	2			
7. Over-all performance	-	-	1	1	-	2			
8. Conditions departments have to									
work with	-	-	1	-	1	2			
9. Attitude of foreman	-	-	1	-	-	1			
10. Attitude of employees	-	-	-	1	1	2			
11. Grievances	-	-	-	1	1	2			
12. Problems requiring attention of									
upper management	-	-	-	1	1	2			
13. Consistency	-	-	-	1	-	1			
14. Cooperation and consideration									
given other departments	-	-	-	-	2	2			
15. Housekeeping	-	-	-	-	2	2			
16. Efficiency	-	-	-	-	1	1			
17. Flexibility and ingenuity	-	-	-	-	1	1			
Total						30			

Table 17. Management Individuals' Responses to Questions 16 and 17. Ranks of variables indicative of differential performance across departments.

discussed in this section, responses regarding productivity are split between actual level or volume of production as an indicator and some ratio involving production as compared with a standard or criterion. One interpretation of this result is that some supervisors pay attention only to actual production counts, while others evaluate the level of production against other criteria. An alternative and possibly more likely explanation is that those who mention only actual level of production have internalized standards derived from past experience which allow them to assess the merit of a particular production figure against other conditions in the organization.

Another major area of response is that including quality and such indicators of proficiency as inspectors' reports, rejects, defects, and repairs.

Topics indicative of morale or satisfaction were mentioned five times in Question 10; in Question 12, which required specific points to be given, the only objective factor mentioned was grievances, while other human relations indicators named were such general responses as "how crew reacts," "people working together," "interest in jobs," and "loyalty to company." Other indicators mentioned include smooth integration between departments, feedback from other individuals at the same or high levels, limitations of facilities, and general appearance.

Questions 16 and 17 were intended to measure perceptions, not of causes of variability in one department over time, but rather variability among departments. It will be noticed that the indicators mentioned by the foremen when discussing the variability in their own departments are similar to those mentioned when discussing differential performance across departments. These include production and production to standard, quality, human relations considerations, housekeeping, or appearance, and mechanical problems. However, somewhat heavier emphasis is given to desirability of cooperation among departments.

Responses of the five line and staff personnel to Questions 16 and 17 add two new elements to those mentioned by foremen. In addition to the emphasis upon production, quality, and human relations, the managerial individuals also mentioned the importance of costs and of the ability of the foreman and department to function without the surveillance or assistance of the higher echelons in the organization.

One conclusion that might be derived from the previous analysis is that there is a fairly high degree of agreement among subjects in terms of the criteria they use in evaluating the departments. That is, responses to the questionnaire items indicate that there is general agreement about the validity of such indicators as production, quality, personnel relations, appearance, etc. If these responses are valid indicators of the real criteria the foremen and management personnel use in their decision-making, there should be a fairly high degree of agreement among the subjects' actual rankings of the departments. Responses to Question 15 serve to throw light on this point. Each subject was asked to rank the production departments in terms of his perceptions of their performance. The question was as follows:

"Here are some cards with the names of the departments here at on them. I want you to rank the departments according to how well you feel each is doing its job. The department that you feel is doing its job best should be placed at the top, the second best department second from the top, and so on down to the poorest department at the bottom. Remember, how you rank them is confidential, so please put them in the order you really think they belong."

Seventeen departments were ranked since the four sub-departments are considered by most employees as separate units, even though accounting data are not kept separately on them. Table 18 shows a matrix of rank correlations between and among foremen's rankings of the departments, the five management individuals' rankings, and also the departments' actual rankings on number of employees and eight of the previously discussed ratios involving objective measures of departmental performance. Only twelve of the foremen were able, or willing, to rank the departments; thus, they are the only ones included in the analysis. Since objective data were not available for the four subdepartments, each was assumed to have the rank of the over-all department, and the four were treated as tied ranks. In cases where the four sub-departments vary widely in performance on the objective measures the rank correlations will be somewhat erroneous, and the portion of the table containing intercorrelations of objective departmental data can be considered only an approximation. However, a comparison of the inter-variable correlations in Table 18 with those in Table 8, in which the four sub-departments are considered one department, reveals a fairly high degree of correspondence, with almost all corresponding coefficients being of the same sign and same general magnitude. Mean rank correlation among operational variables in Table 18 is -.057 while mean rank correlation in Table 8 among corresponding variables is -.051.

The sub-matrix in Table 18 formed by rows 1-12 and columns 1-12 (the upper left corner of the table) indicates the degree of intercorrelation among foremen's rankings of the departments. A rank-order correlation of approximately .45 is necessary for significance at the .05 level. Fifteen of the forty-five coefficients are significant; all of these are positive. The average correlation is .259. The data give no strong indication that there is substantial agreement among foremen in their rankings of the relative performance of the production departments.

The sub-matrix formed by columns and rows 13-17 indicates the degree of intercorrelation between departmental rankings made by the five management personnel. They are of the same general magnitude as the inter-foremen correlations, with a mean of .284. They seem to suggest the same conclusion as the foreman rankings--that there is no general agreement regarding the performance of the departments.

The sub-matrix formed by rows 1-12 and column 13-17 shows the correlations between rankings made by foremen and by other management personnel. The mean correlation is .359. Although this average is slightly higher than those above, it does not indicate any substantial

agreement between the way foremen and management personnel rank the departments. This is not surprising, since the intra-group correlations are so low.

The degree of intercorrelation between ranks of the departments on objective variables may be determined by referring to the submatrix formed by rows and columns 15-26. As was pointed out previously, mean correlation is -.569. However, mean correlation may not be the best indicator of agreement between rankings on objective variables, since a negative correlation does not necessarily indicate "disagreement" as it does in the case of evaluations by respondents. That is, the objective variables do not necessarily imply "best" or "worst," but simply the ordering of the departments. For this reason the rank correlation coefficients were averaged ignoring the sign, and the mean of the absolute values is .358.

The remaining portion of the matrix so far not discussed--the portion described by columns 18-28 and rows 1-17--indicates the degree of agreement between subjects' rankings of the departments and the departments' actual ranks on the objective variables. It would not be meaningful to average the coefficients since they represent both people and objective variables. There seem to be no evident trends in the data either by rows or columns. That is, no one variable seems to correspond highly with foremen's rankings of the departments. This fact would be expected, of course, since there is so little intercorrelation between foremen's rankings.

The data in Table 18 seem to offer good evidence that regardless of their agreement or disagreement about the criteria to use in evaluating the departments, the subjects evaluate the departments quite differently. There is no good evidence that their rankings correspond to any appreciable degree with the ranks arrived at by utilizing the

objective data which was available in this study. It should be pointed

out, however, that objective data utilized was not necessarily indicative of level of production, quality, member satisfaction, appearance, and the other criteria mentioned by the subjects.

		Foreman										
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
	1.		32	02	23	-07	-22	-19	11	06	49	-55
	2.			04	45	66	49	48	74	41	54	09
	3.				07	-12	-09	-07	16	-15	51	- 53
	4.					-04	38	13	49	38	46	-13
	5.						74	71	51	34	21	40
Foremen	6.							68	48	41	26	39
	7.								34	44	25	33
	8.									58	38	22
	9.										20	30
	10.											- 56
	11.											
	12.											
,	13.											
Management	14.											
Personnel	15.											
	16.											
	17.											
No. Employees	18.											
Overtime/Man-Hrs	19.											
Budg/Act Labor	20.											
Budg/Act Suppl	21.											
Budg/Act Scrap	22.											
Budg/Act Cost	23.											
Griev/Man-Hrs	24.											
Bids/Man-Hrs	25.											
Suggest/Man Hrs	26.											

Table 18. Intercorrelations of departmental rankings by foremen, management personnel, and objective variables.

Rho $\overline{>}$.45 is significant at .05 level.

		Mar Per	ageme sonnel	nt					Obje Var	ective iables				
12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.
18	07	32	-12	16	-31	-29	13	45	38	12	51	05	- 39	- 35
36	80	82	-07	41	51	-09	12	-07	17	05	-12	18	- 38	19
14	-15	08	-22	11	- 35	-58	22	21	40	36	23	25	-20	- 36
32	68	66	13	18	21	-12	42	-02	25	21	-05	-15	-31	-17
50	46	39	16	45	44	-16	-08	- 37	-40	-43	-42	09	03	65
57	45	40	36	41	39	-20	10	- 32	-47	- 36	-43	-11	05	51
51	35	40	37	60	31	14	31	-62	-47	-46	-69	-02	31	59
44	72	81	-03	49	56	-21	15	-05	13	11	-04	11	-12	14
40	52	44	13	32	54	15	21	-49	04	12	- 37	-27	14	11
41	30	48	06	22	-17	-57	20	20	38	31	24	06	-33	-26
10	18	00	46	13	70	59	-23	-44	-67	-42	-56	19	48	79
	26	50	57	33	32	-16	-02	-19	- 30	-12	-22	28	29	31
		78	-09	16	64	04	17	-24	21	15	-26	-10	-31	11
			-04	51	53	-09	39	-12	28	21	-11	05	-29	07
				05	17	29	-21	-18	-71	-40	-32	39	65	57
					08	- 20	55	- 36	-22	- 39	- 34	01	20	39
						48	-18	-40	-11	16	-44	15	12	43
							-13	- 33	- 29	-08	-41	15	35	31
								- 33	22	02	-23	-51	-25	00
									26	26	95	24	-42	-49
										81	44	-23	-67	-79
											40	-14	-44	-65
												05	-47	-61
													31	21
														44

SUMMARY AND DISCUSSION

The first conclusions that might be derived from the preceding studies involve the applicability of the methodology and the general approach. In the first place, the operational data maintained as a matter of procedure by the firm under study were found to be fairly amenable to analysis. Data indicative of the performance of the total organization on a monthly basis seemed to be sufficiently comprehensive to yield information about the variability in economic and unit output (the usual kind of criterion variables), cost and efficiency, labor productivity, and specific behaviors of the workers. Thus it may be asserted that analysis of the variability in performance of one organization over time may help point the way for analyses across organizations. Data available at the departmental level also proved useful, though not as useful as the organizational data, either in terms of number of variables available or the kinds of information they yielded. This situation probably stems partly from the fact that the firm does not feel compelled to maintain as much data about the individual departments as about the total operation. Also, it is no doubt related to the fact that the departments are highly interrelated in the production process and yet perform quite different functions, making the computation of comparable data difficult. This is particularly true of data about the levels of output of the departments. It was also found that the difference in the sizes of the departments accounted for a large proportion of the variability in measures in the second stage of the analysis. Any meaningful comparison of heterogeneous departments would seem to necessitate some correction or weighting for department size, a consideration not often encountered in the comparison of individuals or matched experimental groups.

Another general conclusion is that multivariate techniques seem to be useful approaches to the analysis of a variety of operational variables such as were gathered in the present study. The analyses of twentyfour company variables over a sixty month period yielded six factors, most of which were interpretable when discussed in terms of the operational definitions of the variables and conditions within the form. Likewise, the analysis of the ten departmental variables yielded three interpretable factors. The stability of the factors derived from company and departmental analyses was further demonstrated by additional analyses in each case. The Quartimax and Varimax rotations of the company data, although based on somewhat different assumptions, yielded very similar factors. Also, Boyles' factor analyses of the economic and personnel variables separately indicated the same general factor structure. In the case of the departmental variables, it was shown that factor analyses and rotations both by variables and by departments yielded factors which were compatible in terms of their explanations of the data. Thus, heterogeneous groups of variables representing measures taken on different aspects of the performance of the organization and sub-organizations may be seen as useful indicators of more basic levels of organization performance. The sizes of the coefficients in the matrices of intercorrelations seem to demonstrate that the measures do not vary completely independently, nor are they so highly interrelated as to yield only one large factor indicative of over-all performance. This situation seems to strengthen the assertion that something may be learned about the social-psychology of the organization by analyzing operational data with multivariate techniques. Finally, the correlations between company variables and over-all departmental variables during the same periods seemed to indicate a relationship between the department and company performance. This is particularly true of variables indicative of volume, size, and cost ratios. This relationship exists in spite of the fact that

procedures for evaluating company performance are somewhat different than those for evaluating departmental performance.

As has been previously pointed out, the factors resulting from the analyses of performance variables cannot be interpreted as completely indicative of all the dimensions underlying the performance of the organization. In the first place, since data which were available do not represent all possible measures, or even necessarily a random selection of measures, information may have been omitted which would change significantly the nature of the factors. Secondly, since the data presented here describe only one organization during a limited time period (5 years), generalization to other organizations must be done cautiously. Thirdly, there is no guarantee that the orthogonal factors derived from the analyses actually represent the "real world" perfectly. Many factor analysts have asserted that the factors derived from their measurements actually do describe dimensions existing at a level more basic than the variables themselves. One may, for example, attempt to describe basic dimensions of personality on the basis of factor analyses of test items. However, since the factors obtained in this study were obtained by rotation methods restricted to orthogonality (little or no relationship between factors), since there are several possible methods of factor analysis and several possible methods of rotation, and since there has been little previous work on variables of this nature, the interpretation of the factors must necessarily be done with caution.

An interpretation of the factors will necessarily contain elements of subjectivity. There is no way around this problem at the present stage, however, because the major goals of the research involve a search for techniques and approaches for studying organizational performance. Once some insights are gained into necessary methodology more rigorous research can be carried out to specify the exact nature of the underlying social-psychological dimensions.
Strict description of the factors derived from the analysis of company and departmental data must be limited to interrelationships between the variables loaded on each factor. However, the value and appropriateness of this general approach to studying organizations may be tested by going beyond the loadings to discuss factors in terms of other information about the organization. In the discussion that follows a brief description of each of the six organization factors is followed by a more general interpretation of the meaning of the factor.

The first factor derived from the analysis of company data across months (Factor One, Table 4) describes positive relationships between larger numbers of individuals in the direct, indirect and salaried labor forces; lower productive efficiency (as demonstrated by fewer units per man-hour, smaller bonus percentage, and more unfavorable labor and factory overhead variance); more grievances and bumps; and lower average wages. An explanation of this factor can be made on the basis of additional information about the firm under study. Demand for the product fluctuates substantially over time. When product demand increases new people are added to the labor force. In addition, other changes not demonstrated in this analysis take place. Facilities are taxed; material flow is increased; supervisory staff demands are greater; new jobs must be learned. One result of this situation is inefficiency, as demonstrated by the unfavorable nature of the cost factors. Another result is stress in the labor force as demonstrated by increases in bids and grievances. When product demand decreases the above process is probably reduced or reversed. Internal stresses, inadequacies, etc., brought about by marked changes cause the system to function inefficiently. The phenomena described by this factor may be hypothesized to be similar to the dimension of integration proposed by Stogdill.

The data available allow not only a description of the kind of dimension involved, but suggest some clues as to the cause of the variation.

One reason is, of course, the high level of manpower with its concurrently high level of activity. One approach possibly applicable to the present problem is that of Mason Haire who discusses in his biological model of organization the interdependence of size, shape and function. It is Haire's thesis that as an organization grows some of its functional aspects must change also, if it is to survive. That is, as a firm grows larger it must devote continually larger proportions of its energy to non-productive functions such as control, coordination, and communication, and therefore will grow less efficient. (Haire, 1959) The present case may represent a narrower application of this theory. Not only in the case of long-term growth, but also in the case of shortterm fluctuations size may play an important part. Seemingly, the company and its functions are geared to a level of performance which is somewhat short of the maximum as demonstrated by the highest number of employees. Even though new individuals are added at a rate commensurate with the desired level of production, they are not able to maintain the previous level of efficiency.

It should be pointed out that operating profit and units of production are not significantly loaded on Factor One. This result gives credence to Stogdill's suggestion that integration and productivity may be independent, (if one is willing to consider efficiency a major characteristic of integration). A major point for further study should be why, in the case of the firm under study, does profit not fluctuate with efficiency. It may be because higher levels of production are profitable enough to offset the effects of inefficiency.

The second major factor derived from the analysis of company data (Factor Two, Table 4) is clearly most highly loaded on variables indicative of productivity. During periods when the total industry is producing well, man-hours worked and numbers of direct production workers increase, the difficulty of mix decreases (since contract units are easier to fabricate), bonus increases, and factory overhead variance is favorable. Profit is also loaded on this factor, although it is also loaded about equally on two other factors. Thus it may be seen that this factor is not purely an indication of productivity, but is also loaded on measures such as units per man-hour, bonus, and factory overhead variance, all possible indicators of efficiency or integration. The analysis has thus yielded two factors which are not logically completely independent of each other. Both seem to contain indications of efficiency. In one case inefficiency is associated with an increase in size of labor forces, while in the other case at least relative efficiency is achieved with higher levels of production.

Factor Three indicates a clear-cut negative relationship between profit and number of bumps and job changes. Bumps usually come about when the size of the labor force is decreasing. Individuals are expected to operate less efficiently when they are placed in new jobs. Thus, the variables loaded on this factor, actual/scheduled production in Factor IIIq and size of the indirect labor force in Factor IIIv, seem to fit logically into the pattern. The factor seems to be another indication that change is a major determinant of inefficiency.

Factor Four is loaded on two industrial relations measures, bids and grievances. It is also the only factor containing a high loading on material variance. This seems to indicate that efficiency in the use of material is relatively independent of other cost factors. Bids are generally regarded as likely to increase as the size and characteristics of the labor force change. Periods of accentuated change probably represent times of greater stress in the organization, and usually come about as a result of adjustments in volume or kind of production.

The fifth factor indicates that production of company brand units typified by a more difficult mix (proportion of complex products) is related to increased profit. This factor may be seen to reflect a somewhat

different aspect of the company's output than does Factor Two. The analysis has evidently isolated two situations descriptive of dimensions of profitability. Seemingly, amount of profit is positively related to production of both contract units, as demonstrated in Factor Two, and company units, as demonstrated in the present factor. These results seem to indicate that fluctuations in profit should not be explained in terms of kind of product being manufactured, but should be tied to other causes. Previous results indicate that perhaps variability in profit should be linked to change or accommodation in level of production.

The last factor (Factors VIq and VIv), contains positive loadings on actual/scheduled production and units per man-hour, and negative loadings on man-hours worked. Achievement of highest productive efficiency seems to come during periods when the labor force is smallest. These findings lend further support to Haire's hypothesis regarding the negative effects of size on organization performance.

Admittedly there might be other quite different interpretations of the factors derived from this analysis. Those offered are probably conditioned by the present writer's own biases and his acquaintance with the organization. The results do demonstrate, however, the feasibility of such an approach. The dimensions derived may be compared with those suggested by Stogdill and other theorists. Factors One and Six describe the relative efficiency of the labor force in terms of such variables as units per man-hour, labor variance, and actual/scheduled production. Both factors indicate a negative relationship between labor efficiency and the size of the labor force. If one were to look for a dimension called integration he might find it and some of its causes in these factors, as well as in Factor Four which was interpreted as probably indicating periods of change in the process. Factors Two and Five seem clearly to contain indicators of a dimension of productivity, and both are related to profit. They also contain indicators of the conditions prevailing when

productivity is low or high. Factor Three seems to indicate periods of adjustment in the process with its accompanying bumps and lack of profit.

Information yielded by the analyses of interrelations between operational variables suggests the existence of a number of "second order" variables which do not necessarily describe dimensions of organization performance, but which give evidence regarding some of the less obvious causes of variability. Among those second order variables are size (in terms of both volume and number of employees), the introduction of procedural changes, and stress brought about by inputting new or larger units of people or material. The various ratios used in the departmental analysis are of somewhat the same nature. Difficulty of mix, actual/ scheduled production, units per man-hour, and labor, overhead and material variance are not as conceptually pure as variables such as number of units produced, but long range correlation with profit or efficiency attests to their usefulness.

As might be expected, data composed largely of variables dealing with the production process yield the most clear-cut evidence regarding the dimensions of productivity and operational efficiency or integration. No independent factors clearly describe morale or satisfaction dimensions. However, some indicators of corollary attitudinal dimensions may be obtained by further examination of the factor loadings. For example, none of the industrial relations events such as grievances, bumps, or bids are highly loaded on the productivity factors, but instead appear on the factors which have been demonstrated to indicate periods of accommodation. The small amount of evidence available seems to indicate that at least in the organization under study the attitudes of the employees are related to changes taking place within the organization. This argument is further strengthened if one is willing to assume that at least a part of the inefficiency of labor during periods of change may be due to psychological states of the workers. It may be concluded that the analyses

carried out so far have not isolated independent dimensions of morale or satisfaction, but have indicated the interrelation between specific kinds of behavior and conditions taking place within the firm.

The factors derived from the analysis of measures of performance of the production departments may be viewed in the light of the preceding discussion. The departments described in Factor I(var) and Factor I (dept) in Tables 9 and 11, respectively, were described as having high overtime, unfavorable labor and total cost ratios, and fewer grievances. These departments are indirect production departments or minor production departments. Reference to Table 8 indicates high intercorrelation between total cost, labor cost, and overtime. Seemingly, then, the indirect and minor production departments characteristically overspend on labor. One explanation for this fact appears to fit Haire's previously cited hypothesis regarding change in size. The labor and total cost ratios and amount of overtime are dependent not only upon the amount expended, but also upon the amount allocated. Thus, perhaps the departments described in this factor have not been allowed budgets commensurate with the demand for their services brought about by the accelerated growth and change in the major production departments, and thus may have to over-spend to keep up with unrealistic planning. The smaller number of grievances descriptive of departments in this factor can be explained in terms of the previous findings which link grievances to change. Employees in the departments described in this factor characteristically do work of a skilled or specialized nature and are not as likely to be personally affected by changes in job content as are production line employees in the major departments. The major consequence of change in the departments in this first factor may be limited to the necessity of working overtime.

Factors II(var) and II(dept) describe the larger departments in terms of hours worked. They have more unfavorable total cost ratios,

more bids, and more suggestions. Seemingly, not only are the "largest" months (in terms of number of employees) the most inefficient, but also the largest departments. It should be pointed out that this size factor emerged in spite of the attempt to equalize the departments in terms of size. Bids characterize these departments since they are the assembly and fabricating departments most affected by numerous and complex changes. The proportionally larger number of suggestions may be due to the fact that employees in these departments have more opportunity to observe manufacturing operations which might be improved by suggestions.

Factors III(var) and III(dept) describe a group of departments characterized by favorable supply and scrap ratios and few bids and suggestions. These departments cut across the groups of departments described in the first two factors. The only variable in the organizational data which could be hypothesized to be related to supply and scrap costs was material variance. It will be recalled that this variable also was loaded on a factor which contained no other measures of productivity or efficiency. It seems reasonable to hypothesize that utilization of material is relatively independent of other efficiency measures.

The ratios used as variables 1 through 8 in the departmental analysis might all be considered criteria of departmental effectiveness. This analysis indicates that results of any attempt to rate the effectiveness of the departments on the basis of these variables might yield quite ambiguous results, as is demonstrated by the varying sizes of the intercorrelations in Table 8.

Results of the interviews with foremen and management personnel may now be evaluated to see if they contribute to the picture of the firm derived from the preceding factor analyses. In question 7, in which foremen were asked to name factors responsible for variability in the productivity of their departments, twenty-four of the forty-five responses dealt with the attitudes or performance of workers, and ten referred to

change in procedure, volume or number of employees. The emphasis on the effects of change reinforce the previous conclusions that changes involving or paralleling shifts in the level of production are important determiners of efficiency in the organization. The heavy emphasis upon attitudes and performance of individuals also fits the previous analysis, since periods of variability in organization performance were characterized as periods in which actions such as grievances, bumps, and bids were prevalent.

The analyses of Questions 10, 12, 16, and 17 shift the emphasis from an attempt to isolate real or perceived causes of variability in performance to the criteria used by foremen and management personnel to discover the position of a particular department on a continuum of productivity or effectiveness. Reference to Tables 15, 16, and 17 reveals that the major categories of criteria mentioned involve production and quality. The emphasis upon productivity is defensible in terms of logic and in terms of the factorial dimensions uncovered in the first stage of analysis. There was, however, no information available to the present writer which would yield consistent measures of departmental productivity. For this reason none were included in the analysis. The emphasis on quality displays a similar weakness. It is probably an even more subjective element than productivity, and is seemingly not measured or quantified in a form amenable to comparative analysis.

Another group of responses regarding criteria of effectiveness involve more-or-less specific indicators of morale or satisfaction. Thus, not only do the supervisors see human relations factors as contributing to variability in performance, but they use their perceptions of these phenomena as indicators of effectiveness. Other criteria mentioned included cooperation between departments, limitations of the facilities, appearance, and flexibility and adaptibility. Another significant group of responses were those which could only be classified as

general and subjective feelings about "how things were going," or "general performance level."

Costs as indicators of performance are mentioned only once by foremen and twice by management personnel. Yet a significant proportion of the objective data available at both the organization and department levels were cost data.

It may be reasonably concluded from the preceding discussion that any attempt made by foremen or supervisory personnel to evaluate the departments in terms of the criteria they suggested in the interview questions would necessarily be quite subjective. Systematic objective data regarding the productivity of the departments, quality, satisfaction, morale, adaptibility to change and most of the other variables cited were found not to be available. Also, the large number of responses which were admittedly subjective indicate that the interviewees might not use the objective data even if it were available. This conclusion is borne out by the intercorrelations of the foremen, management personnel, and objective variable rankings of the departments in Table 18. In spite of the relatively small size of the firm and the long tenure of the foremen and management individuals there is demonstrated to be no consistent agreement about the rankings of the departments. This is true in spite of the rather general consensus expressed in earlier questions about what might be relevant criteria for evaluating the departments.

Suggestions for Further Research

The analysis of theoretical literature and the results of the present research may be discussed from the point of view of their relevance, if any, to the general body of organization theory. Although the major purpose of this study was not to validate any theory or test any specific hypothesis, but rather to explore the feasibility of a more empirically

oriented approach toward the development of a theory, the findings may yield information which suggests ways to further examine existing theories through hypothesis testing. Some of the findings are relevant to the "basic issues" discussed in an earlier section to summarize the major concerns of organization theorists.

1. Orientation toward achievement. The results point up the rather unclear picture of criteria of achievement or effectiveness. While there were several measures of output available at the organization level, some, such as number of company brand and contract units produced, were relatively independent as demonstrated by the fact that they loaded on different factors. Others, such as profit, were spread across several factors. Thus it seems reasonable to suggest that there may be no single best indicator of effectiveness available. The paucity of objective productivity data available at the departmental level and the disagreement among interviewees as to the nature of the relevant criteria or their application to the situation suggest a lack of recognition on the part of management of the need for clearly specified criterion data.

As has already been pointed out, while agreeing that most organizations strive for achievement, theorists have not done much about specifying the kinds of achievements to be considered as goals for organizations. Several authors, including the present writer, have pointed out that effectiveness or achievement are necessarily evaluative terms and depend upon the point of view of the individual using them. It would seem that one fruitful area for further research might involve an investigation of the relationships between attitudes about criteria of organization effectiveness on the one hand and such variables as status in the organization, group membership, decision-making power, technical ability, leadership effectiveness, and job satisfaction. It could be hypothesized, for example, that supervisors who are considered most effective are those

who have the most accurate perceptions of the criteria of <u>effectiveness</u> applied to their units. It might also be hypothesized that dissimilarity of perceived criteria within an organization or sub-organization will lead to lack of efficiency, coordination, and cooperation. Finally, it might be hypothesized that setting clear and attainable goals should lead to more effective performance and to ultimate job satisfaction when goals are reached.

2. The individual-organization interaction; and 3. Situation versus personality. Loadings of the so-called industrial relations variables (grievances, bids, bumps, etc.) on factors also loaded on cost and productivity variables attest to the interrelationship of individual, group and total organization performance. Increases in the size of the work force and changes in procedure may be seen to co-vary with industrial relations events and productivity. Although factor leadings do not allow firm conclusions about cause and effect relationships, they do serve to suggest hypotheses about the effects of such inputs as management decisions upon performance. Also, the analysis demonstrates the existence of variables available for use in testing hypotheses regarding relationships in the individual and organization interaction. There has been a good deal of research activity, particularly with small experimental groups, on such questions as group versus individual problem solving ability, effects of structural characteristics on group performance, merits of different communications systems, and the relationship between group characteristics and satisfaction or morale. However, because of the fact that a functioning group is a complicated interaction system, with many variables important at one time, results from highly controlled experimental groups have had limited applicability to work groups. Use of operational variables whose meaning in terms of organization dynamics has been made clearer through multivariate analysis should

allow for testing of hypotheses about factors affecting group outputs. It could be hypothesized that introduction of specific kinds of changes will lead to particular phenomena in the internal process (for example, loss of integration), that these internal changes will be accompanied by measureable attitudinal and behavioral changes on the part of the members, and will ultimately lead to specific effects upon the achievement of the organization.

4. Formal versus informal organization; and 5. Rational versus non-rational basis of human behavior. Theorizing about the existence of "informal" or non-rational aspects of organization has been made largely on the basis of observations or members' expressions of norms for behavior which do not correspond perfectly with those proposed by the formal organization. Norms oriented toward work behavior may be viewed as criteria of performance. In the present organization, and probably in others, a good deal of the performance must necessarily be informal because of the lack of objective, clearly understood criteria. Thus it might be hypothesized that the basis for disruptive informal behavior may be due to inadequate or unclear criteria as well as cognitive limits or motivational factors. In an organization in which there is a large amount of structure disruptive informal behavior might be a defense against the uncomfortable restriction, while in a loosely structured organization the informal organization comes about because the members are seeking to provide some cues for themselves regarding relevant performance. It might be further hypothesized that in an organization which is tightly controlled there will be one major informal organization whose major purpose is to counter the effects of the formal organization, while in an under-controlled organization there will be many informal organizations with many sets of criteria as each individual or work group seeks to define for itself its position or function in the total organization.

6. Methods of leadership and supervision. As has already been pointed out, it is the present writer's position, based on analysis of recent literature, that the validity of a particular method depends upon the situation in which it is applied, and that what are needed are strategies of control which will allow selection of a method on the basis of feedback about the organization's performance. Results of the factor analyses and interviews indicate several variables and clusters of variables which may be considered indicative of the underlying dimensions of the organization's behavior. Two of the most clearly described seem to closely parallel Stogdill's conceptualization of the group outcomes or achievements of productivity and integration. Other relationships suggest the importance in the process of such influences as procedural and structural changes, size, and cost allowances. Study of leadership methods in the present framework would involve an investigation of the differential effects, in terms of measurable achievement dimensions, of a particular method applied in several organizations or sub-organizations with different characteristics of structure or process--also measured in terms of objectively defined dimensions.

Further exploration is needed before methods of control can be evaluated. More and different variables, such as turnover, absenteeism, quality procedural change, and departmental productivity should be included. The analysis needs to be applied across organizations in order to discover if the same or similar dimensions emerge. Analysis carried out on months or across organizations instead of by variables might add useful information, as it did in the portion devoted to analysis of departments. Other statistical approaches such as pattern analysis may be found which better fit the data and do not require so many assumptions, for example, the assumption of linearity. Pattern analysis, non-orthoginal rotation, or other methods of summarizing the data might allow more meaningful separation of clusters of variables in which

hierarchical orderings could be studied and in which, for example, the industrial relations variables could be located in clusters which were separated from, but correlated with, output variables.

Finally, methods should be developed for including in the analysis measurement of the more traditional types of psychological and socialpsychological variables. It would be hoped that by combining indirect psychological measurements with objective operational measurements the validity of the former and the implications of the latter may be better determined.

If the preceding steps were successfully carried out hypotheses such as the following would be testable:

The first effect of the introduction of change is the lowering of integration.

Even if integration is not necessarily positively related to productivity it may be related to profit, since profit seems to be related to efficiency as well as to amount of production.

There are curvilinear relationships between amount of structure on the one hand, and satisfaction and performance on the other; i.e., a medium amount of structure is most desirable.

Good integration leads to better productivity in the long run since integration as described both by Stogdill and by the present author may be viewed as a reflection of the "health" of the organization process.

Integration is most positively related to productivity in organizations and sub-organizations in which quality of decisionmaking and cooperative effort are recognized as more relevant criteria of effectiveness than quality.

There will be least loss of integration due to change in organizations in which there is consensus of attitudes regarding the relevant criteria of performance.

CONCLUSION

This investigation was undertaken in an effort to contribute to the general understanding of organizational behavior. After a review of some of the more important theories and a discussion of relevant research it was concluded that one significant reason for the disparity of administrative principles derived from the various approaches and the conflicting evidence regarding their effectiveness is that the effects of particular methods may vary depending upon the characteristics of the individual members or the situation. Further refinement of management methods may necessitate the development of "strategies of control" based upon understanding of the interactions between particular methods or "inputs" and the existing situation. It was further suggested that another difficulty with the present state of organization theory is that theorists have worked with a wide variety of conceptual variables which have yielded hypotheses that are difficult to test, either because the variables have not been operationally defined or because organizations have not recorded and/or utilized the necessary data. The present series of studies was designed to test methods for analyzing available operational data in a search for dimensions of organization behavior, suggest the nature of some of these dimensions, and learn about the members' perceptions of the variability in organization performance.

Factors which emerged from the analysis of organizational and departmental data demonstrated the ability of this approach to allow meaningful conclusions about the dynamics of the organization and some of the underlying dimensions of group behavior. The operational data seemed particularly useful in contributing insights into the conditions affecting productivity and efficiency, while the loadings of personnel

data on the various factors allowed the formation of hypotheses about some of the social-psychological aspects of the firm's operation. When evaluated against the results of the factor analyses, interviews with supervisory personnel indicated some insight into causes of variability in performance over time. Although the interviewees' reports of criteria they used to evaluate the production units showed a fairly high degree of agreement and seemed to make good logical sense, it was strongly indicated that such conclusions were likely to be subjective. This was true because of the non-objective nature of many of the criteria listed and because of the lack of systematic data regarding the standing of the departments on such seemingly objective variables as production and quality. This point was reinforced by the lack of agreement on the part of the interviewees about the ranking of the departments in terms of effectiveness.

The theoretical position taken earlier in the paper was that effective application and evaluation of control strategies must be based on an understanding of the dynamics of the organization and upon valid feedback regarding the status of the organization or its sub-units on the various relevant dimensions of performance. Results of the study seem to indicate the feasibility of a better understanding of organizational performance based on analysis of information which is available or might be made available in the organization. It suggests, however, that the mechanisms for supplying this kind of data are not well established, and that there was a consequent lack of consistency in the responses of supervisory personnel when asked to apply the criteria they report using.

The emergent picture of the organization under study is one in which the firm is forced to establish a policy of flexibility in order to sustain a market for its products. But its efficiency is adversely affected by the adaptation process. Changes in volume and in product are necessarily accompanied by changes in manpower and procedures.

These constant and substantial changes seem to be correlated with a marked loss in efficiency. Factor loadings on personnel variables and portions of the theories of Stogdill and Haire allow hypotheses about the reasons for this phenomenon.

To the extent that the present approach to analysis has yielded a meaningful and valid picture of the dynamics of the organization under study it may be considered useful. Its validity has, however, not been proven. It can only be said that the conclusions are based to a fairly large extent upon induction from the objective data.

The present study was only exploratory, and needs to be replicated with improvements. If the approach can be demonstrated to be valid its ultimate worth will rest with its ability to help improve the effectiveness of the management of organizations. Application will necessarily involve the development of methods for assessing an organization's standing on the various dimensions at a given time. Also required will be validation of control measures which have the capacity to bring about changes in directions deemed desirable according to the goals of the organization or the values of its members.

BIBLIOGRAPHY

Argyris, C. Personality and organization. New York: Harper, 1957.

- Bales, R. F. Interaction process analysis: a model for the study of small groups. Cambridge: Addison-Wesley, 1950.
- Barnard, C. I. The functions of the executive. Cambridge: Harvard Univ. Press, 1938.
- Bass, B. M. Leadership, psychology and organization behavior. New York: Harper, 1960.
- Bennis, W. G. Revisionist theory of leadership. <u>Harvard Business</u> Review, 1961, 39(1), 26+.
- Blau, P. M. <u>Bureaucracy in modern society</u>. New York: Random House, 1956.
- Boyles, B. R. An investigation of organization effectiveness using multivariate analysis. Unpublished Master's Thesis, Michigan State University, 1962.
- Brayfield, A. H. & Crockett, W. H. Employee attitudes and employee performance. Psychological Bulletin, 1955, 52, 396-424.
- Burt, C. L. Correlations between persons. British Journal of Psychology, 1938, 6, 339-375.
- Cartwright, D. & Zander, A. (Eds.) Group Dynamics: research and theory. Evanston, Ill.: Row, Peterson, 1953.
- Cattell, R. B. Factor analysis: an introduction and manual for the psychologist and social scientist. New York: Harper, 1952.
- Craig, P. G. Remarks on the measurement of productivity. Unpublished communication, 1957. (Cited by Stogdill, R., 1959, pp. 204-205.)
- Dale, E. Planning and developing the company organization structure. New York: American Management Assn., Research Report No. 20, 1952.

- Drucker, P. F. <u>The practice of management</u>. New York: Harper, 1954.
- Etzioni, A. <u>Complex organizations: a sociological reader</u>. New York: Holt, 1961.
- Fleishman, E. A. Leadership climate and supervisory behavior. Columbus, Ohio: Ohio State Univ., Personnel Research Board, 1951.
- , & Harris, E. F. Patterns of leadership behavior related to employee grievances and turnover. <u>Personnel Psychology</u>, 1962, 15, 43-56.
- Gaus, J. M. A theory of organization in public administration. in The frontiers of public administration. Chicago: Univ. of Chicago Press, 1936, p. 66.
- Glanzer, M. & Glazer, R. Techniques for the study of group structure and behavior. <u>Psychological Bulletin</u>, 1959, 56, 317-332 and 1961, 58, 1-27.
- Guilford, J. P. Fundamental statistics in psychology and education. New York: McGraw-Hill, 1956.
- Guion, R. M. Criterion measurement and personnel judgments. Personnel Psychology, 1961, 14, 141-149.
- Gulick, L. & Urwick, L. (Eds.) <u>Papers on the science of adminis-</u> <u>tration</u>. New York: Institute of Public Admin., Columbia Univ., 1937.
- Haire, M. Industrial social psychology. In G. Lindzey (Ed.) <u>Handbook of social psychology</u>. Cambridge: Addison-Wesley, 1954.
 - . (Ed.) Modern organization theory. New York: Wiley, 1959.

. (Ed.) Organization theory in industrial practice. New York: Wiley, 1962.

Hardin, E. The reactions of employees to office automation. Monthly Labor Review, 1960, 83, 925-932.

- Herzberg, F., Mausner, B., & Snyderman, Barbara B. <u>The motivation</u> to work. New York: Wiley, 1959.
- Jacobson, E., Kahn, R., & Morse, Nancy (Eds.) Human relations research in large organizations. Journal of Social Issues, 1951, 7(3).
- Kaiser, H. F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.
- Katz, D. & Kahn, R. L. Leadership practices in relation to productivity and morale. In D. Cartwright and A. Zander (Eds.) <u>Group dynamics</u>. Evanston, Ill.: Row, Peterson, 1953.
- Kiel, O. & Wrigley, C. F. A criterion for the number of factors to be extracted from a matrix. Unpublished research, Michigan State University, 1962.
- Likert, R. New patterns of management. New York: McGraw-Hill, 1961.
- Lloyd, L. E. Origins and objectives of organizations. In M. Haire (Ed.) Organization theory in industrial practice. New York: Wiley, 1962.
- Mann, F. C. & Hoffman, L. R. Automation and the worker: a study of social change in power plants. New York: Holt, 1960.
- March, J. G. & Simon, H. A. Organizations. New York: Wiley, 1958.
- McGehee, W. & Thayer, P. W. <u>Training in business and industry</u>. New York: Wiley, 1961.
- McGregor, D. The human side of enterprise. New York: McGraw-Hill, 1960.
- Merton, R. K. Social theory and social structure. Glencoe, Ill.: Free Press, 1957.
- Neuhaus, J. O. & Wrigley, C. F. The quartimax method: an analytic approach to orthogonal simple structure. <u>British Journal of</u> Statistical Psychology, 1954, 7, 81-91.
- Petrullo, L. & Bass, B. M. Leadership and interpersonal behavior. New York: Holt, 1961.

- Roethlisberger, F. J. & Dickson, W. J. <u>Management and the worker</u>. Cambridge: Harvard University Press, 1946.
- Selznick, P. Foundations of the theory of organizations. <u>American</u> Sociological Review, 1948, 13, 25-35.
- Siegel, I. H. Concepts and measurement of production and productivity. Washington: Bureau of Labor Statistics, 1952. Mimeo.
- Smelser, N. H. Social change in the industrial revolution. Chicago: University of Chicago Press, 1959.
- Stephenson, W. The inverted factor technique. <u>British Journal of</u> Psychology, 1936, 26, 344-361.
- Stogdill, R. M. Individual behavior and group achievement. New York: Oxford Univ. Press, 1959.
- Tannenbaum, R., Weschler, I. R. & Massarik, F. <u>Leadership and</u> organization: a behavioral science approach. New York: Oxford Univ. Press, 1959.
- Taylor, F. W. <u>The principles of scientific management</u>. New York: Harper, 1911.
- Thibaut, J. W. & Kelley, H. H. <u>The social psychology of groups</u>. New York: Wiley, 1959.
- Thompson, V. Modern organization. New York: Knopf, 1961.
- Troxell, J. P. Employee understanding and teamwork for greater productivity. New York: National Association of Manufacturers, 1954.
- Turner, W. Dimensions of foreman performance: a factor analysis of criterion measures. Journal of Applied Psychology, 1960, 44, 216-223.
- Walker, C. R. & Guest, R. H. <u>The man on the assembly line</u>. Cambridge: Harvard Univ. Press, 1952.
- Weber, M. Essays in sociology. Translated by H. H. Gerth & C. W. Mills. New York: Oxford Univ. Press, 1946.

- Weber, M. The theory of social and economic organizations. Translated by A. M. Henderson and T. Parsons. New York: Oxford Univ. Press, 1947.
- Wrigley, C. F. & Neuhaus, J. O. The use of an electronic computer in principle axes factor analysis. Journal of Educational Psychology, 1955, 46, 31-41.

APPENDIX

QUESTIONNAIRE

We're interested in learning more about the jobs done by supervisory personnel in factories such as this one. In order to do this we're talking to the people who actually do supervisory work--foremen and other management people here at _____. We have a few general questions which we'd like to get your opinions on.

. . . I think you'll find them fairly easy and interesting.

These questions are for research purposes at Michigan State University. No one at ______ will see your answers. They are strictly confidential. The write-up of the study will contain only general information, group averages, etc., and <u>no</u> information about opinions expressed by any one person.

There aren't any right or wrong answers, all we want to do is learn more about supervision by getting your honest opinion. We hope that what we learn here at ______ and at some other companies we're studying will someday help make the job of the supervisor easier by telling us what his needs and problems are.

Are there any questions before we start?

1. First, what is your job here?

2. How long have you held this position?

- 3. What other jobs have you had here before taking this one?
- 4. What are your job duties?

- 5. Do you notice that your department seems to do a better job some times than at other times?
- 6. What do you think accounts for this fact that your department does a better job some times than others?
- 7. What do you consider to be the most important part of your job?
- 8. What things are you most concerned about on your job from day to day? That is, what kinds of things do you find yourself paying attention to or worrying about?
- 9. Which of these things (in 8) would you say is most important?
- 10. Would you tell me briefly, in your own words, how you judge how well your department is doing from day to day?

- 11. In general, how well do you feel your department has been doing during the past several months? Would you say:
 - _____ Very good _____ Good _____ Fair _____ Poor _____ Bad
- 12. What specific things did you consider in deciding how well your department has been doing? We want to know all the different kinds of information you look at when you decide how well your department is doing.

	_
	_
	_
	_

E.	 	 	
F.			
G.		 	
н.	 		
Ι.			
J.			

- 13. Which item, in 12 above, is <u>most important</u> in influencing your decision about how well your department is doing? That is, which one do you consider most heavily? Mark that item with a "l." Now, which one is second? Mark that "2." Number all the rest of the items the same way, according to how important they are in influencing your decision about how well your department is doing.
- 14. Where do you get this information you discussed in the previous question?
- 15. Here are some cards with the names of several of the departments here at ______ on them. I want you to rank the departments according to how well you feel each is doing its job. The department that you feel is doing its job best should be placed at the top, the second best department second from the top, and so on down to the poorest department at the bottom. Remember, how you rank them is confidential, so please put them in the order you really think they belong.

16. What things did you consider in deciding how well the various departments are doing? That is, what different kinds of information did you use when you ranked the departments?

А.	 	 	
В.			
с.			

D.		 	
E.			
F.			
G.			
н.	•		
Ι.			
J.			

- 17. Which item in 16 above was most important in influencing your ranking of the departments? Mark that "1," mark the second most important item "2" etc., until you have numbered all the items according to their importance in deciding how well the departments are doing.
- 18. In judging how well the various departments--including yours--are doing, is there any information you don't have, but would like to have to use in making this ranking? That is, is there other information that you feel would help give you a better idea of how the departments are doing?
- 20. Now, what information do you think _____ uses in making this ranking? That is, what information does he use in deciding how well the departments are doing?

Α.		 	
в.			
С.			
D.			
E.			
 F.			

- 21. Which of the items in 20 do you think ______ feels is most important in determining how well the departments are doing? Which one is 2nd, 3rd, etc.
- 22. Now, please arrange the cards the way you think the average hourly employee who has been here a year or so would arrange them. Put the department the average employee would say is doing best at the top, 2nd next, etc.

23. What kinds of information would the employee use in making this ranking? That is, what things would he consider important in determining how well the departments are doing?

A.	 	
в.		
с.	 	
D.		
Ε.		
F.		

- 24. Which of the items in 23 would the ______ employee consider most important? Mark that "1, " mark the second most important item "2, " etc.
- 25. Of all the departments listed on these cards, which one do you feel is the most difficult assignment for the foreman? That is, which

	department's foreman has the hardest job? Why?
26.	Which department would you prefer to be foreman of, if you had your
	choice of all of them?Why?
27.	In general, how satisfied are you with your job?
	Very satisfied
	Somewhat satisfied
	So-so
	Somewhat dissatisfied
	Very dissatisfied
28.	What are the things about your job you dislike most?
29.	Are there things here that sometimes make it difficult for you to do a
	good job?
	What are they?
30.	(If there are discrepancies between items 12, 16, 20, and 23 discuss
	them with the subject to find out (a) if he recognizes this, (b) how he
	explains it, and (c) what he thinks its implications are.)

THANK YOU FOR YOUR HELP.

Please keep questions confidential.

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