To the Graduate Council:

I am submitting herewith a dissertation written by Douglas Michael Garber entitled "Organizational Leadership, Technological Conditions, and the Effective Performance of Industrial Supervisors." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Organizational Psychology.

John M. Larsen, Jr., Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

B

ORGANIZATIONAL LEADERSHIP, TECHNOLOGICAL CONDITIONS, AND THE EFFECTIVE PERFORMANCE OF INDUSTRIAL SUPERVISORS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Douglas Michael Garber

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ABSTRACT

Field studies of leadership effectiveness have not taken into account the structural and situational differences that affect social influence processes in the formal organization. By taking a "low level" approach to the development of theory, i.e., that relating only to leadership effectiveness in the industrial setting, it was possible to conceptualize the ways in which technology affects (1) the formal structure of the organization, (2) the nature of its administrative and social control processes, and (3) the situational demands upon the foreman and his work group. In this view, leadership is considered to be an integral part of the ongoing organization and is likely to reflect many of the company's unique features. Which supervisory behavior patterns are appropriate to effective task accomplishment depend upon these structural and situational factors. On the other hand, a much more general relationship exists between leader behavior and subordinate satisfaction. Based on this dichotomy, it was possible to develop a multifaceted contingency model of leadership effectiveness for first-line supervisors in the industrial setting.

Three organizations thought to be representative of their technological types (Woodward, 1965) were selected for study. Questionnaires were administered to foremen, their immediate superiors, and their subordinates. All respondents described the control or influence structure of their organization (Tannenbaum, 1968). Subordinates completed the Leader Behavior Description Questionnaire (Stogdill, 1963)

and indicated their degree of job satisfaction (Smith, et al., 1969). Superiors evaluated the overall job performance of foremen and the extent to which they fulfilled various role requirements. Finally, the foremen themselves provided peer nominations of successful job performance along the same performance dimensions, and described the situational variables that affected their work groups (Yukl, 1969). The approach involved testing of hypotheses derived from organization theory and a review of the literature on industrial leadership, in order to determine how technological conditions affect leadership-satisfaction and leadership-performance relationships. Comparative analysis of leadership effectiveness in different types of production systems were carried out and the effects of within-organization situational differences were investigated.

Of immediate interest was the social control structure which was thought to vary according to the type of production system. Predicted rankings based on organization theory suggested that the amount of social control exercised at lower levels in the organization may be less in technologically advanced production systems, and that the existence of large differentials between levels occurred in the mass production firm. Thus it appeared that the nature of the overall production task constrains the amount and distribution of control in the organization. This has serious implications for the study of leadership in more advanced production technologies since less social influence is exercised at the lower levels and the impact of the foreman's behavior on organizational effectiveness may be less than in unit/small batch production systems.

Concerning the leadership-satisfaction relationship, consideration was found to be important regardless of technological, situational or individual differences, thereby confirming the most general finding in the research literature. Additionally, however, it was found that different dimensions of leader behavior contribute additionally to worker satisfaction in unit/small batch and mass production firms. In contrast there were no consistent relations found with respect to performance effectiveness suggesting that different patterns of behavior relate to successful task accomplishment under different technological conditions. However, it did appear in the three companies studied that leadership was more strongly related to performance in the unit/small batch firm than in firms with more advanced production technologies. While the results with respect to performance were not conclusive, the theoretical framework was judged to be adequate for future investigations of leadership effectiveness of supervisors in industrial organizations.

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CHAPTER I

INTRODUCTION

The question of whether a particular leadership style is associated with the success of supervisors remains an important problem in business and industry. There is no scarcity of evidence concerning the relationships between behavior styles of formally appointed leaders and indices of organizational effectiveness. Indeed, the reverse is true; leadership has been one of the most heavily researched areas in the behavioral sciences, yet the collective results have been almost uninterpretable. Historically, psychologists have investigated the personal qualities that characterize the leader (Stogdill, 1948); they have obtained descriptions of leader behavior and related these to a variety of effectiveness measures (Kahn and Katz, 1953; Comrey, Pfiffner, and High, 1954; Stogdill and Coons, 1957); more recently they have concentrated on determining which leadership styles are related to work group performance in different situations (Fiedler, 1967). One effect of this vast accumulation of evidence has been to expose the wide range of variables that define the process of leadership in an organization. Unfortunately, the conflicting results of the various approaches have led to confusion among those who have turned their attention toward the pragmatic implications of leadership research for the practice of industrial management. At this point, a more adequate theoretical base

is needed in order to understand social influence processes in the formal organization.

Statement of the Problem

There are two related questions of overriding importance concerning the problem of leadership in organizations. The first is one that behavioral scientists have been reluctant to ask until quite recently (see Miner, 1973). Does leader behavior make any difference at all with respect to the effective functioning of organizations? It has commonly been assumed that the behavior styles of first-line supervisors are universally important to the accomplishment of both task and maintenance goals in a wide variety of organizational settings. There have been several indications that this is not always the case, especially with respect to task effectiveness. Korman (1966) critically reviewed a number of studies that used the Leader Behavior Description Questionnaire (LBDQ) and found insignificant to moderate results. Apparently the effects of leader behavior upon performance vary considerably from one setting and situation to another. A second review emphasizing organizational factors was presented by Dubin (1965); here the effects of leadership were thought to be more or less important depending on the technological type of organization. For example, there may be some industrial settings where the impact of supervisory style is relatively small. In these cases, foremen and workers may be so rigidly controlled by company policies, control procedures, and job requirements, that leader behavior can have little effect on productivity. From the managerial viewpoint, knowledge of the situations in which leadership

does relate to task accomplishment is essential. Thus, we first need to provide a theoretical framework that indicates when the behavior of first-line supervisors will or will not make a difference in effective functioning of the industrial organization.

The second question concerns the consistency with which certain patterns of leader behavior relate to various measures of organizational effectiveness. Research carried out with the two basic Ohio State dimensions, consideration (C) and initiating structure (IS), has approximated the identification of a primary set of leader behaviors (Anderson, 1966).

> The preponderance of these studies seem to indicate that the high structure-high consideration pattern optimizes more different effectiveness criteria where the low consideration-low structure pattern most often appears least desirable (Fleishman, 1973, p. 31).

Thus the leader who is high on both C and IS has been referred to as being generally most effective; but those who hold this position must also admit many exceptional cases. For instance, Wofford (1967) reviewed a broader range of literature with respect to leader behavior styles and performance effectiveness. Group Achievement Managerial Style was defined in terms of high C-high IS patterns or behavior that was both employee-centered and production-centered. Overall it was concluded that this style was most effective in terms of productivity and morale of the work group, but situational factors for the organization, department, and specific task often resulted in exceptions.

In contrast to the above assessments of the literature, it may be that the pattern of leadership that relates to success is totally unique

for each particular company. Stogdill's comprehensive study (1965) encompassed 27 organizations grouped according to purpose and general type; few similarities were found even within comparable types. He concluded that "the researcher who wishes to speak with a high degree of assurance in regard to his hypotheses about (leader behavior in a formal) organization, should not study more than one organization" (Stogdill, 1965, p. 48). While organizational variation does seem to be the rule rather than the exception, the implication that behavior-success relationships in similar kinds of organizations (e.g., manufacturing) are totally unique is overly pessimistic. Rather, it is likely that the relevant aspects of industrial organizations which influence these relationships have not yet been identified. In this respect, Yukl's recent assessment of the "state of the art" in the behavioral approach to leadership (1971) would support the position that there is some middle ground between (1) the view that the high C-high IS pattern is universally desirable and (2) the view that the pattern of effective leadership is unique and that each organization must be analyzed separately. Therefore, the theory of organizational leadership to be developed here is applicable only to the industrial setting, but it does suggest that there are definable patterns of successful leader behavior for different types of manufacturing organizations.

Given the failure to take account of organizational factors and the lack of situational emphasis in many behavioral leadership studies, it is quite possible that a number of "off-quadrant" findings can be

explained by extending such a "low-level" model based on organization theory.

> What is needed in future concurrent studies is not just recognition of this factor "situational determinants" but rather a systematic conceptualization of situational variance as it might relate to leadership behavior (Korman, 1966, p. 355).

Although patterns of leader behavior have been found to be stable across time within particular leader-group situations (Fleishman, 1973), there remains a need to conceptualize the situational variance as it is embedded in the larger organizational context, and to determine how this affects the operation of consideration, initiating structure, and other dimensions of leadership. Characteristics of the organization itself such as the nature of the overall production task, structure, control processes, and role expectations are most likely to be useful in this respect. Sociologists have made advances in the study of structural variables and control mechanisms that emerge in various types of production systems; both Woodward (1965) and Perrow (1967) have suggested a technology-structure-behavior interrelationship, and the study of these linkages provides a means of examining how the nature of the leadership "situation" varies from one organization to another. As an organizational phenomenon, leadership is increasingly being studied in terms of its structural and situational effects (Hollander, 1971), but "there has been as yet little or no research on the kinds of environmental variables which would affect the effectiveness of differing patterns of C and IS" (Korman, 1971, p. 128).

Purpose of the Study

In recent years, social scientists have become interested in how behavior varies according to technology and organization structure. The modern structuralist viewpoint that has emerged is defined as the fusion of classical management and human relations perspectives where the organization is described as an open system interacting with its environment (Tausky, 1970). Closely associated with these conceptual advances has been the more frequent use of comparative methodologies, a significant development in recent field studies of organizations. Here the unit of analysis is the organization as a whole, and comparisons are made between a number of entities that differ along some global dimension such as technology. Rather than attempting to specify the "one best way" to organize and manage all work,

> what is needed is a scientific, descriptive theory of organization which spells out the relationships among given dependent variables (like man-hour productivity or satisfaction with supervision) and various independent variables (typically organizational characteristics or practices), under various situational conditions or parameters (such as the personalities of the participants or the production technology) (Katzell, 1962, p. 104).

It would seem that organizational leadership should be approached within this framework of contrasting systems of work organization.

The now classic case studies of Joan Woodward (1958, 1965) have contributed substantially to the development of organization theory by suggesting that formal structure and internal characteristics of industrial firms vary with technology. The early study concentrated on the formal attributes of organizational structure and authority relationships, while the later one developed findings relevant to

social structure and organizational processes. In her final work, Industrial Organization: Behavior and Control (1970), it was proposed that this approach be extended to encompass the technology-structure-behavior interrelationship, where attributes of the control system were designated as the primary variables intervening between technology of the organization and social processes within it. It is important to note that this formulation was heavily influenced by a model developed by Perrow (1967) where it was also maintained that technology is the most adequate basis for investigating the structure and functioning of organizations. This model offered a somewhat more parsimonious definition of technology and suggested more explicitly how the nature of the production task affected the intervening variables. While the emphasis to date has been on understanding differences in organizations per se, further developments using this type of analysis may also prove useful for conceptualizing structural and situational differences as they might affect behavior patterns in a particular organization. In the following section, concepts and definitions are presented with reference to these important developments, and in some sense are grounded in organization theory.

Why should technological conditions affect the leadership style that is appropriate to success in manufacturing organizations? Several studies have indicated that technological variables influence the goals and structure of the organization (Blauner, 1964; Woodward, 1965; Harvey, 1968), the nature of its managerial control systems (Burack, 1967a; Reeves and Woodward, 1970), the task-related interactions of middle and

lower-level managers (Perrow, 1967), the role requirements of supervisors (Yanouzas, 1964; Burack, 1967b), and employee behavior and attitudes in the work group (Walker, 1957; Sayles, 1958; Mann and Hoffman, 1960; Chadwick-Jones, 1969; Meissner, 1969). There is little doubt that the above covariates of technology are important in structuring the environment and situation in which social influence processes occur. Moreover, the Tavistock studies have suggested a high degree of interdependence between the technical and social subsystems. Although the effects of technology permeate nearly every aspect of work organizations, few attempts have been made to determine which patterns of leader behavior are appropriate to successful supervision under differing technological conditions. The complex interactions between technology and social influence processes are not yet well understood, but it seems that the structure of the organization and the behavior of work group members are substantially affected by the nature of the technology employed, both in the sense of systems of work (the level of the organization) and physical equipment (the work group level). What is required at this point is the identification of relevant variables and clarification of the multiple linkages between technology and leadership in the formal organization; this is attempted in the remainder of Chapter I.

Utilizing Woodward's classification scheme, Dubin (1965) incorporated the results of several lower-level empirical studies into a coherent framework relating technology, leader behavior, and productivity. His review not only points out some of the limitations of a

purely human relations approach to the problem of leadership, but also suggests a means of dealing with the troublesome situational variance. That is, the nature of the leadership situation varies between different types of industrial organizations, and whether or not leader behaviors will be related to productivity depends upon the kind of system under study. Analytically, the central problem in the study of organizational leadership is to determine under what conditions patterns of leader behavior become predictable, and how these patterns are related to several measures of effectiveness. By expanding Dubin's approach to include additional criteria (rated proficiency and worker satisfaction) a "middle-range" theory of industrial leadership may be developed encompassing production systems which are differentially affected by technology. In Chapter II, the nature of organizational leadership is explored and a model presented relating supervisory behavior styles and three criteria of effectiveness under varying technology conditions.

As Dubin (1965) has already suggested, leader behaviors may be more important in achieving high levels of productivity in the "low technology" condition and is relatively less important in advanced production systems. However, the present investigation focuses on supervisory proficiency, i.e., the extent to which role requirements are fulfilled. In production systems that vary according to technology, the expectation is not that the patterns of effective leadership will be the same, but rather that a different "leadership mix" will be related to success in each setting. Therefore, conceptualization of technology at the level of the organization may prove useful in

reconciling some discrepancies in previous leadership research. A review of the literature in this framework (Chapter III) suggests that behavior-success relationships are not totally random phenomena, nor can they be attributed only to individual characteristics of supervisors and situational factors within the work group. Rather leadership orientation should be treated as a property of role set which has both technological and organizational preconditions (Rossel, 1970).

In summary, an integrative theory of organizational leadership will require: (1) a definition of terms and some initial steps toward the development of a contingency view (Chapter I), (2) an assessment of the linkages between technology and social influence processes, and the development of an analytical model showing how technology relates to leadership at the level of the work group (Chapter II), and (3) a review of previous leadership research within the framework of organization theory (Chapter III). Following this attempt to synthesize diverse literatures, the fourth chapter describes the methodology employed in a three company study of organizational leadership carried out from July to December, 1972. The most general hypotheses concern a differential prediction for correlations between leadership and successful performance; these are thought to depend upon the setting and situation. On the other hand, the leadership-satisfaction relationships were expected to be quite general. Results of this investigation are analyzed in Chapter V and the implications for further research are presented in the final chapter.

Definition of Terms

The application of several theoretical viewpoints to the problem of organizational leadership will necessarily result in a multiplicity of terms which overlap to some degree, but are not equivalent. Where important concepts have accumulated a surplus of specific meanings, theory building becomes difficult. The semantic difficulty is compounded by the fact that the sociological and psychological literatures have been compartmentalized; each abstracts from the complex reality of organizational functioning somewhat different relationships between social processes and effectiveness. In general terms, sociologists have made important contributions in the study of organization structure, control processes, and social roles, but often have made crude assumptions about individual differences and motivation (Pugh, 1966). On the other hand, psychologists have extensively studied leader traits and behaviors, sometimes neglecting structural and role differences that are equally important in understanding leadership in the formal organization (Whyte, 1969). A brief overview of terms may be helpful at this point in order to suggest the wide range of concepts that apply to the present study and to provide a common frame of reference.

Broadly construed, technology refers to "direct problem-solving inventions" (Leavitt, 1965). It consists of equipment, machines, and tools, sets of activities, methods, and processes, and the layout, arrangement, and sequencing of work; in this sense it has to do with both the physical means and the programs utilized to get the job done (Litterer, 1973). Given the broad multidimensional character of

technology, it is not surprising that several competing theoretical formulations exist. In fact, elaboration of theory has largely outstripped the development of adequate measurement methods; seemingly little agreement is found concerning which aspects of technology are most suitable for the development of a general taxonomy, nor has there been much empirical evidence to support any particular approach (Taylor, 1970). In spite of this, the various conceptions of technology have contributed immensely to the development of organization theory. The first major breakthrough in this area was a classification scheme proposed by Woodward (1958). It was based on the predominant type or form of production which included three basic modes: (1) unit/small batch production, (2) large batch/mass production, and (3) continuous process production. Each of these will now be considered briefly in turn.

Unit/small batch systems are often referred to as "job shop" production operations. These involve either producing a completely customized product, the oldest historically, or producing a special order to meet customer specifications. The production lot size is typically small and the layout oftentimes consists of rather unsophisticated general purpose equipment that can accommodate considerable variation in the process. In Perrow's scheme (1967) this type of system represents an intermediate degree of routineness in the nature of the work itself, since a larger number of exceptional cases are encountered in the manufacturing process, but standardized techniques are available for dealing with this variability. Examples might include the production of tailor-made suits (unit) or a firm that produces a wide variety of specialized electrical items (small batch).

Secondly, the large batch/mass production category is sometimes called "intermittent manufacturing" and is characterized by the production of a fewer, more highly standardized items. Because of the relatively large demand for these items, individual components are mass-produced for inventory and production runs are quite large. The components can be assembled into several configurations, each representing a separate model in the product line. In comparison with unit/small batch systems, however, it seems that volume is greater and considerable product homogeneity exists. The layout consists of more highly mechanized, special purpose equipment that is arranged in order of manufacturing sequence. Again with respect to Perrow's model, the techniques of production are more highly standardized and the nature of the task is routine. The mass production of televisions or automobiles using assembly lines might be taken as examples.

Finally, continuous process systems produce extremely large quantities of a single, relatively uniform product. Here the demand for output is high and stable, thus enabling large production runs in anticipation of requirements. Equipment and machinery are the most highly specialized and complex, this type of system being particularly amenable to both high levels of mechanization and automation. Perrow classified this type of operation as being extremely routine in the nature of tasks performed since very few exceptional cases are encountered in production, and techniques have been highly rationalized and prescribed. The processing of oil and chemicals are most frequently cited as examples.

Given this overview of how technology can be used to classify different kinds of production systems, it is suggested that the organization's structure and processes vary meaningfully between systems. In general terms:

> Structure refers to the arrangements of a system's subsystems and components in social-psychological and physical space. Here we are concerned mainly with those characteristics that tend to remain constant over time. Such structural characteristics tend to deal with distinctions associated with shape, pattern, number of components or description of other constituent materials that are basic aspects of the system (Indik, 1968, p. 5).

Thus structural variables include both the formal characteristics of organizations such as size, shape, number of hierarchical levels, and span of control, and also the nature of the authority relationships and communications patterns describing the social system. In contrast, process variables are those which tend to "maintain the system in a steady state, or deal with the adjustment processes that are mobilized to maintain those steady states" (Indik, 1968, p. 5). While there are a number of adaptive mechanisms within the system, control processes seem to be the most important type in the industrial setting. There are two types of organizational process variables that are especially important, administrative control and social control. Administrative control refers to the formal managerial process of establishing rational production standards, measuring performance and monitoring outcomes, and taking corrective action. In contrast, social control has to do with the informal processes by which individuals or groups influence each other within the organizational setting. When Woodward sorted 100 manufacturing firms into the three basic modes mentioned earlier,

certain regularities in organization structure, managerial processes (most notably the administrative control function), and other intra-organizational phenomena were noted. That is not to say that technology determines these structure and process variables, rather certain constraints are placed on how both of these aspects vary.

Most importantly, the work organization is a socio-technical system that contains a number of groups, working together in order to accomplish organizational objectives. The nature of the specific work operations affects several situational variables that impinge upon the work group and its supervisor. These include size of the group, the difficulty and structure of the task, the cooperation requirements for members, the degree of pressure for production, and the discretion and power of the leader. As we examine unit/small batch, large batch/mass production, and continuous process systems, it would be expected that these situational factors vary in certain directions. For example as we shall see, an assembly-line technology may have large groups working on relatively easy but highly structured tasks, who are under considerable pressure for production from outside sources. Exactly how each of these variables differs from one type of system to the other is not entirely clear, but the nature of the overall production task provides the organizational framework for conceptualizing how these might actually fluctuate.

Finally, the role of the first-line supervisor is also likely to be different across the broad range of technology. The concept of role relates to the activities and functions of an individual who

occupies a particular position in the larger system. Formal role prescriptions are statements of expectations that certain kinds of behaviors should be engaged in, such that tasks are accomplished effectively. These are also thought to be influenced by the organization's structure and arrangements for getting work done (at the level of the organization) as well as by the nature of the task-related situational variables at the level of the work group. In various "low technology" production systems certain patterns of leader behavior may be required to fulfill these role requirements, while in more technically advanced systems leadership behavior itself may be somewhat less important in meeting requirements of the foreman's role.

If indeed there has been a convergence in organization theory, it focuses upon the concepts of structure and role requirements (Hickson, 1966). Here it has been suggested that operations technology is the best means for understanding and dealing with both of these phenomena. Given this brief overview of terms, it is now possible to sketch out a general contingency view of leadership effectiveness which will be extended and made more explicit in Chapter II.

Towards a Contingency View

The study of leadership phenomena originated with psychological investigations of personality characteristics or traits that made a person the leader. In the trait approach, there was a tendency to think that leadership is something that resides in the individual's make-up and would be likely to produce the same results in any situation. When it became evident that this conception was not particularly fruitful

(Stogdill, 1948), the situational or group dynamics approach became the primary framework for investigation. Here the focus was on leader-follower relationships in different situations, whereby influence processes were shown to be greatly affected by group structure and the nature of the task itself (Hollander and Julian, 1969). Thus leadership has come to be viewed as a property of interactions between members of a small group, where the emergent leader plays a central role in attaining final outcomes.

Fiedler's contingency model (1967) represented a further contribution to understanding the situational nature of leadership effectiveness; combining the above two approaches, it was suggested that good work group performance depends upon the structural properties of the group and situation as they interact with individual differences in leader traits. However, the situational variables (i.e., task structure, leader-member relations, and position power) were defined largely as they existed within the small group itself rather than in the context of the larger organizational setting. In its present form at least, the evidence for the contingency model is not totally convincing (Graen, Alvares, Orris, and Martella, 1970; Mitchell, Biglan, Oncken, and Fiedler, 1970). "Only task structure has emerged as an important situational determinant . . . and it appears likely that other situational factors, not incorporated in the Fiedler model, are also important sources of contingency" (Miner, 1973, p. 341). In contrast, the concept of organizational leadership stresses that both the role of the leader and behavior of work group members are affected by a broader

range of situational variables that are defined in terms of the organization's overall production task.

In a laboratory setting, the group itself constitutes the organization, representing a considerably less complex situation than the permanent work group operating in a structured, functional environment. Stogdill foresaw the need to define leadership as an organizational phenomenon as well as an attribute of individuals and groups, since "the minimal conditions that permit the existence of leadership are exactly the same variables that define the organization" (1951, p. 136). Viewed as a system of interacting variables within the formal organization structure, the traditional "group process" definition was expanded to include the concepts of formal role differentiation and function.

> Leadership exists only in so far as individuals, as members of organizations, are differentiated as to the influence that they exert upon the organization; and the leadership influence of any one member will be determined to a large degree by the total leadership structure of the organization. It is for this reason that leadership has been here defined in terms of influence upon the activities of the organization, rather than in terms of influence upon persons (Stogdill, 1950, p. 12).

Similarly, Bavelas (1960) noted that leadership might be considered either a personal quality, or alternatively, an organizational function; while both aspects are essential to understanding the nature of social influence processes, it appears that the former has received a disproportionate amount of attention in the psychological literature.

There are several compelling reasons why organization theory should be brought to bear on the problem of leadership. The organization itself represents a structuring of events and activities, some of

which are repeatable and predictable, and others which are particular to a certain setting. Since the term "organization" implies a patterning of variables, one of which is leadership, it may not be possible to study the process of social influence in a field setting without relating it to the larger organizational context (Argyris, 1961). Also, the nature of leadership in an industrial organization may be determined as much by its structural characteristics and the role requirements of the supervisory positions as by individual differences in leader traits and behaviors.

> In fact, organizational leadership, like other cases of the exertion of influence in complex social settings, is always a combined function of the social-structural factors and the particular characteristics of the individuals making up the structure. And yet, the social-psychological literature has been strangely silent in describing the operation of leadership processes in the real world, i.e., within social systems; the literature on leadership has a disembodied, non-organizational quality (Katz and Kahn, 1966, p. 308).

Therefore, organization theory will be useful in so far as it delimits the large number of possible structural and situational variables that impinge upon leadership processes in the industrial setting.

In work organizations, the patterns of leader behavior that relate to effective performance may be expected to vary:

1. between organizations of different purpose or function;
2. between different types of manufacturing organizations, especially where the nature of the overall production task and methods of controlling operations are substantially different;

3. as a function of vertical task structure between higher and lower levels of the same organization; and
4. as a function of horizontal task structure between diverse subunits of the same organization.

The reason is similar in each instance. It seems that the nature of the supervisory role is very different under each of the above conditions, and how leader behaviors are related to organizational effectiveness may depend upon the degree to which these behaviors match specific role requirements. An overview of each of these sources of contingency is presented which provides the appropriate perspective for the major theoretical development contained in Chapter II.

Across the broad spectrum of organizations that have come under study, it appears that the requisite kinds of leadership are indeed quite different. For example, Etzioni (1965) has suggested that different degrees of instrumental and expressive leadership will be required to obtain compliance of members in coercive (prisons), utilitarian (industrial firms), and normative (religious) organizations. "Different kinds of supervisory behaviors are effective because they are suited to special kinds of organizations" (Dubin, 1965, p. 3). A similar distinction is present in the Ohio State research. In one military situation, successful leaders exhibited a high degree of initiating structure and low consideration (Halpin and Winer, 1957); in contrast, the most proficient educational administrators were higher than average on both variables (Hemphill, 1955). These two studies suggest that the relative emphasis on the basic dimensions of leader behavior depends,

in part, on the goals and purpose of the organization (Shartle, 1960). As a result, it would not be expected that similar kinds of leader behaviors fulfill supervisory role requirements in organizations that differ drastically with respect to purpose and function.

Analagous to this line of reasoning, organizations of a similar purpose such as manufacturing will also differ substantially with respect to the nature of the overall production task and they can be classified on this basis. To the extent that the supervisory role is different in each type of production system, differences in leadership-success relationships will be predicted. Stogdill (1965) provides the only investigation utilizing a number of different types of manufacturing firms that approximate the desired technological classification. While supervisory consideration was found to be related to employee job satisfaction in all 15 industrial firms, the results with respect to task accomplishment were largely nonexistent (in only two firms were there significant correlations with group productivity). In the present analysis, the expectation is not that similarities would exist, but that the results with respect to performance would depend upon the type of system under study. What did seem surprising in Stogdill's findings was the lack of consistent relationships within groupings that approximated different technological types (i.e., metals, textiles, chemicals). However as we shall see, this evidence is not totally inconsistent with the notion developed in the next chapter, i.e., that leader behaviors are relatively less important for attaining productivity in advanced production systems. Nevertheless, it is maintained that differences

between organizations must be taken into account in order to understand how leader behaviors fulfill various role requirements in contrasting industrial systems of work organization.

Also related to the nature of the overall production task, there are two types of "within-organization" contingency variables: vertical and horizontal task structure. Concerning the former, Katz and Kahn (1966) have pointed out that organizational leadership functions are distributed across hierarchical positions with top, middle, and lower-level managers having different demands placed upon them. It appears that hierarchical level in the organization is one variable that affects which leader behavior patterns will be related to successful performance. Although the evidence concerning this issue is yet fragmentary, Nealy and Fiedler (1968) have documented the

> shift in research emphasis from the group to the organization as the unit of analysis, and from the study of managerial personality to the study of managerial functions as a means of identifying at each organizational level the combination of leadership and situational factors conducive to organizational performance (p. 313).

In this respect, Mann (1965) proposed the "skill mix" concept based on several studies carried out at the University of Michigan. He inferred that the success of first-line supervisor was a function of his human relations and technical skills, but at higher levels in the organization, administrative skills became more important and technical skills less important. Similarly, Nealy and Blood (1968) examined leadership effectiveness at the first two levels of supervision in a veteran's hospital; they found that both consideration and initiating structure were related to success at the first level, but the most successful

second level supervisors were described as having a high C-low IS style. These studies provide tentative support for the interpretation that task demands on leaders at various levels are different and we may expect different behavior patterns to be effective.

Consequently, the way in which managerial functions are distributed between middle and lower hierarchical levels is an important concern in determining the nature of the "situation" in the study of supervisory leadership.

> In order to understand leadership as a process of organization rather than simply a personal characteristic or process within a group, it must be known what critical functions are performed at each level and how these functions interrelate (Nealy and Fiedler, 1968, p. 319).

Perrow (1967) has suggested that the distribution of lower-level managerial functions varies meaningfully with the nature of the production task, and for purposes of the present study, his model may be useful for conceptualizing technical-structural effects upon the leadership role of the first-line supervisor in different types of production systems (see p. 44). Hence it is suggested that hierarchical level is a possible contingency variable and that the nature of the production task may affect the distribution of managerial functions across these levels.

Patterns of effective leadership also vary with respect to horizontal task structure; where a number of specialized subunits exist it is likely that the major dimensions of leadership will show somewhat different relationships with success. Some manufacturing firms characteristically include a number of such specialized subunits, but the extent of differentiation may depend upon the degree of environmental

uncertainty (Lawrence and Lorsch, 1967). When the nature of the task and function performed differ substantially from others in the organization, such as in certain peripheral subunits, the effective leader may engage in behavior patterns different from those found to be effective in other parts of the organization. For example in research and development laboratories, Baumgartel (1957) found that a task-relevant, democratic style led to increased motivation among workers. Similarly, a high degree of participation (i.e., freedom of action) has often resulted in higher performance on innovative, unstructured tasks (Andrews and Farris, 1967). For this type of task and setting, it has also been pointed out that initiating structure is positively related to subordinate satisfaction (House, Filley and Kerr, 1971) rather than negatively as found in studies dealing with production workers. Furthermore, even smaller differences in horizontal task structure may account for the existence of separate "leadership climates" in apparently similar units of a large organization. Fleishman, Harris, and Burtt (1955) found striking differences in leader behavior patterns of foremen in production and nonproduction units, suggesting the importance of this variable for understanding the nature of the leadership situation.

> Especially in the industrial situation there seems to be a need to study the group and its leader as a subgroup of the larger organizational framework. For example, how the industrial supervisor leads his group may be a function not only of his own behavior tendencies and characteristics of his group, but also of the total leadership situation and value system in that particular leadership hierarchy. The existence of his group within a larger organization implies fixed expectations of the leader on the part of his superior as well as his followers and peers (French, 1970, p. 15).

Technology (i.e., the characteristics of the overall production task) may well be the most adequate basis for distinguishing between different types of organizations. Only very recently has integrative theory building proceeded at a rapid pace "especially regarding the appreciation of technology as a main basis for differentiating organizational varieties and explaining organizational processes" (Hunt, 1970, p. 235). This permits categorization of manufacturing organizations such that each subset represents a more homogeneous patterning of variables than such organizations in general. Structure, processes, and behavior are thought to vary less widely within each type of production system. For a particular setting, technology is also thought to constrain the way in which managerial functions are distributed across hierarchical levels (vertical task structure), as well as the number of highly differentiated subunits (horizontal task structure). It has been suggested that these two variables are also possible sources of contingency as they affect the nature of the supervisory role and situational variables in the work group.

In moving towards a contingency view it has been suggested that technology-organization relationships are important in defining patterns or configurations of variables as they affect leadership processes. A broad conceptual view of how the situational variance is embedded in the larger organizational context has been suggested. Thus the outcome of the theoretical model presented in the following chapter will not be an approved pattern of successful leadership, but rather a defined network of relationships among phenomena that permits one to understand how

leader behavior relates to performance effectiveness under varying technological conditions.

CHAPTER II

TECHNOLOGY AND ORGANIZATIONAL LEADERSHIP

In order to deal with the problem of how leader behaviors relate to organizational effectiveness in different types of production systems, it will first be necessary to classify the essential variables and to indicate their interrelationships. Within this framework it will be possible to condense and clarify a diverse, elaborate literature concerning technology, structure, and control at the level of the organization. Having provided a scheme for showing how the nature of the situation is embedded in the larger context of the organization and how it varies from one technological type to another, a model is presented showing how leader behavior relates to satisfaction, productivity, and proficiency at the level of the work group.

Classification of Variables

Adding organizational dimensions to the investigation of leadership processes poses some difficult conceptual problems. Indik (1968) developed a comprehensive taxonomy that may be used to identify broad classes of variables relevant to the present analysis and to suggest how these variables interrelate. The major categories included four levels of analysis: the individual, group, organization, and organizational context variables. Also incorporated was the previously mentioned distinction between structure and process variables; it will be recalled that the former refers primarily to the formal aspects of

the organization that are relatively fixed and unchanging, while the latter concerns adaptive mechanisms that enable an organization to maintain equilibrium. Figure 1 illustrates the relationships between the seven categories (panels I-VII).

Here technology can be viewed as an organizational context variable (VII) which at the level of the organization affects both formal structure and control processes (I and II) as well as structural-situational variables and influence processes (III and IV) at the level of the work group. It can be seen that the impact of technology is multidirectional. That is, salient aspects of the overall production task influence the way in which the system is structured (I) and methods for controlling operations (II). Likewise, the nature of the task performed in the sense of physical equipment, methods, and layout affect situational factors at the level of the work group (III) and the nature of the supervisor's role in the socio-technical system (IV).

> The relationship between technology and behavior, therefore, can be studied at two levels, by examining the constraints placed upon the behavior of those individuals who come into direct contact with the technology of the organization; and by looking at those salient features of the technology which limit the structure of the total organization to a greater or lesser degree (Reeves, Turner, and Woodward, 1970, p. 5).

The work groups and their supervisors occupy a unique position in the manufacturing organization since not only are they affected directly by machines and workflow, but they also are subject to the indirect impact of the organizational-structural manifestations of the system's production technology. The following sections serve to describe relevant concepts and provide the needed focus on theory by tracing the

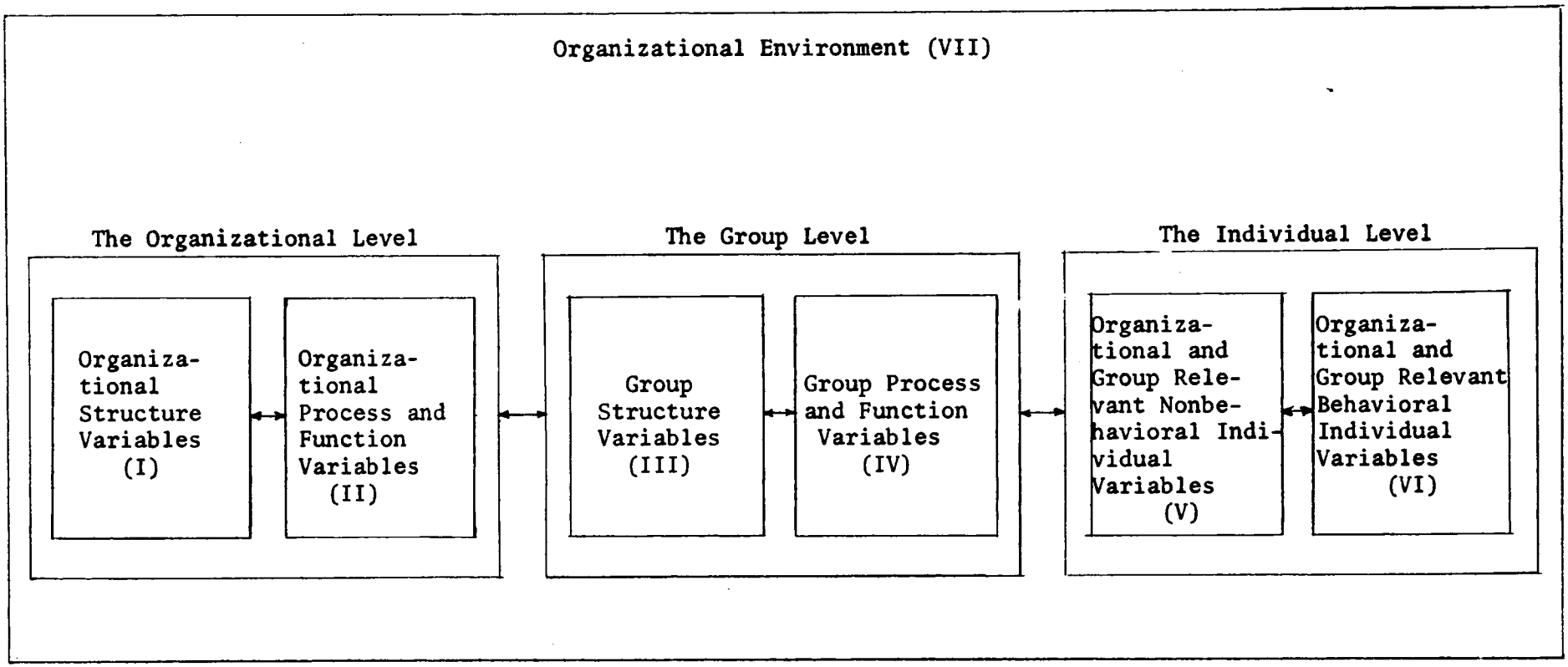


Figure 1. Classification of variables by level of analysis and structure vs. process (Indik, 1968).

linkages between technology and organization structure, control processes, and the nature of the supervisory role in different types of production systems.

Technology

The variety of typologies dealing with technology include: (1) Woodward's form of production (1958) which was developed specifically for manufacturing firms; (2) systems based on standardization of techniques and/or materials (Thompson, 1967; Perrow, 1967) or standardization of product (Harvey, 1968); and (3) still others dealing with the sophistication of the production hardware itself (Bright, 1958) or with both equipment and sequencing of operations (Burack, 1967; Hickson, Pugh, and Pheysey, 1969). Only a few of these will be examined, however, since most have been considered in detail elsewhere (see Taylor, 1970). The primary concern is to assess technology as a multidimensional organization context variable as described above. In contrast, several other studies (Sayles, 1958; Blauner, 1964; Meissner, 1969; Shepard, 1971) have dealt with the impact of technology on the behavior and attitudes of individuals in the small face-to-face group. In the latter cases, complex relationships for the organization as a whole have been deemphasized. It seems that the most important advances in organization theory have resulted from investigating the cumulative structural and situational effects of the system's production technology.

The production systems of manufacturing organizations are characterized by repetitive cycles of input, transformation, and output that interact dynamically with environmental factors (Katz and Kahn,

1966). Technological complexity of the system can be indexed, therefore, in terms of raw material (input), techniques and equipment (throughput), or product (output). Nearly all conceptions of organizational technology deal explicitly with the transformation process itself, defined most generally as the techniques used in conversion. Hickson, Pugh, and Pheysey (1969) have presented a convenient three-part classification in which the throughput or "operations technology" is more carefully specified as "equipping and sequencing of activities in the work flow" (p. 380). In addition, "materials technology" referred to the response required to accommodate variability in the inputs or objects transformed (Perrow, 1967; Thompson, 1967). The third subconcept was "knowledge technology," also derived from Perrow's analysis, which concerned the availability of standard problem-solving methods to deal with the combined effects of environmental-process uncertainty. While the above emphasis on process and input dimensions seems to be justified, it is also possible to gauge the technological complexity of the system in terms of standardization of product (Harvey, 1968).

> It must be evident that input and output systems, as well as throughput systems, can be described in terms of the processes or technologies by which they are implemented. That is, operations by which inputs--raw materials--are introduced into a system describe a technology, and the same is true on the output (product) side. This fact, plus the other consideration that conversion processes in an organization must be relative to the input and output to and from the system . . . strongly suggest that the input-conversion-output cycle represents a single, basic technological sequence or organizational substrate (Hunt, 1970, p. 240).

For purposes of the present study, Woodward's classification scheme can be used to relate several competing theoretical positions concerning

organizational technology as it applies to the industrial setting. Recall the three basic technological types that were described previously: unit/small batch, large batch/mass production, and continuous process systems. These categories were intended to represent a quasi-ordinal scale of "technical complexity," the latter term being designated as "the extent to which the production process is controllable and its results predictable" (1958, p. 12). Thus the production of single units to meet customer requirements is "the oldest and simplest form of manufacture," mass production of goods being more technically complex, and continuous process production "the most advanced and the most complicated (1965, p. 40). In systems terminology it seems that Woodward's scale of technical complexity actually represented a composite of both throughput dimensions (i.e., sophistication of equipment and layout of work) and output dimensions (i.e., production lot size and type of customer order). While the approach has sometimes been criticized on the basis of its imprecise definition of technology, it remains extremely useful for classification purposes--separating manufacturing organizations into groups which have similar structural characteristics and like intra-organizational processes. This basis for classification remains particularly appealing because (1) the categories are analagous to a standard industrial engineering scheme, (2) the more advanced systems have a greater likelihood of employing higher levels of mechanization and/or automation, (3) increasing throughput complexity (more sophisticated operations technology) does seem to result in greater control over the physical limitations of the production process, and (4) interrelationships

with the environment (at least with respect to output dimensions) are evident, suggesting that technology is a complex organization context variable.

Applicable to manufacturing and service organizations alike, Perrow (1967) developed a model which included two relevant technological dimensions: (1) whether the raw material is perceived as uniform and stable or nonuniform and unstable, and (2) whether problems are amenable to logical analysis or require difficult nonprogrammable analysis. The resulting fourfold classification is illustrated in Figure 2, showing the difference between routine and nonroutine technologies with the appropriate industrial examples. Where the number of exceptional cases encountered in production is disproportionately large and problems cannot be analyzed on a logical, systematic basis, the technology is classified as being nonroutine (cell 2). A research and development operation would be an example of such work activities. People working in engineering firms (cell 3) are also faced with a large number of exceptional cases, but because of the existing knowledge technology, problems can be attacked more systematically using standard sets of procedures. Development of prototypes is given as an example of this intermediate degree of work routineness. In routine technologies (cell 4), there is little variation in the raw material (cases processed), and procedures for dealing with problems in production have been highly developed. Here continuous process operations represent extremely routinized work activities. In this model, the highest frequency of industrial operations would be located in cells 3 and 4; within this range there is substantial overlap

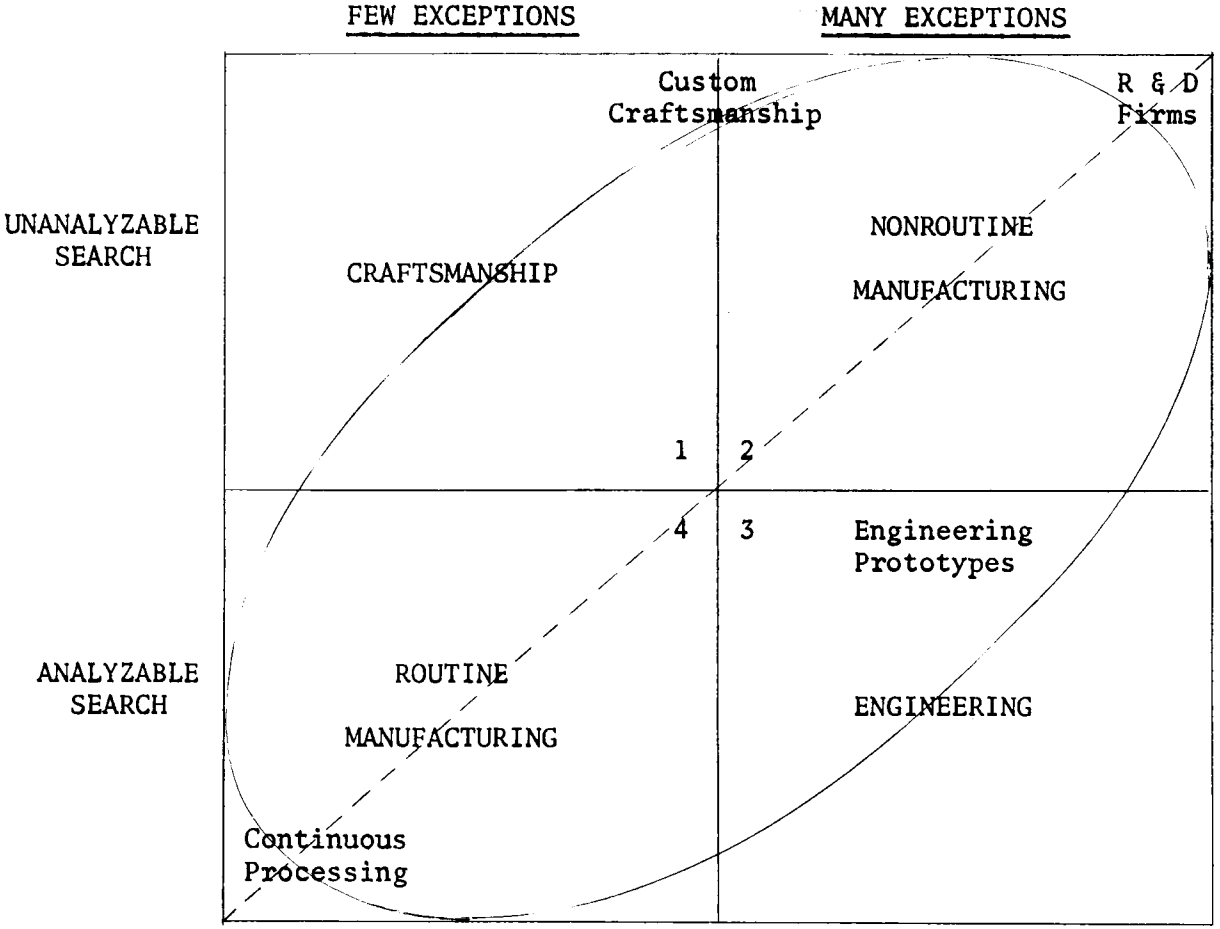


Figure 2. Perrow's model (1970).

with the approach of Woodward, but as we have seen, the basis for classification is quite different. Here variability in the raw materials or cases processed is an input dimension and standardization of techniques is a throughput dimension; in combination these can be used to distinguish between the technologies of different organizations.

In comparison, organizational technology has been described in Woodward's view as a composite of variables that distinguish one generic type of manufacturing organization from another, and according to Perrow's model, in terms of two critical technological variables that reflect a basic difference in the nature of the production task--whether the individual's work is routine or nonroutine. These studies have substantial relevance for one another since the former starts with the production system as a whole and the latter with the work performed, but both suggest that structure and processes of the organization will be affected by the nature of the technology employed. Reference is made to two current reviews of the literature on technology and organization which utilize "system complexity" (Hunt, 1970) and "predictability of operations" (Mohr, 1971) thereby showing a high degree of overlap in the development of various theoretical formulations. Technology does seem to be the most adequate basis for classifying organizations, and the fact that linkages between technology structure, and behavior can be traced downward from the system or upward from the nature of the individual's task suggests a convergence in theory.

The previous analysis can now be applied directly in classifying the three field settings contained in the present investigation

(Companies A, B, and C). Figure 3 shows this cross-classification with respect to the Woodward, Perrow, and several other technological models. Company A was an aerospace electronics department which engineered and produced a variety of sophisticated electronics equipment. A very large proportion of its business was military defense contracting. This firm represented the unit/small batch category since most products were made to customer order and these were often in relatively small production lot sizes. Although some work groups produced components in large batches, these operations involved small group manufacture rather than assembly lines. It was clear that the engineering layout was best described as being a "job shop." Further, Company B was involved in the production of a limited number of commercial electronics products such as televisions and stereos. This firm represented the mass-production category since large quantities of standard items were produced. Operations were arranged in a product-line layout (i.e., a separate assembly line for each product), and the great majority of jobs involved short-cycle, repetitive assembly work that was machine-paced by a conveyor. Finally, Company C was a major producer of aluminum, and the electrolytic smelting operation appeared to be a good example of continuous process technology in general. Here a quite uniform product (aluminum ingots) was made in extremely large quantities. Very highly sophisticated materials handling equipment and machinery were employed in these operations as is typical of this form of production.

These three firms can also be classified according to Perrow's model. The predominantly small batch firm (A) would be classified as an

Company	Woodward (1965)	Perrow (1967)	Harvey (1968)	Burack (1967a)	Hickson et al. (1969)
A defense contracting and aerospace electronics	predominantly small batch, some large batch	Cell 3, engineering: large number of exceptional cases	technically diffuse	highly intermittent flow	operations technology: low knowledge technology: high
B consumer electronic products	mass-production assembly line	Cell 4, routine: only moderate number of exceptions	intermediate	intermittent flow	operations technology: moderate knowledge technology: low
C production of aluminum	continuous process	Cell 4, routine: few exceptional cases	technically specific	old: quasi-process, high new: process	operations technology: old: high new: higher knowledge technology: old: medium new: medium

Figure 3. Classification of field settings by type of production system.

engineering firm having many exceptional cases. Oftentimes additional manufacturing development activity was required on contracts prior to production; in such an integrated design-production process, a relatively large number of exceptional cases would be encountered as a result of adapting conversion techniques to meet contract specifications. Thus Company A would be classified as a technology of intermediate routineness (cell 3) within the broader scheme. In the mass production category (B), however, techniques were specified in advance using industrial engineering methods and fewer exceptional cases would be found. The variability that did exist involved model changeovers--i.e., substitution of another production program using a different configuration of the same inputs (cell 4). In the continuous process category (C), techniques were largely prespecified at the design stage and were built into the machinery itself. Also, inputs such as processed aluminum ore were also very highly standardized and easily accommodated, an example of even higher work routineness within cell 4. Thus it has been possible to cross-classify the 3 companies according to the major models of technology described previously.

Other models of technology outlined in Figure 3 provide additional bases for comparison. Harvey (1968) modified Woodward's approach by proposing a bipolar continuum ranging from technical diffuseness ("made to orderness") to technical specificity (the production of a few standardized items). It was argued that in one sense, firms at the lower end of Woodward's scale were actually more complex, since "diffuse" firms are confronted with technical problems resulting from a high degree

of innovation and product change. Harvey not only took account of the form of production, but also the amount of changefulness within a form as indexed by the number of product changes over a ten-year period. Company A produced a variety of products, most with a high degree of "made to orderness"; the nature of the process and its environmental characteristics resulted in a high rate of product change. Company B was less "technically diffuse," but some variety of products was offered due to fluctuation in demand for various models. Company C was judged to be technically specific since given high output stability, a single basic item was manufactured with no change in configuration.

Finally, it is also important to note that the two conceptions dealing specifically with "operations technology" or equipment and sequencing of operations in the industrial setting, also suggest important differences between each system. Burack (1967) stressed the continuity of production and degree of mechanization/automation present from an industrial engineering standpoint. The manufacturing procedures varied from intermittent flow and general purpose equipment (A), through the assembly line technology (B), to the advanced process systems (C) where the flow was continuous and the equipment highly automated. Existing in Company C at the time of the study were essentially two "subtechnologies," one being older and less efficient, the other incorporating the most recent advances in automated production techniques. The basic differences between the older (quasi-process: high) and the newer (process) subtechnologies involved the degree of process integration, the greater use of automatic feedback control mechanisms, and the

employment of automated materials handling techniques. In the overall framework presented by Hickson, Pugh, and Pheysey (1969), operations technology appears to increase monotonically from A to C, but the other aspects of organizational technology do not necessarily become more sophisticated. For example, it may be that "knowledge technology" (i.e., knowledge used in the workflow) may actually be highest in the unit/small batch category, a concept not inconsistent with the Perrow and Woodward models. In any case, it seems likely that the field settings chosen varied with respect to each of the technologically determined input-throughput-output dimensions of system complexity described earlier.

Organization Structure

There exists a highly speculative controversy concerning whether technically advanced production systems are becoming more or less "bureaucratic" and/or "autocratic." Burns and Stalker (1961), Dubin (1965), Perrow (1967), and Harvey (1968) indicate that the structure associated with complex production technology is "more centralized, more rigid, with proliferation of specialized subunits and close supervision" (Taylor, 1971, p. 4). From the opposing standpoint, Blauner (1964), Woodward (1965), Thompson (1967) and Meissner (1969) suggest that highly sophisticated technologies may permit more flexible structures with increased worker autonomy. Neither of the above positions is conclusively supported by research data, and as will be seen, the problem breaks down into the kinds of control mechanisms that evolve in these technically determined structures. Whether rigid or flexible structures,

autocratic or supportive managerial practices, emerge in systems of differing technological complexity is not yet clear; but the structure that is limited by various technological conditions may be seen as the framework within which social influence processes operate.

> An organization can conceivably have several organization structures, each structure being appropriate for a particular set of decisions (or tasks). . . . Organizational leadership may also be conceived as a strategy for accomplishing work effectively. We may hypothesize that leadership will be consonant with the organizational structure. Since the organizational structure will tend to vary, we may hypothesize that the leadership pattern will also vary (Argyris, 1964, p. 214).

Emphasizing formal aspects of structure, Woodward (1958, 1965) found that both the number of levels of managerial authority and the ratio of supervisory personnel to workers, among several others, increased directly with technical complexity of the system. In contrast to these direct relationships, the span of control of the first-line supervisor showed a curvilinear tendency; the median number of people supervised was 23 in unit/small batch firms, 48 in mass production, but only 15 in process operations. Therefore process firms featured an extremely "tall" pyramidal shape with smaller spans of control, while unit/small batch companies were relatively "flat" and possessed moderate spans of control. Thus, technology had an important influence on formal structure, and it would seem that the above variables define the nature of the situation in which the supervisor and his work group must operate (e.g., the size of the work group and amount of superior-subordinate interaction). Of more intrinsic interest than the skeletal properties of the organization, however, is the relationship between technology and what Mohr (1971) has termed "social structure."

> There is apparently a U-shaped curvilinear relationship between technology and certain dimensions of the social structure of organizations, such as the tendency to break down the labor force into small primary groups, and in general, the tendency toward organic--flexible, participative, informal--as opposed to mechanistic--hierarchic, formal--systems of management (p. 445).

Mechanistic (bureaucratic) structures are characterized by rigid hierarchical structures, emphasis on authority relationships, well-defined tasks, procedures, and powers, and a high degree of role prescription. In contrast, organic systems are noted for flexible structures, influence processes based on technical expertise rather than authority, and a continual readjustment of roles in terms of interaction with others. Woodward found that firms in the mass production category had many structural characteristics of mechanistic systems; these included elaborate production control techniques, a highly differentiated line-staff organization with many specialists, and more formalized managerial processes (e.g., written communications, rules, and standard operating procedures). However, the most intriguing findings concerned what Woodward called "similarities at the extremes" on the scale of technical complexity. In both unit/small batch production and continuous process companies, there tended to be less emphasis on clear-cut duties and responsibilities, greater delegation of authority, and a higher degree of participative management.

Structural arrangements as predicted from Perrow's model are not altogether the same as the previous findings, however. It was mentioned previously that the nature of the production task affects the distribution of managerial functions across hierarchical levels as well as

situational variables affecting the operation of work groups. Referring to Figure 4, the task structure and task-related interactions of middle (technical) and lower (supervision) level managers are illustrated in each of the four cells. Structural aspects included (1) the discretion of subgroups, (2) their power, (3) the basis for coordination within a group and (4) the interdependence between groups. In strictly non-routine technologies (cell 2), discretion and power of both groups are high, coordination is achieved by feedback and mutual adjustment, and the two groups are highly dependent upon one another for accomplishing tasks. This is clearly the organic form. In contrast, technologies where operations are highly predictable (cell 4) lead to structures that approximate the mechanistic form. That is, coordination is achieved by preestablished plans, the power of the administrative relative to supervisory levels is high, and interdependence between these two groups is low. The continuous process operation was taken as an example of extremely routine technology. At least with respect to highly advanced production systems, the structural arrangements expected by Woodward (organic) and Perrow (mechanistic) are exactly opposite. It seems that this problem can be dealt with by examining control processes that are utilized in different types of production systems.

Control Processes

Administrative control is the process of establishing rational production standards, coordinating subunit tasks, and is limited to the monitoring of outcomes, reviewing feedback information, and taking corrective action (Reeves and Woodward, 1970); it refers to the process

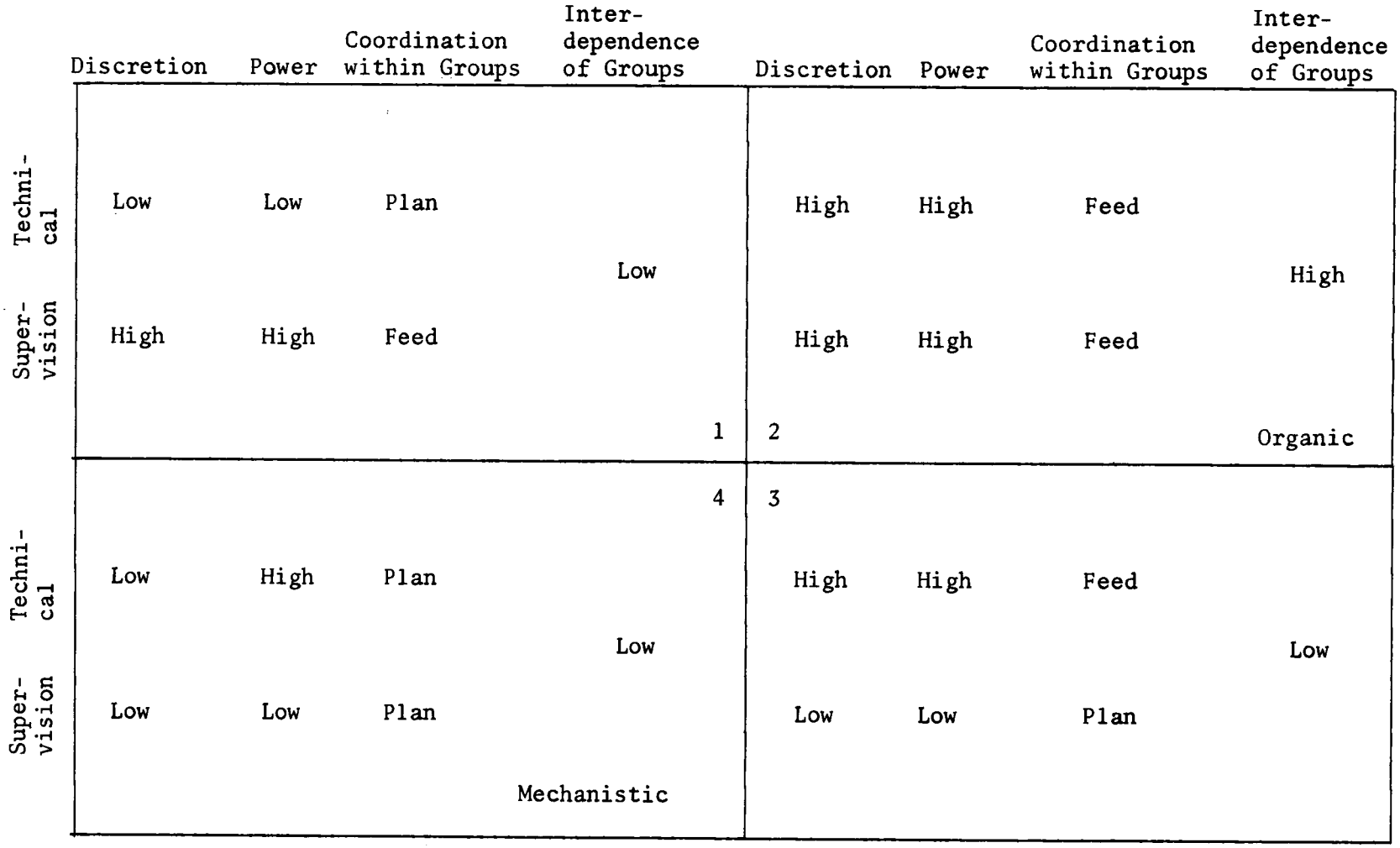


Figure 4. Task structure and task-related interactions of middle and lower level managers (Perrow, 1970).

by which various activities of the organization are channeled toward the attainment of goals and objectives. On the other hand, social control has traditionally been defined in terms of power, authority, or influence, and is an inevitable correlate of leadership processes in an organization; specifically it concerns the process by which individuals and groups influence each other's behavior within the organizational setting. Thus, adaptive processes in organizations include two overlapping but conceptually distinguishable components, administrative and social control, and it is these two aspects that intervene between production technology and organizational leadership processes.

In linking the type of production system with organization structure and managerial process, the implications for administrative control are straightforward. As operations technology becomes more sophisticated, the ability to set standards, obtain feedback information and evaluate performance increases monotonically. Extending this notion, Dubin (1965) pointed out that in unit/small batch operations, the responsibility for quantity and quality of production is assumed by the workers; in more advanced production systems, however, administrative control is shifted to higher levels of management. It seems likely that as systems become more complex and the nature of the work becomes more routine, control of activities in this sense is facilitated. However, Woodward's finding that continuous process firms approximate the organic structure and that control processes were less elaborate and formalized is not so easily reconciled within the above framework.

In answer to the above problem, Reeves and Woodward (1970) presented a means of classifying managerial control processes according to type of production system. This work represented an integration of theories since they incorporated both the concepts of predictability of operations (Perrow, 1967) and impersonal control mechanisms (Blau and Scott, 1962) within the original framework. Figure 5 illustrates the classification of administrative control according to the personal-mechanical and unitary-fragmented dimensions. Each of these will be examined separately, showing how the four types of control systems (A1, B1, B2, A2) vary with the nature of the organization's technology.

With respect to the personal-mechanical dimension, it was pointed out that in unit/small batch firms, the nature of the work is relatively nonroutine and the end results quite difficult to predict. "Traditionally and historically, therefore, the successful achievement of goals of a (unit/small batch) manufacturing firm depends upon the exercise of one man's influence or authority over others" (p. 44). In this setting, administrative control is mainly personal in nature. However with increasing technological complexity, operations become more routine and predictable; not only does it become increasingly difficult to exercise personal-hierarchical control, but also the tools, equipment, and layout facilitate the use of impersonal control mechanisms (Blau and Scott, 1962). That is, in large batch/mass production operations it becomes easier to plan and control production by means of measurement methods, and these impersonal devices operate independently of particular managers and supervisors. Further, continuous flow

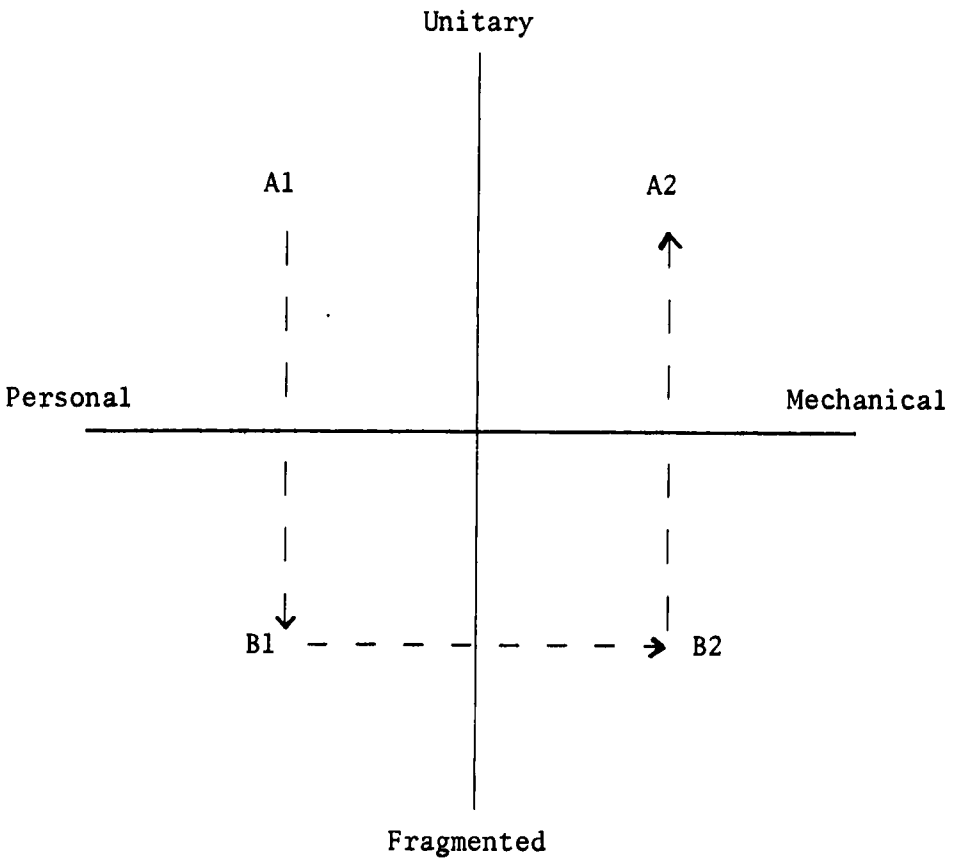


Figure 5. Classification of administrative control processes (Reeves and Woodward, 1970).

process firms are characterized by even a greater degree of mechanical as opposed to personal control processes; in one sense, control has been built into the operation at the design stage. Where automated technology is employed

> . . . More and more of the problems arising in the course of a firm's manufacturing activities are predicated and dealt with in advance as part of the planning process. A change in emphasis in line management's job inevitably results. Line managers and supervisors increasingly cease to concern themselves with day to day problems of production operations and function primarily as adjusters and supplementers of the control processes (Reeves and Woodward, 1970, p. 45).

The other dimension was termed "fragmentation of control"; it referred to whether control processes were unitary (single-system) or fragmented (multi-system). In the latter case the implication is that there are a number of different control standards which must be satisfied simultaneously, and these may not be compatible with one another. In unit/small batch firms, for example, little coordination between less-differentiated subunits is required because of lower degrees of task interdependence. A unitary control system is feasible in this case. Similarly, activities in continuous process operations are integrated by means of the extremely sophisticated hardware employed. But in mass production systems, administrative control becomes most hightly fragmented, and multiple control systems (i.e., quantity, quality, cost, etc.) predominate.

Table 1 shows the corresponding distributions of "types of control" based on Reeves and Woodward's reexamination of the South Essex data. From the illustrations it can be seen that unit/small batch production firms tended to have unitary and mainly personal controls (A1). As

TABLE 1

REEXAMINATION OF WOODWARD'S DATA

	Control System A1 (%)	Control System B1 (%)	Control System B2 (%)	Control System A2 (%)
Unit/small batch production	75	25		
Large batch/mass production	15	35	40	10
Continuous process production			5	95
Total firms	28	21	18	33

Source: Reeves and Woodward, 1970.

the system becomes potentially more predictable, attempts to increase control over the variability inherent in the process may lead to multiple-system procedures and fragmentation (B1). However, to the extent that advancing technology facilitates the implementation of impersonal control mechanisms, the administrative control system would then be classified as fragmented and mainly impersonal (B2). While the great majority of Woodward's large batch/mass production firms fall into the latter two categories, it is also evident that technology is a less important factor throughout the middle range. In continuous process operations, the unitary-mechanical control systems (A2) strongly predominate. Table 1 suggests that organizational technology may be a powerful determinant of the administrative control processes utilized, especially in the extreme cases. This analysis accounts for the original findings of "similarities at the extremes" with respect to certain social-structural characteristics when, in fact, the formal

attributes of unit/small batch and continuous process firms were drastically different.

At the extreme points of the technical complexity scale, it seems that technology limits or constrains the type of administrative control system employed, while at intermediate levels (i.e., large batch/mass production) the procedures used largely reflect management philosophy and preference.

> The fact that structure and behavior appear to be more consistent and predictable in situations where the hardware of the technology is a major determinant of the control system and less consistent and predictable where management is not so rigidly restricted by technology in deciding how the production operations are to be controlled, suggests that control may be an intervening variable between technology and industrial behavior. The link revealed by the South Essex studies between technical and organizational characteristics may in fact be a link between technology and the nature of the control system, on one hand, and between the control system and organizational behavior on the other (p. 39).

The essential question for the present study is whether social influence processes are similarly affected.

Social control refers explicitly to the way in which individuals and groups influence each other's behavior in a particular organizational setting. It has been operationalized in terms of the total (average) amount of influence in the organization and in terms of the distribution of influence across hierarchical levels. In the existing research it is assumed that a high total amount of interpersonal influence is related to successful operation in virtually all types of organizations (Tannenbaum, 1968). The full range of implications concerning increased frequency of impersonal control mechanisms has not been recognized in theory, however.

As the production system becomes more amenable to impersonal and mechanical control mechanisms, these may serve as a substitute for hierarchical-interpersonal control over the behavior of people in the organization, i.e., less influence is required to obtain good performance and high productivity. Directly challenging the prevailing view of Tannenbaum (1968), it is tenable that a lower total amount of influence will be required for effective task accomplishment under conditions of increasing technology. Similarly, it would also be expected that technology serves to constrain the distribution of influence across levels; here the distribution of social control is also thought to vary as a function of technological complexity, with the greatest "power differentials" occurring in the intermediate range, i.e., large batch/mass production systems.

Situational Variables and Supervisory Roles

By examining the nature of the overall production task and its associated situational variables, it may be possible to suggest how the supervisory role changes from one type of production system to another. The type of control system utilized seems to have important implications for the directing and coordinating activities of the foreman and his role in the socio-technical system. To the extent that role requirements are different, the patterns of leader behavior that relate to effective job performance would also be expected to differ.

Small batch or unit production involves the manufacture of special orders, where customer specifications for various kinds of products must be met. Given the relatively large number of exceptional cases

encountered in the conversion process, it becomes quite difficult to program work activities. Recall that the personal-hierarchical control system most frequently occurs under these conditions; the mechanisms of control are simple and are exercised by the supervisor himself. In this case a great deal of time is spent in directing the activities of subordinates: the supervisor schedules work, dispatches orders, and checks the results of individual work group members. On the other hand, workers exert a great deal of control over tools, materials, and speed of work, and are not themselves rigidly controlled by production programs and job requirements.

> The small batch (and certainly the unit production situation) is therefore a relatively undifferentiated supervisory situation. One vital factor affecting this appears to be the degree of actual variation in operations performed between one job or batch and another. The greater this variation, the more complex becomes planning and it is more and more essential that this planning is performed by people with a first-hand and intimate knowledge of the precise details of the changeovers. This puts a premium on the shop floor knowledge of the supervisor (Thurley and Hamblin, 1962, p. 7).

Not only is a high degree of technical "know-how" required to fulfill role requirements of the line supervisor, but also human relations skill appears to be especially important (Mann, 1965). Because workers operate autonomously and control quantity and quality of production to a large extent, a high degree of personal influence would also be prerequisite to effective task accomplishment. Therefore in the "low technology" condition, it appears that leadership behaviors aimed at influencing the behavior of workers are of high relative importance in attaining good performance. Virtually the full range of leadership (initiating structure, consideration, and participation) in addition to a high

degree of technical competence is expected to relate to supervisory success.

Moving to large batch/mass production operations we find different situational variables and a very different role for first-line supervisors. Increased predictability of the process resulting from standardization of techniques and higher levels of mechanization may lead to a fragmented and/or impersonal managerial control system. Technology does not serve to constrain the control processes as greatly in this category, but the following appears tenable. Where the production process has been highly routinized, coordination of work group activities is achieved by planning rather than by mutual adjustment (Perrow, 1967). Indeed, the locus of administrative control shifts upward in the organization and higher level managers set the production standards (Dubin, 1965); this results in lower discretion and power on the part of the supervisor, since activities are now controlled on the basis of routine reports (Perrow, 1967).

> Operator or supervisor leeway is neither wanted nor desired by the operating managements. The increasing interdependence of operations requires forward planning for efficient, continuous operation. . . . The decrease in personal supervisory control is paralleled by the expansion of built in (impersonal) process mechanisms for control and the extension of staff responsibility (Burack, 1966, p. 54).

Blau and Scott (1962) have suggested that the supervisor's subordinates are constrained or regulated in their activities by nonhuman mechanisms of control including machinery, production schedules, and the like. Correspondingly, the supervisor does less in the way of directing work activities and there is less supervisor-member interaction; because

of the larger operative spans of control and the fact that worker ability is high relative to job demands, close supervision is not required (Burack, 1966). Rather the supervisor acts as a "trouble-shooter," reacting to breakdowns, ensuring a free flow of materials, and coordinating activities between several work units. This is a much more highly differentiated role than is found in unit/small batch production. Further, it would seem that leader behaviors would be generally less important in meeting the above role requirements, but that technical competence remains important in achieving successful production outcomes.

In continuous flow process operations the situational variables affecting the work group and the role of the first-line supervisor are different still. Given the highly predictable nature of the production process, unitary and impersonal managerial control processes predominate.

> The setting of objectives in respect to time, quality and cost, the sequencing of the manufacturing activities and even in some cases the mechanisms for taking corrective action were specified and built into the plant design (Reeves and Woodward, 1970, p. 39).

Work groups are typically smaller than in either unit/small batch or mass production processes. With a heavier concentration of managerial personnel, smaller spans of control, and a higher degree of superior-subordinate interaction, it has been theorized that increased closeness of supervision will result in autocratic managerial styles. However, Burack (1967) found that the function of directing work group activities involved less supervisory time commitment in advanced process technologies. Similar results comparing unit/small batch and process operations were also obtained (Yanouzas, 1964). With the employment of increasingly

sophisticated impersonal control mechanisms, supervisors also do less coordinating between various subunits (Burack, 1967).

The interaction of closeness of supervision (Dubin, 1965) and increasing skill levels of the workers could not be anticipated and the result is paradoxical.

> The outcome of such close supervision may actually be in the direction of greater work autonomy and flexibility, rather than less, with actual work operations being moved up one hierarchical level. As supervision becomes closer and closer and more highly skilled, the point is approached where the work organization in automated factories may begin to resemble that of craft industries where the supervisor is simply the most skilled of the workmen. If the group continues to decrease in size, it may eventually be considered either a leaderless group or a "group of supervisors." The supervisor will become more a controller of output--not necessarily a supervisor of people, but of machines (Taylor, 1971, p. 4).

Therefore the supervisor does even less in the way of directing or coordinating and his role resembles that of a facilitator or communications link for the work group. This role may not be highly differentiated from those of the highly skilled operators themselves. Therefore it is expected that leadership behavior would be of little importance in achieving productivity in the continuous process category, and technical competence may not be essential for success either.

In comparing the three types of production operations, it can be seen that the nature of the task in its broadest sense determines a number of situational variables that affect the functioning of work groups and also has implications for the supervisory role. This analysis suggests that whether or not leader behaviors are related to effective task accomplishment depends upon the extent to which they fulfill role requirements in the larger setting.

Effects of Leader Behavior Under Varying Technological Conditions

The foregoing has suggested how the organization structure, control processes, situational variables and leadership roles vary with the type of production system under study. In order to outline a general approach to the study of organizational leadership, we need to specify the relationships between these dependent variables (worker satisfaction, productivity of the work group, and rated job performance of the supervisor), four independent variables (the major dimensions of supervisory behavior including initiating structure, consideration, participation, and technical competence), and the conditional variables (a composite of structural and situational variables that affect the role of the first-line supervisor and are presumed to vary with the nature of the production technology). Given an understanding of the way in which structure and process vary between different technological types, it now is possible to suggest how leader behaviors relate to effectiveness at the level of the work group. Figure 6 shows the relationships among these variables within the technical-organizational context.

The criteria of effectiveness include job satisfaction of the individual worker (which is one indication of how well the organization's maintenance goals are being achieved), and two kinds of performance measures (oriented towards how well the task goals are being accomplished). Of the performance measures, work group productivity is thought to be the more "ultimate criterion" than is rated job performance of the supervisor, but often these have been treated as equivalent

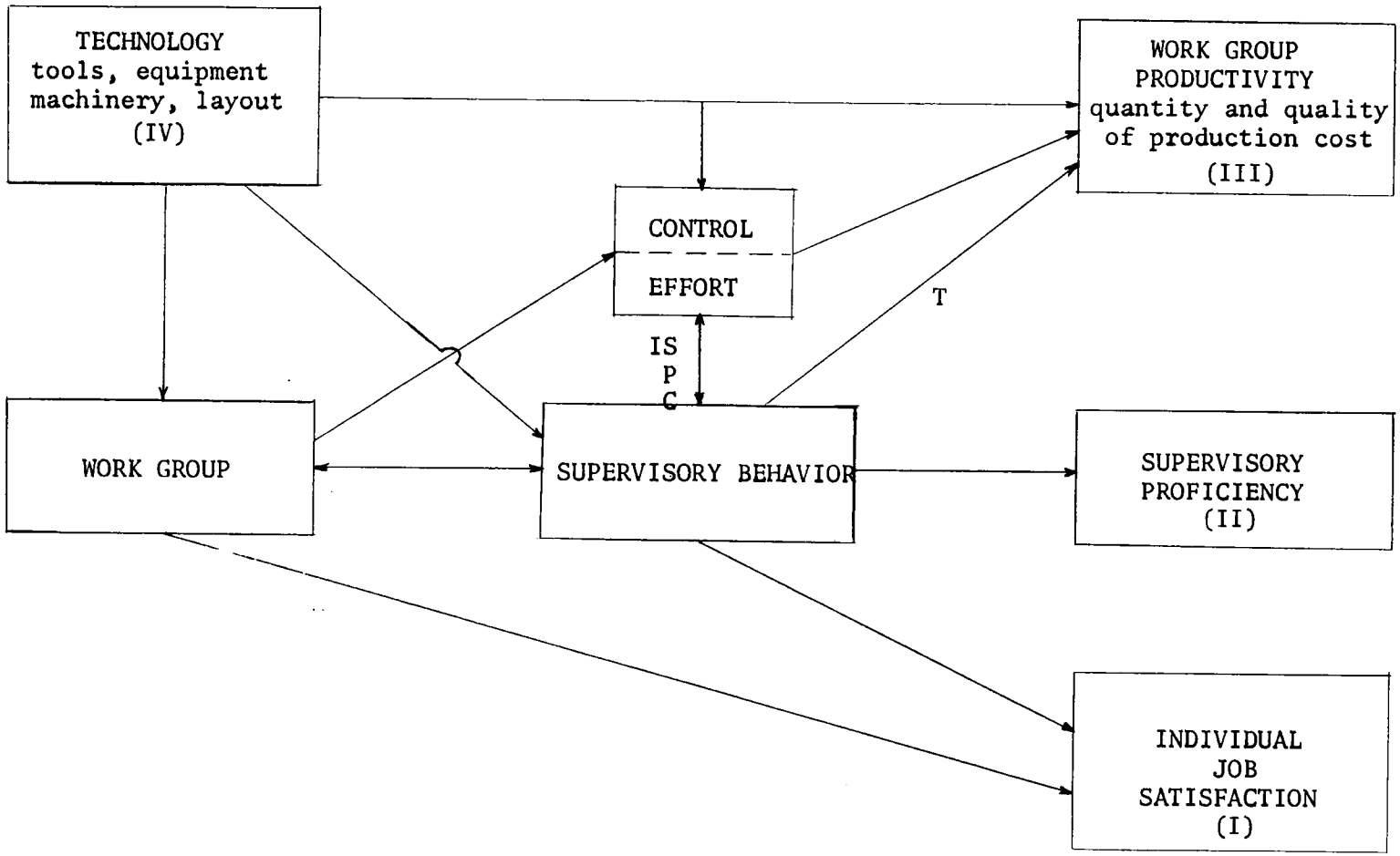


Figure 6. Technology, leadership behavior and organizational effectiveness in a manufacturing setting (work group level).

indicators of task effectiveness. In the early Michigan studies, it was thought that satisfaction affected the relationship between leadership and success; however, it has been pointed out that worker satisfaction is best treated as an output rather than as an intervening variable linking leader behavior and productivity (Kahn, 1956; Stogdill, 1959). Each of the three criteria has been used extensively in the study of leadership, but the results with respect to satisfaction have been much more consistent than with respect to performance. As we shall see, leader behavior seems more important to the organizational maintenance function in virtually all types of industrial organizations, but relates to task effectiveness only under certain technological conditions.

When subordinate job satisfaction has been used as the criterion (panel I), general relationships have been established with certain dimensions of supervisory behavior, but not with others. The association with leader consideration (C) typically has been significantly positive (Korman, 1966; Filley and House, 1969). In fact, there is some experimental data to show that consideration causes the satisfying outcomes (Lowin, Hrapchak, and Kavanagh, 1969). In general we might also expect subordinates to be more satisfied with supervisors who possess considerable technical competence (Mann, 1965). Results with respect to participation (i.e., tolerance of member freedom) (P), and with respect to initiating structure (IS), have been much less consistent. Leader participation in many cases relates positively to satisfaction, although there are several qualifications that must be appended to such a statement (Vroom, 1964; Yukl, 1971). How initiating structure is related to

satisfaction is not well understood, the finding of no relationship being quite common. It may be that participative and structuring behaviors are preferred by subordinates only under certain technologically determined task conditions.

It can be seen in Figure 6, p. 57, that technology (panel IV) affects worker satisfaction more globally, presumably through variables that impinge upon the work group itself and deal with (1) the nature of the work itself, (2) opportunity for interaction with coworkers, and (3) the kinds and amounts of rewards that are available in that particular situation. In this respect Blauner (1964) and Shepard (1971) have detailed the alienating tendencies of the overspecialized work associated with mass production technology; it appears that these intermediate levels of operations technology provide less overall job satisfaction than in either unit/small batch or continuous process systems. Production technology, although more indirect in its operation, may have equally important implications for overall satisfaction as does the more observable effect of supervisory style.

Supervisory behaviors (IS, P, C, T) are shown to have more direct, pervasive effects on satisfaction, especially with respect to satisfaction with the supervisor. This is most generally a function of the foreman's considerateness and technical competence, and depending on the nature of the situation, may also show some relationship with participation or initiating structure. While technology represents a composite of variables that affect the general level of overall satisfaction, supervisory style is thought to account for the major proportion of the

variance. There is no a priori reason to believe that leader behaviors will have differential effects on job attitudes in various types of production systems. Therefore, the prediction of leadership-satisfaction relationships will be similar for each type of system, while leadership-performance hypotheses will be contingent upon the nature of the system under study.

When work group performance or rated proficiency of the supervisor have been used as criteria, the results have been quite inconsistent; over twenty-five years of research have not clarified the relationships between leader behavior and effective task accomplishment. Evans (1970), House (1971), and Yukl (1971) have presented behavioral-situational models of leadership effectiveness which attempt to deal with the problem of how leaders actually "motivate" workers toward goal attainment. Yukl (1971) specified a large number of situational moderators in his multiple-linkage model; in contrast, House's path-goal theory (1971, 1973) emphasizes task structure as the major situational determinant. However, none of these specifically accounts for the limiting effects of technology in the industrial setting. The idea that the impact of leader behavior on work group performance depends upon the type of system under study (Dubin, 1965) should be central to the study of industrial leadership.

In manufacturing operations, work group performance (panel III) is usually operationalized in terms of measurable productivity (quantity and quality of production, cost, etc.) or rated departmental efficiency. Dubin (1965) argued persuasively that the influence of supervisory

behaviors on productivity is often small relative to the effects of technology and other factors.

> Two general possibilities present themselves. (1) On the assumption that supervision accounts for a fixed and sizeable proportion of the variation in output, comparisons may be made between different kinds of supervision to see which has the highest positive correlation with productivity. This has been the strategy followed in most studies of supervision. (2) An alternative approach is to ask under what conditions does supervision make more or less difference than do other factors affecting productivity? There may be considerable variability in the relative importance of supervision from one organizational setting to another (Dubin, 1965, p. 5).

Intuitively, it is suggested that the leader behaviors of the foreman are quite important to work group performance in systems of lower technological complexity (i.e., unit/small batch firms); however, as the operations technology becomes more sophisticated (e.g., mass production or continuous process operations) the supervisor's behavior has correspondingly less effect on productivity than do other factors.

Most psychological studies implicitly assume that supervisory behaviors are prima facie, of primary importance to task accomplishment by the work group. But as Homans (1965) has pointed out, this may be true only in cases where human effort is essential to attaining efficiency, and only when the rate of task performance is controlled by the worker to some degree. Refining this notion somewhat, it is argued that leadership behaviors are important to work group performance only in so far as interpersonal influence is required to direct the activities of work group members, reinforce their efforts, and coordinate their activities with other groups. Thus, two technically determined variables are shown to intervene between supervisory style

and productivity (see Figure 6, p. 57): (1) the degree to which human effort is required to perform the task and (2) the extent to which con-control over operations is exercised by the workers. With increasing amounts of mechanization (e.g., automatic transfer equipment) the amount of physical effort needed to attain a given output decreases, and at moderate and higher levels of automation (e.g., the use self-regulating mechanisms) control of operations is also successively removed from the worker's domain. The supervisor may contribute to work group productivity in two ways: (1) indirectly through his leadership behavior (IS, P, C) which is interpersonally oriented and provides control, reinforcement, and feedback when needed or (2) directly through his technical "know how" and job competence (T). Referring back to Figure 6, now consider that technology varies from low to high between different types of production systems.

In the unit/small batch or "low technology" condition, the nature of the tools, equipment, machinery and layout are relatively unsophisticated. A personal-hierarchical control system is employed and the workers themselves largely determine both quantity and quality of production as well as the speed of work. It has also been suggested that supervisory directing and coordinating functions are essential for good work group performance under these conditions. We might expect that all aspects of supervisory behavior would be of some importance in attaining high productivity and that leader behavior would account for a large proportion of the variance in achieving task goals.

Next in the mass production category we find higher levels of operations technology, both in the sense of mechanization and the

programming of work activities. Machine pacing determines the speed of work and quantity of production becomes largely a function of certain technological variables. Quality is still controlled by the workers, however, and multisystem, impersonal control mechanisms are employed to increase the predictability of outcomes. The foreman does less in the way of directing individuals personally since it is now easier to control activities on the basis of results. At this intermediate stage the supervisor bears responsibility for results of the group and his technical competence (T) is very important in fulfilling his "trouble-shooting role." On the other hand, interpersonal influence seems generally less important to performance of the unit, and leadership behaviors would be expected to account for less of the variance in productivity. Coordinating between groups remains important, however, and certain leadership styles may be more appropriate in this respect.

In continuous process systems (i.e., the "high technology" condition, both quantity and quality of production are largely a function of the technology itself. The administrative control processes are unitary and highly impersonal and are often integral to the process design. The supervisor does little in the way of either directing or coordinating nor are his technical skills so important in attaining high levels of productivity. Furthermore, the presumed "motivational" effects of various leadership styles are quite small relative to the impact of impersonal mechanisms of control. It seems that supervisory behavior is even less important in achieving productive outcomes, and would show no relationship with measurable productivity.

The above analysis relies considerably on the original contributions of Dubin (1965) who emphasized that the relative importance of leadership style to productivity of the work group depends upon the type of manufacturing system under study. By incorporating a more precise definition of technology, by specifying control processes as the primary intervening construct, and by attempting to trace the linkages from the organization to the work group and its supervisor, the theory has been developed and extended. In essence, it has been suggested that as the sophistication of the operations technology increases and the programming of work activities becomes more extensive, leader behavior accounts for a decreasing proportion of the variance in work group performance. As will be seen, the development of this conceptual approach plays an important part in the investigation of how leader behaviors relate to the proficiency of industrial supervisors.

An alternative measure of organizational effectiveness which has been specified as a dependent variable in the present study is rated supervisory proficiency (see Figure 6, p. 57, panel II). Reviews of the leadership literature have failed to distinguish between proficiency and work group performance since they might be expected to be highly intercorrelated. However, for purposes of the present study, it appears that this criterion is more appropriate since the measures obtained (1) are less likely than objective measures to be confounded by the direct effects of technology and therefore (2) are more comparable across different types of production systems. Supervisory proficiency is here defined as the extent to which an individual meets the role requirements

of his job as defined in the nature of the production system in which he performs it. Thus, there is a very indirect relationship between technology and proficiency when conceived in this way. This relationship concerns the way in which technology at the level of the organization affects formal role prescriptions and other situational variables. Since the roles of the first-line supervisor differ between technological types, we would predict that different, rather than similar patterns of leader behavior to be associated with success.

To the extent that measures of supervisory proficiency are really indicators of task effectiveness in the organization, the leadership-success relationships will also be contingent upon the type of production system in which they occur. One aspect of this view concerns the expectation that a different "leadership mix" will relate to rated job performance in unit/small batch, mass production, and continuous process operations. The second part concerns whether leader behavior accounts for an equal or a decreasing proportion of the variance in job performance as operations technology increases. It may be that supervisory roles in advanced production systems do not require a great deal of interpersonal influence in order to get the task accomplished. If indeed this is the case we would expect that a review of previous industrial leadership studies would show some consistency with respect to the pattern of behavior that relates to successful performance in each basic type. However, if leadership does account for a decreasing proportion of the variance in success on the job, then: (1) studies in unit/small batch systems should show a large number of positive

results with few exceptional cases, (2) the large batch/mass production category might contain mixed results, and (3) studies in continuous process systems would contain very few positive findings.

The current investigation was designed to test hypotheses based on such a review of the literature (Chapter III) that different patterns of leader behavior will relate to successful performance and that the behaviors in general are more important in the low-technology condition than in the high-technology condition. The methodology (Chapter IV) involved a comparative analysis of leadership-success relationships in three types of production operations. Emphasis was placed on describing between organization differences where the structure, control processes, and roles were expected to vary considerably. Given an organization where there is considerable variability in the nature of the production technology from group to group, technological variables may prove useful in segregating those units where leader behaviors are relatively more important for successful performance. In such a case, by taking account of the moderating effects of technology, it is expected that the predictability of supervisory proficiency from knowledge of leadership style will improve.

In summary, the question of whether leadership in fact makes a difference with respect to the effective functioning of industrial organizations was addressed first by suggesting how the nature of the situation is embedded in the larger organizational context, by examining the major concepts of technology, structure, control processes, and supervisory roles, and by condensing and clarifying the existing

literature. In this respect a complex contingency view was developed. First, certain behaviors of first-line supervisors were thought to be universally important for individual job satisfaction of the worker and the accomplishment of organizational maintenance goals. With respect to proficiency of the supervisor and performance of the work group, however, it was suggested that behavior-success relationships depended primarily on organizational factors associated with the nature of the overall production task; that is, different types of production systems will have different patterns of leadership that relate to success, and that leadership in general will be more important in the low technology condition.

CHAPTER III

LITERATURE REVIEW

Scope and Purpose

A contingency approach to the study of organizational leadership suggests that patterns of leader behavior that relate to success will differ according to the structure and functioning of organizations themselves. Technology is thought to have an affect on leadership in two ways.

1. At the system level it affects formal structure, administrative and social control processes, and the nature of the role prescriptions that the supervisor is expected to fulfill.
2. At the work group level it places direct constraints upon the supervisor and workers by determining a number of relevant situational variables such as the degree of task structure.

In the first case above, a comparison of the control structures found in technologically different types of production systems provides a means of examining social control processes on an organization-wide basis. In view of the predicted differences in social control among industrial organizations, it is also likely that the patterns of leader behavior required for success might also differ under varying technological conditions. Thus a review of the leadership-performance relationships by type of production system should produce comparatively uniform results within each type of system. For purposes of this paper, emphasis is

placed on those studies dealing with the leadership behavior of supervisors in an ongoing industrial organization, some 20 in all. With respect to proficiency and performance criteria, these will be broken down into the three major categories used by Woodward (1965) being allocated on the basis of quite often limited information contained in each study. Results of this review are offered in support of the notion that effective leadership has both technological and organizational pre-conditions, and that different patterns of leader behavior are likely to meet the role requirements for each type of production system. In addition there are also within-organization differences in effective leadership which can be explained in terms of technologically determined situational variables. Given the pervasive effects of technology upon structure, processes and behavior in organizations, it seems reasonable to pursue this "middle range" approach to the study of industrial leadership within the framework of organization theory.

Control Structure

Organizations are characterized by different patterns of social control, i.e., patterns of influence relationships which are basic aspects of the system. Two indices which were developed to measure patterns of interpersonal influence are (1) the total amount of control and (b) the distribution of control in the organization. These may be indicated on a control graph where the horizontal axis represents hierarchical groups and the vertical axis shows the amount of control exercised. The average height of the curve represents the total amount of interpersonal influence in the organization while the shape is determined by the relative amount

of control exercised by various echelons. Research results suggest that the total amount of control is positively related to organizational effectiveness and morale, but the slope (distribution of control) shows no relationship.

Tannenbaum (1968) has indicated that social control processes are both reciprocal and expansible phenomena. The concept of reciprocity parallels the neoclassical management view concerning acceptance of authority, i.e., that control over behavior of the workers is effective only insofar as operative goals of the organization are accepted and the supervisors possess "legitimate power." Therefore in one sense the lower levels also exert some degree of reciprocal control over higher echelons. Even more important to the present discussion is the expansibility argument which states that the total amount of social control in an organization is variable and can be increased. Data from a wide variety of settings including voluntary service organizations, labor unions, insurance companies, and the like largely "support the contention that organizations with both influential leaders and members are likely to be more effective than organizations with less influential leaders and members" (Tannenbaum, 1968, p. 309). In some cases, then, it appears that organizational functioning can be improved by increasing the total amount of social control, regardless of the relative degree exercised by a particular echelon.

Further, in an experimental situation the total amount of control showed a strong causal relationship with performance (in terms of completion times and payoffs); also where control was well distributed,

significantly greater payoffs were achieved (Levine and Katzell, 1971). These authors pointed out that it is not clear why a high degree of control (influence) leads to more effective performance; that is, the theory does not deal with the functional concomitants of various organizational control structures. They also suggested that the importance of the distribution of control has been greatly underestimated. The main concern here is how the total amount of control and the distribution of control vary in different types of production systems. In accord with Likert's supportive management theory (1961), Tannenbaum (1968) concluded that a high degree of interpersonal influence is related to successful task accomplishment in virtually all types of organizations. This research has often been interpreted as confirming the prescriptions of several participative theortists that a relatively high total amount of control implies a greater degree of interaction and influence within and between hierarchical levels. However, like many of the early "human relations" findings in leadership research, support for the theory, with few exceptions, is derived largely from nonindustrial settings.

There actually have been only two studies carried out in industrial organizations where operations technology could have had some effect. Mann and Hoffman (1960) compared two power plants in the same company, one of which was automated while the other was conventionally operated. In Figure 7, the new plant (Advance) had a higher total amount of control (average height of the curve) as reported by the men and their supervisors. Also it appears that the slope of the control function in the old plant (Stand) was somewhat steeper. Not only were the first-line

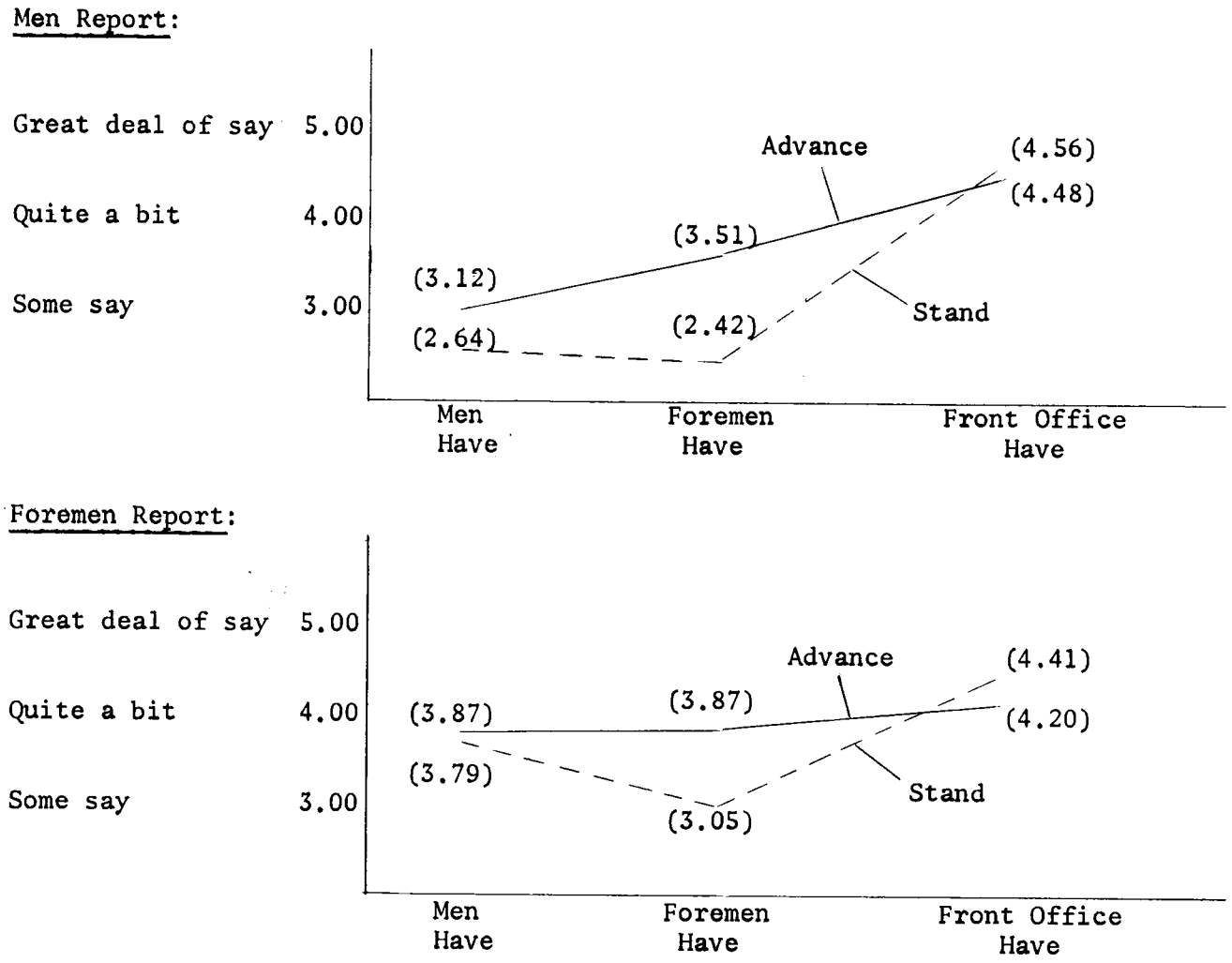


Figure 7. Comparison of old and new power plants (Mann and Hoffman, 1960).

supervisors more influential in the more advanced technology but also the human relations aspects of leader behavior were more important for success in this setting. Unfortunately the effects of technology, introduction of job enlargement, and the reduction of the number of supervisory levels were confounded in the above comparison. The second study reported by Seashore and Bowers (1970) examined the durability of combined technical and social change in a mass-production firm. Figure 8 shows that the total amount of social control increased over the five-year period and the slope of the curve became considerably flatter at the top three levels. Again the effects of technological change could not be separated from the effects of introducing participative management.

However, it has been argued by this writer based on several works in organization theory that the nature of the organization's production technology places constraints on both the total amount of social control required for success and the distribution of control across hierarchical levels. For instance, Dubin (1965) pointed out that it may not be possible to fix production responsibility at the lower levels in manufacturing organizations, except in unit/small batch technologies; there may be a tendency for the locus of control to shift upward in mass production and continuous process operations. Also if we explicitly recognize the effects of impersonal control mechanisms (Blau and Scott, 1962), it is equally tenable that organizational effectiveness can be enhanced by unifying and depersonalizing the administrative control system (see Reeves and Woodward, 1970). It may

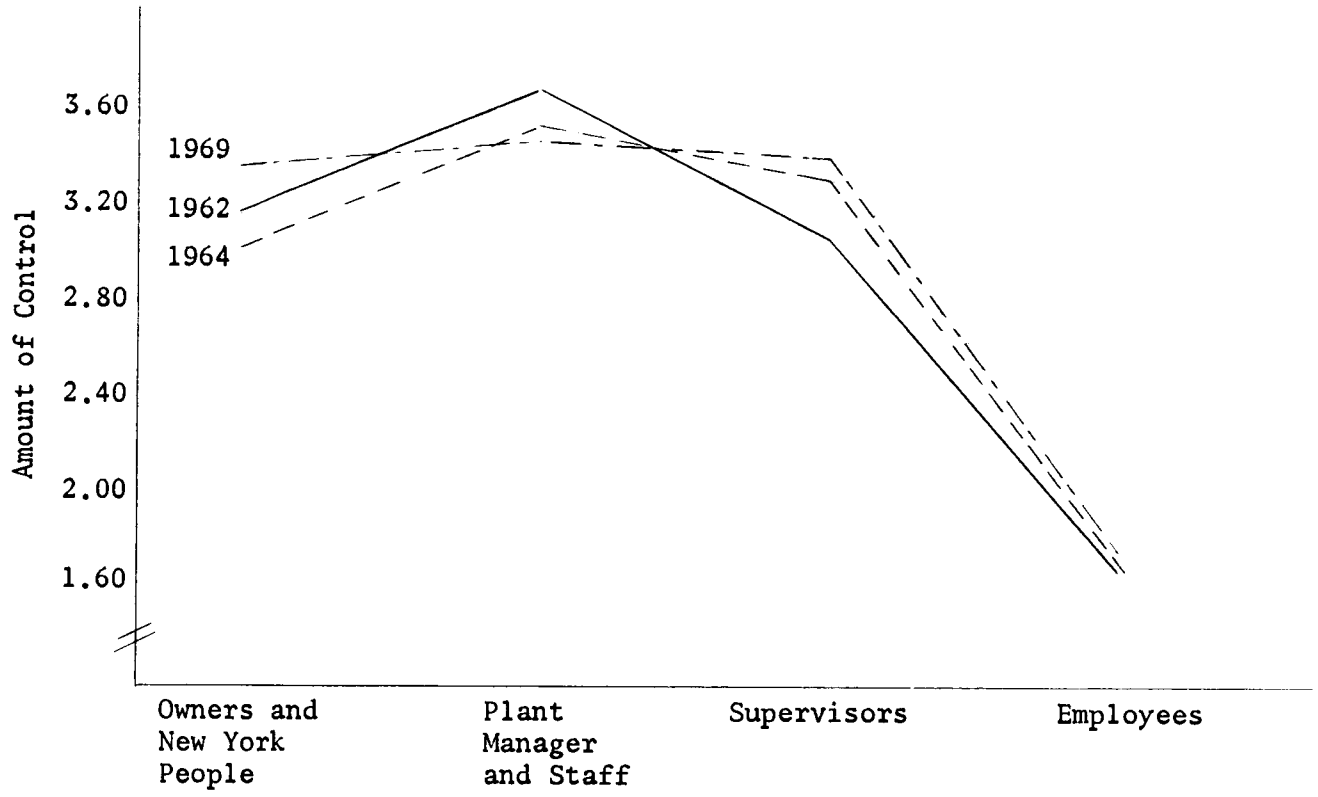


Figure 8. Change in amount and hierarchical distribution of control (Seashore and Bowers, 1970).

be that lesser degrees of interpersonal influence are required for effective task accomplishment in production systems where operations are more highly routine and predictable. Thus it is expected that lower amounts of total social control would be found in technologically advanced production systems.

Concerning the distribution of control across hierarchical levels in the organization, it is expected that the largest fixed power differentials exist in the mass production operation. The problem of whether the nature of the overall production task has an effect upon the system's social structure was examined by Mohr (1971). Originally identified by Woodward (1965), this phenomenon has to do with the tendency for unit/small batch and continuous process systems to have similar "organic" characteristics: (1) moderately small spans of control and smaller work groups, (2) less emphasis on the hierarchy and formally prescribed duties, and (3) verbal as opposed to written communications. In direct contrast, mass production firms possessed opposite "mechanistic" characteristics; therefore, it would be expected that the distribution of social control would parallel the above distinction. That is, the slope of the control function should be the steepest in the mass-production category.

Dimensions of Supervisory Behavior

The model of organizational leadership presented in Chapter I focused on behavior of the first-line supervisor as it related to work group productivity, rated proficiency and satisfaction of the individual worker. The two basic dimensions of leader behavior, developed in

research carried out at Ohio State University, are most commonly called consideration (C) and initiating structure (IS); these correspond closely to the concepts of employee-centeredness and production-centeredness which are associated with research programs of the University of Michigan. Consideration is used to describe the extent to which the leader creates an environment of psychological support and helpfulness by looking out for the welfare of his men, doing things for subordinates, and emphasizing good interpersonal relationships. Such leadership activities create an environment of warmth and friendliness and are designed to motivate workers and/or to maintain their role behavior over time; in contrast, the leader who is low on this dimension frequently exhibits threatening, punitive, and deflating behavior. When control of work operations and the responsibility for production is fixed at low levels in the work organization, good subordinate relationships can facilitate task accomplishment. Initiating structure is used to describe the degree to which the leader provides psychological structure for subordinates by assigning particular tasks, scheduling work, specifying company rules and regulations, and clarifying his own expectations. This dimension consists of those leadership activities which define a work group member's role, implement unit tasks, and enforce the legitimate demands of the organization. When faced with new or highly variable task conditions, the leader who initiates structure provides the relevant cues that facilitate goal attainment. C and IS account for a large proportion of the variance in leader behavior and are measured by averaging subordinate descriptions of their supervisor (Stogdill and Coons, 1957; Stogdill, 1963).

Even though supervisory leadership in industrial organizations has received considerable attention, the behavioral dimensions may not have been enumerated completely. Yukl (1971) reviewed several studies which indicated that the amount of participation allowed by the leader (actually, decision-centralization) is an additional, separate dimension of leader behavior. It appears that articipation (P) is a dimension oblique to consideration (showing low to moderate correlations), but is relatively independent of initiating structure. One of the subscales of the LBDQ (Stogdill, 1963) is called "Tolerance of Member Freedom" and can be regarded as a measure of the leader's tendency to provide autonomy and to permit work group participation. In the Michigan studies this corresponds reasonably well to general vs. close supervision in the sense that general supervision amounts to workers operating in an autonomous fashion. Thus, for purposes of the current study we have a tri-dimensional scheme (C, IS, and P) which adequately describe those supervisory behaviors that influence workers toward effective performance. Recalling the model presented in the first chapter, a fourth aspect of supervisory behavior was referred to as technical competence (T); this was not considered as a dimension of leadership, but rather represents the quality of task-oriented decisions. That is, the foreman may improve performance directly by gathering information, resources, and cooperation from sources external to the work group. T has been operationalized in terms of job competence which represents an important aspect of the supervisor's individual contribution to productivity (Comrey, High and Wilson, 1955) and has been shown to have important

implications for fulfilling his organizational role (Mann, 1965; Cooper, 1970). In review of the literature, therefore, studies employing the two major dimensions of leader behavior (C and IS) and their relationships to proficiency and work group performance are emphasized. It is often possible to distinguish between supportive patterns of supervisory behavior (C and P) and instrumental patterns of supervisory behavior (IS and T) (Filley and House, 1969); the basic question in the study of organizational leadership is how these patterns are related to criteria of organizational effectiveness in different types of production systems.

Leader Behavior and Satisfaction

In contrast to the leadership-productivity question, the relationships between some dimensions of leader behavior and worker satisfaction are reasonably consistent. For example, Stogdill (1965) found that consideration correlated positively with employee satisfaction in all of 27 organizations examined, but was related to productivity in only two of these. In general, reviews of an extensive amount of literature have indicated that where supervisory consideration is high, there is likely to be greater satisfaction (Filley and House, 1969; Yukl, 1971; Stogdill, 1974); because of the very few exceptional cases the evidence need not be presented here. The above relationship held true concerning satisfaction with job freedom in industrial organizations, regardless of technological conditions (Stogdill, 1965). However the results with respect to initiating

structure and participation are less straightforward and depend much more heavily on the nature of the situation. Yukl (1971) presented a discrepancy model of subordinate satisfaction with the supervisor showing that the extent to which IS or P are satisfying to subordinates depends upon their preference levels for these kinds of behaviors. Such leadership preferences were, in turn, thought to be a function of subordinate personality variables and the nature of the situation. In the present theoretical framework, the situational variables are thought to be a function of the organization's overall production task.

Where grievances, turnover, and absenteeism have been used as objective indices of employee dissatisfaction, it seems that highly structuring behavior can have dysfunctional consequences (Fleishman, Harris, and Burtt, 1955). Certain relations of IS and C with grievances and turnover were found to be nonlinear, however (Fleishman and Harris, 1962; Skinner, 1969). For a wide range of considerate behavior there was no relationship with grievances and turnover, but below a certain point both rose markedly; on the other hand, only at the highest levels of structuring do these indicators of dissatisfaction increase. Fleishman and Harris also investigated possible interaction effects; their analysis pointed out that initiating structure may have less effect upon subordinate satisfaction than does consideration. Based on findings obtained in the above mass-production settings, one is tempted to conclude that initiating structure relates negatively to subordinate satisfaction. On the other hand, House, Filley, and Kerr (1971) attempted to replicate the Fleishman and Harris study in three research

and development organizations. Not only did the study fail to confirm the previous results, it suggested their opposite: initiating structure had a positive linear relationship to satisfaction. House (1971) has developed a comprehensive path-goal theory of leadership which apparently reconciles these divergent findings; specifically it is organizational level and the degree of task structure that determine the effects of IS upon worker satisfaction.

To further complicate the matter, there may be instrument-associated differences between the IS scales of the old and new forms of the LBDQ; the latter version has eliminated items referring specifically to authoritarian practices, i.e., "He rules with an Iron Hand." In view of the above problems, Stogdill's multicompany study (1965) most often found that structure was positively related to satisfaction with the company and loyalty to it, where C and IS were positively intercorrelated. Additional evidence suggests that initiating structure is either positively related (Hoffman, 1968) or unrelated (Boyles, 1968; Kroen, 1968) to subordinate satisfaction, but it seems generally less important than consideration (Cunningham, 1964). In the industrial setting under relatively high degrees of task structure, it is expected that IS (LBDQ, revised form) would correlate positively with satisfaction of workers as Stogdill found, but that this effect may be due to the moderate intercorrelations with consideration.

Participative leader behavior can be expected to correlate positively with employee satisfaction, but the results may be quite sensitive to situational differences. In six studies cited by Yukl

(1971), some evidence was found to support the idea that allowing subordinates more freedom in decision-making associates with greater satisfaction on their part; however, the extent of relationship may depend upon employee personality factors, their expectations, and the nature of the situation. For example Vroom (1959) found a positive correlation between P and Satisfaction for subordinates having a high need for independence, but not for those with a low need for independence. It seems also that participation relates to more favorable employee attitudes when the decisions are nonroutine in nature and when subordinates regard their participation as being legitimate (Filley and House, 1969). In industrial settings participation may be more important for satisfaction in unit/small batch systems where the degree of task structure is lower and workers have greater control over the physical means of production. More advanced production technologies with highly programmed tasks may offer less opportunity for subordinate participation, thereby limiting the range of supervisory behavior exhibited.

More technically competent supervisors also tend to have more satisfied work group members, and like consideration, this does not appear to be a function of technologically determined situational variables. Cooper (1970) suggested that technical competence not only affects subordinate's actual performance on the job, but may also extend to factors such as absence and lateness which are rough indicators of worker satisfaction. In this framework the complexity of the task itself and the nature of the structural relationships in the work group may encourage the exercise of "task-relevant" leadership. Mann and

Hoffman (1960) compared foreman practices in two power plants that differed appreciably with respect to operations technology. In both plants the partial correlation between human relations skills and satisfaction were significantly greater than the partial correlation between technical competence and satisfaction. The relative importance of these two factors were the same in both the automated plant and the older plant, and situational variables seemed to have no effect. Thus like initiating structure, technical competence appears to be less important than consideration in its effect on subordinate satisfaction.

Supportive dimensions of supervisory behavior (C and P) therefore tend to have a greater impact upon employee satisfaction than do the instrumental aspects (IS and T). It has also been suggested that the effects of initiating structure and participation are more highly situational in nature than the others. The question arises as to how much additional satisfaction is provided by other supervisory behaviors beyond the effects of consideration. The answer appears to be that satisfaction with the supervisor and overall satisfaction are influenced most heavily by C and are less a function of other supervisory behaviors in the industrial setting. Therefore it is expected that a similar "leadership mix" will be associated with individual job satisfaction in each type of production system. Specific hypotheses are presented in the following chapter based on the above rationale.

Leader Behavior, Proficiency, and Productivity

Whether or not leadership makes a difference with respect to effective task accomplishment seems to depend upon the type of

organization under investigation. First, a review of the literature concerning leadership in certain nonindustrial settings suggests that supportive leader behaviors (C and P) are in fact positively and significantly related to effective task performance by the supervisor and his work group. Included in this category are studies of clerical and other kinds of personnel in business and government organizations; specifically excluded are the extensive number of studies done in military and educational organizations (see Stogdill, 1974). The selected settings are referred to here as constituting the "low technology" condition since machines, tools, and equipment are relatively unsophisticated and the operations technology is less likely to be an important situational determinant. These serve as a basis for comparison with results obtained in manufacturing organizations. Since there are many exceptional cases in the industrial setting, the findings were classified rationally based on information contained in each study according to the predominant form of technology (Woodward, 1965): unit/small batch, mass production, and continuous process systems.

Many studies using the four dimensions of supervisory behavior, operationalized somewhat differently in various programs of research, were classified and reviewed; the results obtained appear to be more interpretable within the framework of organization theory. In unit/small batch systems virtually every dimension of leader behavior was found to be important for success in one company or another. The predominance of positive findings suggested that leader behaviors, in general, are very important to getting the job done. This was somewhat similar to

the low-technology category except that there was a general requirement for instrumental supervision (IS or T) in addition to the supportive dimensions. In contrast, the collective results for mass production organizations provided a much less consistent picture. Some of the evidence indicates that a high initiating structure, low consideration style relates to effective performance. However, the finding of no relationship was quite frequent suggesting that leadership is generally less important for achieving task goals in these settings. Finally in continuous process systems, leadership-success relationships remain problematical as very few studies have actually been carried out in this type of organization. Nevertheless, the conclusions drawn from this review differ from those of Dubin (1965) and Korman (1966) and are the basis for developing testable hypotheses in the following chapter.

The "low technology" condition. For the most part, early studies of leader behavior focused on nonindustrial settings; this often produced the effect of minimizing technologically-determined situational variables. For example, Katz, Maccoby, and Morse (1950) selected twelve high and twelve low producing sections in a large insurance company; each section was performing comparable tasks under similar conditions. The behavior of supervisors was assessed by means of employee interviews. It was found that in high-producing sections, supervisors tended to be employee-oriented (C) and to exercise general supervision (P); supervisors of low-producing sections were described as being job-centered (IS). A replication among railroad maintenance-of-way workers produced a similar positive relationship between employee-centeredness and rated

productivity (Katz, Maccoby, Gurin, and Floor, 1951); however, no difference was attributed to the effect of general supervision in this case, and this can be accounted for in terms of task-related variables, i.e., less routineness in the work (Vroom, 1964). "In the railroad situation, the technical competence and experience of the foreman had a chance to effect performance because of the amount of freedom enjoyed by the section unit" (Katz, 1948, p. 82). While these studies emphasized the importance of the human relations dimensions, it is also clear that the pattern of behavior that relates to success depends somewhat on the nature of the situation.

Similarly, in another early program of leadership research, Comrey, Pfiffner, and Beem (1952, 1953) studied U.S. Forest supervisors and office supervisors of the California Department of Employment. For comparable samples that corresponded to the first-level of supervision, the authors found that supervisors of the higher performing work groups were more democratic, more sympathetic, and more willing to help subordinates in their work. Supportive leadership practices related to task effectiveness in both cases. In contrast, where operations technology affects the functioning of the work group, the results may be more highly variable. In an overhaul and repair department of a naval air station, Wilson, Beem, and Comrey (1953) found that both high and low producing shops had supervisors who were described as being considerate and participative, and in this case, supportive leader behaviors may be associated with failure as well as success.

Lawshe and Nagle (1953) also found that a subordinate-described dimension equivalent to consideration correlated with rated group performance in an industrial office setting (r = .86). Other Michigan research in low-technology subunits tended to confirm their early results. Mann and Dent (1954) conducted a study in eight accounting departments of an electric power company; here there was substantial agreement between promotability ratings of foremen and subordinate perceptions of human relations skills. Likert (1961) reported findings concerning the leadership effectiveness of life insurance agents. Supervisors who were seen as being sympathetic and cooperative, interested in the agent's success, democratic, and sincere, were likely to have higher producing agencies. Finally, Inkik, Georgopoulous, and Seahore (1961) examined leadership in a parcel delivery station, another setting in which operations technology is less likely to exert constraints on the functioning of the work group. The criteria of effectiveness included individual and station success, both in terms of measurable productivity and ratings. Their findings strongly indicated that performance levels will be higher under conditions of good superior-subordinate communications, satisfaction with supervisory behavior, empathy, and work autonomy. Based on the previous evidence, it is not surprising that Likert (1961) concluded in favor of considerate, nondirective, and participative leadership (combined with high performance goals) for attaining both satisfaction and productivity. The only fault, it would seem, was failing to recognize that these results could not be generalized to all types of organizations. Also, it may be that for unstructured task situations, instrumental behaviors of supervisors are occasionally important to success.

Other studies in the low-technology condition, which actually used the two major Ohio State dimensions do not completely support the above conclusions, however. For a female clerical sample, Gekoski (1952) found that initiating structure, but not consideration, was positively correlated to rated individual productivity in an insurance office. This is one of the few studies in which no relationship with consideration was found. On the other hand, Boyles (1968) found that high IS supervisors had lower performing workers and that high C supervisors had higher performing workers in an airline office. Similarly, Cunningham (1964) found mixed results when he examined the leadership-success relationships for two kinds of county agents. Consideration was significantly related to effectiveness for agricultural agents, but IS was not; initiating structure was significantly related to effectiveness for 4-H agents, but C was not. While generally the most effective agents were found to be above the median for both variables, it is also clear that situational factors have an effect on which dimensions correlate with performance.

In another insurance setting, Graham (1970) provided further evidence to support the idea that considerate behavior relates positively to performance, regardless of the leader's personality characteristics. Finally, Trieb and Marion (1969) carried out a study in two retail grocery store chains. In both, subordinate described consideration was positively associated with rated group performance, but initiating structure correlated with success in only one of these samples. Apparently the effects of initiating structure depend more heavily on the nature of the situation since a much less consistent pattern of correlations exist. It is thought that under conditions of low task

structure and/or high role ambiguity the relationship may be positive, but for highly programmed work activities, it may be zero or negative (House, 1971). Thus far it seems that considerate leadership practices are consistently related to productivity and proficiency in the low-technology category, and initiating structure may or may not be important for success, depending on the nature of the situation.

Not enough attention has been given to organizational factors that determine the situational variables affecting the work group. It has been suggested throughout that one of the most important situational variables is the degree of task structure, which helps to account for a number of exceptional cases within the low-technology category. Mott (1972) has reported evidence to support the interpretation that task structure determines the relative importance of supervisory behavior as it relates to organizational effectiveness. In this study, nine divisions of the National Aeronautics and Space Administration were categorized according to the overall level of task structure, and the results were striking.

> When task structure was medium or low, virtually every measure of supervisory behavior was highly related to the index of division effectiveness (as well as productivity and adaptability) . . . When task structure was high, an almost opposite pattern occurred. Few measures of supervisory behavior accounted for much variance in the effectiveness index (Mott, 1972, p. 162).

However, technical skills (T) do remain important when tasks are highly structured. Apparently all dimensions of leadership are relatively less important when tasks are highly structured and routine since "the number and range of leadership activities associated with successful performance decline" (Mott, 1972, p. 173). It should be pointed out that this line

of reasoning parallels the development of the industrial leadership model presented earlier. Additionally it was suggested that leader behaviors are more important when tasks are highly interdependent (and coordinating between units is essential), and supervisory technical problem solving activities become more important with increasing task independence.

Table 2 summarizes the findings for the "low-technology" category; the majority of studies suggest that considerate, participative practices consistently relate to productivity and proficiency criteria. Given these reasonably similar results across several programs of research, the major inference is that supportive leadership practices do make a difference with respect to effective task accomplishment. It is also difficult to make a case for the high IS-high C pattern being generally more effective in these types of organizations, contrary to the most widely-held view. Rather the effects of initiating structure depend upon the degree of task structure in the particular setting. While many reviews of the literature have pointed to the relationships between supportive leadership and satisfaction, they also indicate that no consistent relationships exist with respect to performance or productivity. In view of the above evidence, it seems that these relationships do exist, if only in certain "nonindustrial" production systems.

Moving into manufacturing settings, it seems that both higher levels of initiating structure and consideration are required for success. Fleishman and Simmons (1970) obtained behavior descriptions and performance ratings from superiors of 318 Israeli foremen; these supervisors

TABLE 2

LEADERSHIP EFFECTIVENESS IN THE "LOW-TECHNOLOGY" CONDITION

Investigator/ Setting	Type of Sample	Predictor	Type of Criterion	N	IS	P	C	T	Remarks
Katz et al. (1950) insurance company	clerical supervisors	interviews	measureable productivity	24 sections	-	+	+		IS = job-centered; P = general supervision; C = employee-centered.
Katz et al. (1951) railroad gangs	railroad supervisors	interviews	rated productivity	36 sections	-	0	+	+	general supervision not associated with high productivity--nonroutine tasks.
Gekoski (1952) insurance office	clerical supervisors	LBD (Hemphill, 1950)	individual productivity	21	+		0		
Comrey et al. (1952) U.S. Forest Service	supervisors	questionnaire (Comrey, 1954)	rated productivity	18 groups	0	+	+	0	P = democratic, sharing information; C = sympathetic, less critical of subordinates, more willing to help in their work; T = personal competence.
Comrey et al. (1953) Dept. of Employment	office supervisors	questionnaire (Comrey, 1954)	rated productivity	30 offices	0	+	+	0	
Wilson et al. (1953) Naval Air Station	repair crew foremen	questionnaire (Comrey, 1954)	measurable productivity	33 shops	0	0	0	0	both high and low producing sections had supportive leaders.
Lawshe & Nagle (1953) industrial plant	office supervisors	attitude measure	rated productivity	14 groups			+		
Mann & Dent (1954) electric power co.	accounting supervisors	questionnaire	promotability ratings	8 depts.		+	+		
Likert (1961) insurance company	insurance agents	interviews	rated productivity	20 agencies		+	+	+	P = democratic; C = sympathetic, willing to help subordinate; T = technical competence.
Indik et al. (1961) parcel delivery co.	supervisors	questionnaire	individual & sta. success	27 stations		+	+		
Cunningham (1964) county agents	agricultural & 4-H agents	LBDQ (1957)	rated performance	?	1/2		1/2		most effective agents above median for both C and IS.
Boyles (1968) airline offices	reservation agents	LBDQ (1963)	rated performance	168	-		+		
Trieb & Marion (1969) 2 chain grocery stores	group leaders	LBDQ (1957)	rated performance	108	1/2		2		C correlates with performance in both samples, IS relates to success in one.
Graham (1970) insurance sales office	insurance agents	LBDQ (1957)	rated performance	116			+		
Mott (1972) NASA-1	supervisors	questionnaire	rated productivity	9 divisions	+	+	+	+	all dimensions positively correlated under conditions of low to medium task structure; only T remains important for highly structured tasks.

were attending training sessions and it is likely that several different types of production systems were represented. Those high on initiating structure and consideration were the most effective and those low on both were found to be least effective. In the industrial setting, then, the most frequent generalization of the Ohio State researchers remains tenable; however, there are a sufficient number of exceptional cases to warrant further examination by type of production system. It seems quite clear that both the early Michigan and Southern California research programs altered their original conclusions when they investigated the nature of industrial leadership (Comrey et al., 1955; Kahn, 1956).

Unit/small batch systems. There have been several leadership studies carried out in industrial organizations which might be classified as unit/small batch production systems. Where production operations are more highly variable and difficult to control, and when the nature of the tasks are somewhat less routine and the responsibility for quantity and quality of output rests mainly at the lower levels of the organization, then leader behaviors of the first-line supervisor are extremely important for effective task accomplishment. For example, a further study in the University of California series (Comrey, High, and Wilson, 1955) demonstrated that the task-oriented aspects of aircraft supervisors' behavior were significantly related to three statistically independent measures of productivity: (1) the work-rework ratio, (2) the acceptance rate, and (3) the production rate. Foremen of the more productive work groups were judged by their subordinates to possess good judgment and technical competence (T), and to provide psychological structure by

communicating, planning, and organizing (IS). Not only were the instrumental aspects important, but successful supervisors also were helpful to subordinates in the performance of their jobs (C) and tended to be more participative and less arbitrary (P). In contrast with their previous studies in the low-technology category, the authors drew the following conclusion.

> Good supervision is sensitive to the rights and needs of human beings, but over and above this, it is possessed of those personal qualities of technical competence which have been traditionally associated with good management (Comrey, High and Wilson, 1955, p. 99).

Patchen (1962) examined the way in which leadership behavior relates to group performance norms in a plastics material manufacturing plant. In this setting, work operations involved "extruding and laminating raw plastic materials, slitting the materials to standard sizes, printing on material, and form fitting it into such finished products as bags to hold food products" (p. 279), a relatively high-variety small batch system. Group performance norms correlated with productivity and efficiency of the work groups, and it was found that both an instrumental and supportive supervisory orientation was required to sustain these norms. Either encouraging efficiency or going to bat for the men was not sufficient to obtain high productivity. Furthermore, close supervision, defined as frequent checking on subordinates and <u>not</u> as reducing subordinates' freedom to do the work in their own way, does serve to increase productivity if leadership practices are also supportive. Again the need for structuring-like behaviors become apparent when the nature of the production task is comparably nonroutine, but the human relations dimensions are nonetheless important.

Four companies in the metals industry (three of which produced small parts and precision gears and bearings, thus approximating a unit/small batch operation) were included in Stogdill's multicompany study (1965). Supervisory consideration correlated positively with rated group volume in two companies, the only ones of 27 in which such a relationship occurred; initiating structure was significantly related to group drive in two firms, but surprisingly enough, not to rated productivity. Inconsistency in these results may have been due to the fact that the samples consisted of both foremen and general supervisors. A later study carried out in an electronics firm (Hoffman, 1968) was also classified as a small batch production system from the information available. Strong positive results were obtained in this case since all three dimensions of leader behavior correlated significantly with superior-rated effectiveness of the first-line supervisors (IS = .56; P = .46; C = .69; $p < .001$). These results support other findings in this category and are consistent with the model presented in the second chapter.

Two additional studies of leadership effectiveness in small batch operations were reported by Cooper (1966). Task relevance was defined in terms of job competence and motivation of the leader (T) and was assessed by means of superior ratings. In a pilot study of a board-making mill, it was found that supervisors high in task-relevance had subordinates who themselves were more highly proficient; specifically, strong negative correlations were obtained between technical competence and the frequency of process errors within work groups. The following study in a cooking-oil plant confirmed the above results, and it was

suggested that T was more important than initiating structure or consideration for obtaining good performance on the part of work group members.

> The main findings of the study were that the job performances of subordinate workers were significantly related to the proficiency levels of their work leaders--high subordinate performance being associated with high leader performance (Cooper, 1966, p. 79).

It has been suggested that in unit/small batch technologies that the task structure varies from low to moderate, and under these conditions the full range of leader behaviors correlate with success. Therefore as shown in Table 3, instrumental leadership is equally important as the supportive dimensions with respect to effective task accomplishment, if not more so. The one exceptional case was a subsample from a predominantly mass production operation (Fleishman, Harris, and Burtt, 1955); although the results obtained did not reach statistical significance, it should be pointed out that the pattern of correlations was reversed from that found to be effective in mass-production departments. Given the above evidence, then, does leadership make a difference with respect to work group productivity? When combined with the experimental data obtained from a leadership rotation study carried out in a furniture manufacturing company (Rosen, 1969, 1970), it is clear that the foreman plays an important part in determining the productivity of his work group. While it is likely that the level of work group performance in turn affects the behavior of the supervisor, as this data also showed, the impact of the leader's behavior on work group members and their output should not be underestimated. Contrary to

TABLE 3

LEADERSHIP EFFECTIVENESS IN UNIT/SMALL BATCH PRODUCTION SYSTEMS

Investigator/ Setting	Type of Sample	Predictor	Type of Criterion	N	IS	P	C	T	Remarks
Comrey et al. (1955) aircraft production	first-line supervisors	questionnaire (Comrey, 1954)	measurable productivity	29 depts.	+	+	+	+	No significant relationships with rated performance.
Fleishman et al. (1955) truck manufacturing	nonproduction foremen	SBD (Fleishman, 1953)	rated performance	23	0		0		Pattern of correlations reversed from that of production departments.
Patchen (1962) plastics products manufacturing	foremen	questionnaire (Patchen, 1962)	group performance norms	17	+		+		IS = encouraging efficiency, frequent checking on subordinates; C = going to bat for the men.
Stogdill (1965) 4 companies in the metals industry	general and first-line supervisors	LBDQ (1963)	rated group volume	117	0		2/4		IS related to rated group drive in 2 companies.
Cooper (1966) board mill/cooking oil plant	first-line supervisors	superior-rated T, IS, and C (Cooper, 1966)	measurable productivity	57	1		1	2	
Hoffman (1968) electronics firm	first-line supervisors	LBDQ (1963)	rated performance	?	+	+	+		

Dubin's statement that leadership has no appreciable effect on measurable productivity (1965, p. 37), in unit/small batch production systems at least, it may have very important effects. In general, a high degree of superior-subordinate influence is required for success in this type of production system, and both instrumental and supportive aspects contribute substantially to effective accomplishment of tasks.

Large batch/mass production systems. Other studies of leadership effectiveness have been carried out in organizations that may be classified as mass production firms; for the most part, the results differ from those carried out in unit/small batch technologies. In these industrial settings, large quantities of highly standardized items are produced utilizing somewhat more sophisticated tools, equipment, and machinery (i.e., assembly lines). The nature of the overall production task tends to be more routine and predictable, and it becomes increasingly possible to control results by impersonal means such as standard operating procedures and routine reports. Simultaneously, control over the physical means of production is removed from the worker's domain, and the impact of leader behavior on productivity is thought to be small relative to other factors in the work environment. As we shall see, many studies in this category show no correlation between leader behavior and effective task accomplishment. With respect to supervisory proficiency, the pattern of effective leadership may be affected by technologically-determined situational variables; thus the style of leadership that relates to good performance on the part of the foreman is that which is appropriate to the type of production system in which he works.

A study among 20,000 workers engaged in the production of tractors and earth-moving equipment showed that supervisors who were both production-oriented (IS) and employee-oriented (C) tended to have higher-producing work groups.

> Foremen with the best production records were those who were most skilled at and most concerned with meeting employee needs for information, support, and assistance. But they were not less concerned with production. Their subordinates were more likely to state that high productivity was important to their foremen, and that foremen supervised by seeing that production was kept up as well as doing other things (Kahn, 1956, p. 44).

The qualification that instrumental activities are positively related to work group productivity clearly altered the early generalizations of the Michigan research program concerning the job-centered supervisor. However, the findings with respect to employee-centeredness were somewhat equivocal. Here the positive relationship with productivity was explained in terms of the supervisor's response to high performance by work group members rather than as an antecedent of performance (Vroom, 1964); also it became evident that group cohesiveness was an important intervening variable in determining this relationship. Furthermore, when a very broad range of task structure is represented in an organization, the high structure, high consideration pattern of leader behavior is likely to be most effective on a global basis.

A study by Argyle, Gardner, and Ciofi (1958) was based on 90 foremen in eight British factories that produced electrical motors in large batches; it is frequently cited as stressing the importance of supportive, human-relations-oriented practices for attaining high productivity.

> (However), the only dimension of supervisory behavior which bore a significant relationship to measured output of the departments supervised was the punitive or non-punitive correction by the foreman of worker mistakes and errors (Dubin, 1965, p. 29).

When combined with general supervision and democratic relations (P), the supportive aspects of leader behavior accounted for less than 18 percent of the variance in work group productivity. It appears that the provision of autonomy for workers does not contribute to effectiveness of the work group and that the human relations dimensions are relatively less important than other factors in this type of production system.

It may be that leader behaviors in general have little effect upon productivity in mass production organizations, especially when the degree of task structure is high. No relationship between initiating structure or consideration and rated group volume, quality, or drive were found in two textile firms contained in Stogdill's investigation (1965). Finally, Cummins (1970) attempted to specify the relationships between leader behavior and work group performance in a large manufacturing firm. Several situational variables were taken into account, and no differences were found in leadership effectiveness under conditions of high or low task structure. It was noted that the rated quality of output was associated with initiating structure, but only when the leader was also highly considerate. Consideration positively moderated the relationship between IS and productivity in this case; thus it may be important only insofar as it allows higher levels of structuring behavior, and it is these instrumental activities that affect productivity of the work group. When the foreman exerts low to moderate

pressure for production, both productivity and morale increase; although very high pressure reduces morale, output continues to increase (Likert, 1961). It is clear that increased pressure does result in higher production.

When rated job performance of the supervisor has been used as the criterion of effectiveness, there is some reason to believe that initiating structure is important for success. Fleishman, Harris, and Burtt (1955) carried out a study in a motor-truck manufacturing plant; foremen rated highest by their superiors tended to be high on initiating structure and low on consideration, but this was true only for mass production departments. Dubin (1965) noted that the final assembly departments could be categorized as unit/small batch, while the parts and subassembly departments approximated mass production operations.

> Results indicate that there appears to be a difference between production and non-production departments in the requisite kinds of leadership. In the non-production departments, the foremen who are rated most proficient by their own supervisors apparently motivate their work groups to get the job done by creating a friendly atmosphere and by considerate behavior with a minimum emphasis on work methods, standards, and structuring of activities. (In production departments) considerate behavior is very good from the morale standpoint, but not so good for proficiency as judged by the foreman's own boss (Fleishman, Harris, and Burtt, 1955, pp. 103-104).

While the authors interpreted these findings in terms of "demandingness of the time schedule" or pressure for production, this is only one of several technologically determined situational variables that affect the pattern of leadership that relate to success. It may be that a high IS-low C pattern may be appropriate for success in the mass production setting.

> Thus, for production workers in unit and small batch technologies, the factor of high consideration . . . (does) have a bearing on rated departmental efficiency and foreman proficiency . . . In mass-production, efficiency and effectiveness are positively related to low consideration by the foreman, and much structuring of the situation by him (Dubin, 1965, pp. 37-38).

There is some question as to whether studies not cited in the above review would support this contention. Most predominantly, the finding of no relationship has been common in the large batch/mass production category. Pierce (1970) treated C and IS as dependent variables, thereby attempting to ascertain the effects of the situation upon the foreman's behavior style. One specific finding was that supervisors of machine-paced groups exhibited higher levels of initiating structure than did other supervisors. Although routineness in the nature of the task encourages higher structuring, this does not mean that IS relates consistently to proficiency. For instance, Rambo (1958) developed a comparable instrument for measuring C and IS; using an analysis of variance procedure, it was found that supervisors in different departments of a mass production firm do differ in the degree of consideration and structure shown to subordinates, but no differences were found across vertical echelons. No significant relationship among C and IS and superior rankings at three managerial levels were found. Similarly, Yunker (1972) investigated relations between leader behaviors and success in a branch plant manufacturing automotive maintenance tools. While consideration correlated positively with overall satisfaction, neither C nor IS were related to supervisory proficiency. If leadership is less important to success in mass production technologies, then we would expect to find a number of occurrences where no relationship was found.

Dansereau (1970) studied the leader behavior of line and staff supervisors in a steel manufacturing company. The initial analysis revealed no significant correlations with performance. However, when the behavior descriptions were standardized within "super-units," initiating structure, technical competence, and perceived hierarchical influence were found to correlate with superior rated proficiency. In this setting, it appeared that a cluster of instrumental supervisory behaviors were associated with success.

> Consideration seemed to make little or no difference in either performance or satisfaction, but initiating structure seemed to be of major importance. It may satisfy subordinates for the supervisor to be "considerate" but it still appears that it has little to do with a style of leadership that should be adopted by a supervisor in this organization to be effective with superiors and subordinates (p. 28).

Thus, situational variables having to do with the nature of the overall production task seem to affect what pattern of leader behavior relates to the proficiency of supervisors.

With reference to Table 4, it is possible to state a few tentative conclusions concerning leadership effectiveness in mass production systems; here the degree of task structure is thought to vary from moderate to high. Overall, initiating structure is of primary importance in getting the job done, but it is also likely that supervisory behavior in general has less effect on productivity of the work group as compared with the low technology or unit/small batch categories. With respect to proficiency of the foreman, high structuring is associated with superior ratings of job performance, but there may be a general tendency to rate this type of leader exceptionally high

TABLE 4

LEADERSHIP EFFECTIVENESS IN MASS PRODUCTION SYSTEMS

Investigator/ Setting	Type of Sample	Predictor	Type of Criterion	IS	P	C	T	Remarks
Fleishman et al. (1955) truck manufacturing	production foremen	SBD (Fleishman, 1953)	rated performance	72	+		-	Pattern of correlation reversed from that that of nonproduction departments.
Kahn (1956) tractor factory	foremen	interviews	rated productivity	300 groups	+		+	Generally, the most productive groups had foremen who were both employee-centered and production-centered.
Rambo (1958) manufacturing firm	3 levels of management	rating scale (Rambo, 1958)	ranked performance	151	0		0	
Argyle et al. (1958) production of electrical motors and switchgears	foremen in 8 factories	interviews, questionnaire (Argyle, 1957)	measurable productivity	90		0	+	C = nonpunitive correction of mistakes; P = democratic supervision. Differences in productivity attributed to method of supervision not greater than 18%. Supervision has greatest effect when work output is not machine paced.
Stogdill (1965) 2 textile firms	2-3 levels of management	LBDQ (1963)	rated group volume	94	0		0	
Skinner (1969) textile firm	foremen	SBD (Fleishman, 1953)	superior ratings	21	0		0	
Cummins (1970) large manufacturing plant	first-line supervisors	superior rated IS and C	rated productivity	133				The same individuals rated leader behavior and productivity. C moderates the relationship between IS and quality of production.
Dansereau (1970) steel manufacturing plant	production and non-production foremen	LBDQ (1957); RDI (Dansereau, 1970)	rated performance	48	+		0 +	Results emerged only when predictor scores were standardized within "superunits".
Yunker (1972) automotive tool plant	first-line supervisors	LBDQ (1963)	rated performance		0		0	

(Anderson, 1966). It would also appear that the supportive aspects of leadership are less important for success. The evidence with respect to participation is sketchy, but it seems essential only when change is implemented, i.e., under conditions of unusually low task structure (Coch and French, 1948; Lawrence and Smith, 1955; Strauss, cited in Whyte, 1955). Therefore, within the larger framework of organization theory, we would expect instrumental patterns of behavior to be most effective for accomplishing tasks, although the impact on measurable output may be small indeed.

Continuous process systems. There is only meager evidence concerning the leadership-success relationships of first-line supervisors in continuous process production systems. Some of the available research utilized measures of leadership attitudes which were obtained by self-description rather than by subordinate description of the leader's behavior. One study in a petrochemical plant revealed a correlation of .29 between consideration (LOQ) and forced-choice performance ratings taken two years later (Bass, 1956). Similarly, Dunteman and Bass (1963) found that the task-orientation scores of 66 first-line supervisors in a large chemical plant were correlated with higher performance ratings; they were also found to be higher in interaction-orientation than their superiors. The general picture that emerges is one of considerate, task-relevant leadership, at least as it is associated with the proficiency of the foreman.

However, in a continuous process soap manufacturing operation, it was found that neither C nor IS (LOQ) correlated with the success of

middle managers (Fleishman and Harris, 1962). Dubin (1965) relied on the latter study to support the interpretation that "neither consideration nor structuring relates to rated efficiency of performance" (p. 38) and in general "the more a technology resembles a continuous process system the more appropriate will close supervision be" (p. 47). Other evidence is not consistent with these conclusions, however. Besco and Lawshe (1959) examined leadership effectiveness in a cereal processing plant and showed that rated departmental effectiveness correlated significantly with subordinate perceived consideration, but not with subordinate perceived structure. This was the only behavioral study carried out in a manufacturing setting that contains information on this matter, and it would appear that consideration is required for departmental effectiveness, if not productivity. Also, the pattern of leader behaviors were opposite of that shown to be appropriate for success in mass-production settings by Fleishman, Harris, and Burtt (1955).

> The Fleishman group did their studies in situations that enabled the foreman to operate within a wide range of initiating structure-type behavior. The organization in which (the current) study was conducted had highly automated production facilities. Most of the workers were machine tenders or machine feeders. Job assignments, production schedules, and duties were fairly static. Work pace was determined by the equipment and little change was possible" (Besco and Lawshe, 1959, p. 580).

This study lends further credence to the idea that task structure is an extremely important determinant of the pattern of leader behavior that relates to successful job performance in different types of production systems; it does oppose Dubin's specific hypothesis that a high IS, low C pattern is even more likely to be appropriate in continuous process systems. While there is substantial reason to believe that leadership

does not affect the level of work group productivity, a considerate style is likely to be associated with rated success of the supervisor.

Other evidence bearing on this point was obtained in two chemical firms and an oil refinery contained in a study by Stogdill (1965). While C and IS showed no relationship with rated volume of production, highly considerate behavior was correlated with rated group drive in all three process systems. In one sense, these data support the notion that leader behavior may be relatively less important to the productivity criterion than other factors (i.e., the technology itself), but that consideration may still play an important part in fulfilling the supervisor's maintenance function--maintaining group functioning and making it resistant to internal and external stress. Given an understanding of the structure and functioning of the continuous process system, it seems reasonable that considerate behavior on the part of the first-line supervisor fulfills an important role requirement in this type of organization.

Summary

The preceding review of the literature has suggested that the behavior of first-line supervisors can typically be related to various measures of productivity and proficiency, but the relationships may vary depending on the type of production system under study. In the low technology condition, supportive aspects of supervisory behavior consistently related to successful job performance. Specifically in unit/small batch manufacturing operations, all of the major dimensions of leadership were thought to be related to success. The results were not so easily interpretable in large batch/mass production systems; it seemed that

instrumental activities would predominate and would be more appropriate for successful task accomplishment. With respect to continuous process systems, considerate supervisors are likely to be more successful, if only with respect to supervisory proficiency and not productivity. The results also appear to depend upon the nature and requirements of the organizational situation, but they also show that effective leadership has technological and organizational preconditions. The former determines both the nature of the overall production task and certain situational variables that impinge upon the work group, while the latter concerns the arrangements for controlling the production operations.

CHAPTER IV

METHODOLOGY

This chapter provides the description of methodology and procedures utilized in a comparative study of organizational leadership designed to explore the previously developed theoretical framework. The field settings, measures utilized, and conditions of administration are described herein. Hypotheses developed both from organization theory (Chapter II) and a review of the literature (Chapter III) are then presented. Two general questions that guided the research were:

1. Are the relationships between leader behavior and worker satisfaction the same or different in various types of production systems?
2. Are the relationships between leader behavior and rated proficiency of the supervisor the same or different in various types of production systems?

The contingency approach developed earlier would predict that there is a general relationship between behavior of the first-line supervisor and the satisfaction of work group members. Thus with respect to the former question, it is generally expected that a similar "leadership mix" will be effective in each type of production system; that is, similar patterns of leader behavior (most notably consideration) will relate to worker satisfaction in all three companies. In contrast, the answer to the second question would be that different patterns of leader

behavior would correlate with proficiency of the foreman in each firm. While considerate, supportive behavior may serve to satisfy the needs of subordinates in some universal sense, the pattern of leadership that relates to effective task accomplishment depends upon the role requirements of the particular kind of production system and the nature of the situation. The results of the project are presented and discussed in the following two chapters with emphasis upon the implications for further investigations of organizational leadership.

Field Settings

Three industrial firms were included in the study, all being manufacturing subsections of large, multidivision corporations. Here the term "organization" or firm refers to these particular production subunits. These companies were selected from a list of eleven possible alternatives, such that the "type" of production system corresponded roughly to each category of Woodward's classification scheme. Although the selection of companies was based on the a priori judgment of the investigator and depended somewhat less upon the willingness and/or ability of the firms to participate in the study, it appeared that an adequate range of "operations technology" was obtained and that substantially different types of production systems were examined (see pp. 36-40). From the list of companies that had been judged to be representative of the three major technological types, selection was carried out sequentially in order of preference. Companies A and B were thought to be typical of unit/small batch and mass production operations, respectively, and were the initial choices in these

categories. From the first two continuous process firms contacted, a negative reply was obtained, but at the third--Company C--they were willing to participate in the research project.

While the organizations were selected to obtain a very wide range of operations technology within the industrial setting, they differed in several other ways such as geographical location, size, and whether or not a union was present. Two of the firms were located in the Southeastern part of the United States while the third was located in the Northeast, pointing to differences in the subpopulation characteristics of the workers employed. With respect to the size of the particular production subunits studied, one was small (approximately 350 hourly employees) and the others comparatively larger (about 1350 and 1900). Similarly concerning the question of unionization, two of the three were represented by a national labor union. It is interesting to note that no two organizations were similar on more than one of these factors. these firms did have in common that they were all functioning quite successfully, and because of the different structural arrangements, there were similar numbers of first-line supervisors to serve as subjects for the present investigation.

Data Collection

In each of the three manufacturing organizations, preliminary interviews were held with higher level managers in order to explain the purpose of the study and to obtain information concerning the nature of the particular production system. After it had been determined that the technological characteristics of the operations were appropriate

to the objectives of the research project, the methods of collecting data were presented and discussed, and the company's participation solicited. The data were collected in the following manner for each organization. A list of first-line supervisors, hereafter designated as foremen, who had five or more hourly-paid employees that were engaged in "production-operations," was prepared. Samples of foremen thus consisted of all those who were readily available at the time of the study and whose work groups were engaged in manufacturing or direct support activities (e.g., maintenance, quality control).

Meetings were scheduled for the foremen's superiors followed by meetings for the foremen themselves, both during regular working hours. The purpose of the study was presented in a cover letter prepared by the investigator and endorsed by the company's top management (see Appendix A). The stated purpose was to investigate "the nature of management and supervisory practices in several different organizations located across the country." Three important conditions were mentioned in the letter and reinforced in the endorsement procedure: (1) individual questionnaire responses would be confidential, (2) only results for the company as a whole would be reported to higher level management, and (3) participation in the study was voluntary. Verbal instructions reiterated the major points contained in the cover letter, with emphasis on the confidentiality of every individual's response, and questions were taken with respect to the above material. Forms administered to superiors and foremen are presented in Appendices B and C respectively.

At the meeting of the first-line supervisors, or on the day following, questionnaires were distributed to randomly chosen hourly

employees to be completed on a take-home basis. Lists of work group members had been prepared in advance by choosing alternate names from an employee information system or other administrative lists of names. The employee questionnaires were handed out to these individuals by their foremen; the measures included were those contained in Appendix D each of which were accompanied by the cover letter and endorsement. A sealable envelope was provided for the return of the questionnaire, and this was accomplished by means of in-plant mail or by means of a receptacle placed near the plant entrance. Where available, additional information on employees was collected from company records including sex, age, tenure, salary level, and years of education. In order to permit matching with the other data collected, it was necessary to identify questionnaires on an individual basis; so for this reason the envelopes were coded appropriately.

Finally, the Technological Classification Form (see Appendix E) was completed by at least three higher level managers and/or staff specialists who were familiar with the range of production operations employed. This was intended to identify possible technological differences between work groups for purposes of within-company analysis of leadership effectiveness. To the extent that it was possible, the same procedures for data collection were followed in each organization and this was accomplished within a three-month period.

Measures Employed

In view of the many constructs relevant to the study of organizational leadership phenomena, a large number of variables

including technology, social control, worker satisfaction, rated job performance of the foreman, supervisory behavior, and situational dimensions were measured. The purpose was first to assess the linkage between technology at the level of the organization and social influence processes. Then, taking the production system as the basic unit of analysis, leadership-satisfaction and leadership-performance hypotheses were tested. The instruments employed in this effort possessed previously demonstrated reliability, acceptable scale characteristics, and were judged to be appropriate for operationalizing the theoretical concepts. No new measures were constructed since existing ones met the requirements for the current investigation.

Operations technology. While the organizations selected were thought to cover a broad range of operations technology, actual measurement of the input-throughput-output dimensions of technological complexity were carried out using the Technological Classification Form (Taylor, 1970). The TCF consisted of ten rating scales completed by at least three expert judges in each company. The dimensions measured included:

1. the nature and degree of standardization of the raw materials or inputs,
2. the sophistication of the hardware or "operations technology," and
3. the nature of information exchange relevant to system output.

Scale reliabilities, characteristics, and use as a theoretical construct are presented in Taylor (1971). The purpose of using this instrument

was to assess differences among organizational subunits that had more or less sophisticated technologies.

Because of the difficulty in obtaining judges that had detailed knowledge of the entire range of technology, each rater completed the scales independently and then a consensus rating was obtained for the group as a whole. In Companies A and B it was possible to obtain differential ratings between groups, although the variability in the mass-production firm was somewhat restricted. In Company C the technology was essentially the same for all work groups, varying primarily between the new and the old production systems. Thus a more global measure of within company differences in technology was also obtained. In Companies A and B this corresponded to the difference between manufacturing and nonmanufacturing groups; in Company C it amounted to classifying work groups according to the readily observable differences among the existing subtechnologies and production control workers.

Social control. Interpersonal control structure was measured by a set of matching items in each of the superior's, foremen's and employee's questionnaires. Thus the respondents at the lower three levels in the organization were asked to indicate how much influence the various persons or groups of persons listed actually had on matters pertaining to operations. The several hierarchical levels consisted of:

1. the top executive for the entire production operation,
2. managers designated on the organization chart to be at the next lower level (e.g., section managers),
3. immediate superiors of the foremen,

4. the foremen themselves, and

5. nonsupervisory employees.

For each of these levels, the respondent indicated the amount of influence exercised on a five-point scale ranging from "very little or none" to "a very great deal." The above operationalization corresponds to that of several studies presented in Tannenbaum's book (1968). It is, however, an assessment of the entire organization's control structure by only the lower three levels; the same individuals also provided the information concerning leadership effectiveness in the organization.

Worker satisfaction. Randomly selected members of work groups each completed the Job Description Index (Smith, Kendall and Hulin, 1969). The JDI is a cumulative-point adjective checklist which measures satisfaction with five areas of the job including the (1) type of work, (2) supervisor, (3) coworkers, (4) pay, and (5) opportunities for promotion. Scores are obtainable for each facet of satisfaction, and a derived score of overall satisfaction can be obtained by summing the five scale values. The instrument was based on a sophisticated model for measuring job attitudes, has been carefully developed and validated, and extensive normative data exists for its interpretation. Scale characteristics of the JDI include a high degree of internal consistency ($r = .80 - .88$) and reasonably low intercorrelations between scales. Moreover, Smith, et al. (1969) demonstrated that direct scoring of the scales met all the requirements for convergent and discriminant validity. Since the instrument has been filled out by thousands of employees across the

country, it is possible to make comparisons between different organizations as well as within company analyses. An additional advantage of using this measure has to do with the fact that it may be used with employees that have only an elementary school education. For purposes of the present study it is also important that it yields a separate score for satisfaction with supervision as well as overall satisfaction; it is expected that the former will be more heavily influenced by leader behaviors than the latter, but that both are important criteria in the study of organizational leadership.

The five JDI scales were presented on separate pages of the employee's questionnaire (see Appendix D). On each scale subjects were asked to place a "Y" (yes) or "N" (no) next to each of several adjectives depending on whether it applies to their job; if they were unable to decide, a "?" (don't know) would be entered. Items were scored +3 for a yes response to a positive adjective or a no response to a negative adjective, +1 for a question mark, and 0 for a "yes-negative" or "no-positive" response.

Supervisory proficiency. In accordance with the model presented in the first chapter, the relationship between leader behaviors and rated supervisory proficiency were of primary concern. The Performance Rating Form in Appendix B was completed by superiors. They were asked to choose from the prepared list of names all those foremen with whom they had worked and those whose job performance they had observed on several occasions. Using only those individuals well known to superiors (those written on the first page), supervisory proficiency was rated on scales

concerning three types of skills and overall job performance. Definitions of the skills were based on those used in research carried carried out at the University of Michigan, adapted from a study by Cohen (1969).

> (1) Human Relations Skill: Ability to get along with others. Showing a personal concern for others. Getting those one leads to do the best they can. Letting workers know where they stand and how they can improve themselves. Treating others fairly.
>
> (2) Technical Skill: Being an expert in the work specialty one supervises. Technical "know how" of work methods, equipment and procedures. Clearly understanding complex technical problems and being able to solve them. Seeing future technical problems before they arise and taking steps to prevent them.
>
> (3) Administrative Skill: Being able to plan, schedule and organize work for those he leads. Giving the right job to the right man. Clearly explaining work, inspecting it, and following up on it until it is finished. Setting realistic deadlines. Carrying out company work policy and procedure. Also, showing a willingness to assume one's managerial responsibilities.

All supervisors were evaluated one scale at a time using a nine-point rating scale with anchors ranging from "not currently meeting skill requirements needed for acceptable job performance" to "far exceeds the skill requirements of the job" (see Appendix B). Raw scores corresponded to the scale values circled by the raters. The ordering of the first three scales was varied in a random fashion, but in every case the fourth was a summary scale of overall job performance. Therefore supervisory proficiency, as evaluated by superiors, consisted of three skill measures and an overall performance rating; it was hoped that this standardization of the rating dimensions together with the emphasis upon observable job performance would lead to high conspect reliability of the ratings.

Performance effectiveness can be operationalized in a number of ways, the most common being an overall superior evaluation of job performance. Where a single measure of job performance is used, the results may be dependent upon the source of the ratings. Anderson (1966) pointed out that superiors tend to rate higher those administrators who are described by their subordinates as initiating structure (IS) in the work group; in those cases where subordinate ratings have been used, however, group members rate as better leaders those whom they have described as being highly considerate (C). Furthermore, some investigators have found that there is little agreement among different raters of an individual's behavior (Mitchell, 1970) and the type of criterion utilized--superior, peer or subordinate--may affect the generalizability of the results. While peer ratings have been used extensively in small group research on leadership, only a very few studies have applied this method in field settings. It will be recalled that supervisory proficiency was defined in terms of how adequately an individual fulfills his organizational role, and this may be evaluated by peers as well as superiors. The relationship between leader behaviors and proficiency on the job can best be examined by using multiple measures of performance effectiveness.

Peer ratings of proficiency were obtained with respect to human relations, technical, and administrative skill dimensions (see Appendix C); definitions of these aspects were identical to those rated by superiors. The peer nomination technique has typically been used in sociometric studies of leadership in the face-to-face group, and may be

regarded as a means of evaluating each member on a recognizable quality, i.e., his contribution to group effectiveness. In this case, however, they provided an independent assessment of the adequacy with which the foreman fulfills his organizational role. The evidence concerning the reliability and validity of peer ratings has been presented elsewhere (Hollander, 1954) and is quite substantial. Only positive nominations were asked for in order to minimize the expected dysfunctional consequences of foremen making negative choices with respect to their peers. Apparently positive nominations can be equally valid as measures of performance effectiveness (Webb, 1948; Kaufman and Johnson, 1974). Foremen were instructed to nominate peers who were best in terms of the defined attribute, then the next best and so on, in order of preference. Scores on each dimension consisted of the number of times an individual was so chosen by his peers. Two derived scores of overall proficiency were obtained from these nominations: (1) the total number of times a person was mentioned by his peers for all three dimensions and (2) the number of times a person was chosen as being first across all three dimensions, i.e., outstanding skills.

Leader behavior. Work group members filled out four scales describing their foreman's behavior including the dimensions of (IS)--initiating structure, (C)--consideration, (P)--participation, and (T)--technical competence as shown in Appendix D. The first three are subscales of the Leader Behavior Description Questionnaire (Stogdill, 1963) and are those behaviors aimed specifically at influencing work group members. Stogdill (1965) has reported that the internal consistencies

of the IS, C, and P scales consistently fall in the range of .80 and above for several widely differing populations. Initiating structure refers to behavior that organizes, defines, and clarifies subordinate activities and relationships, i.e., instrumental leadership. Consideration refers to behavior which indicates friendship, mutual trust and respect, and interpersonal warmth between supervisor and subordinate, i.e., supportive leadership. An experimental study reported by Stogdill (1969) presented evidence concerning the construct validation of these two major dimensions of leadership under well-controlled laboratory conditions. It had been found in earlier studies that these aspects were independent of one another (being orthogonal dimensions), but a recent study reviewed a large number of studies that showed this assumption is not justified for the LBDQ (Weissenberg and Kavanagh, 1972). A third dimension, here called Participation, is the Tolerance of Member Freedom subscale of the LBDQ; this represents the amount of participative decision making allowed by the leader, a separate dimension of leadership in Yukl's theoretical framework (1971). Based on five different administrations of the Participation scale, it was concluded in the above paper that P tends to show moderate intercorrelations with consideration, but is relatively independent of initiating structure.

The fourth dimension of supervisory behavior was called technical competence and was constructed by combining two scales which apparently measured the same thing, job ability and the quality of task-oriented advice and decisions. Five of the items were developed by Comrey, Pffiffner, and High (1954) using factor analytic methods. Moderately high reliability was reported for the measure ($r = .75$) when administered

to a large number of industrial production workers. Further, it showed significant positive relationships with several measures of work group productivity (Comrey, Wilson, and High, 1955). Three additional items were used in several research studies reported by Mann (1965), and these tended to have the highest interitem correlations of his three skill mix indicies. A composite of the two scales had only seven items, however, because one was identical; thus it was inferred that the internal consistency of the scale would be adequate. Subordinates rated their foremen with respect to technical competence along 5 point, Likert-type graphic rating scales.

Situational variables. The nature of the leadership situation is also likely to differ appreciably between different production systems. Two of these, role conflict and role ambiguity, were provided by employees as a part of their larger questionnaire. These scales assess the degree of (1) "congruency-incongruency or compatibility-incompatibility in the requirements of the role" and (2) "the predictability of the outcome or responses to one's behavior and the existence or clarity of behavioral requirements" (Rizzo, House and Lirtzman, 1970, p. 155-156). The development and analysis of these scales is described in the above reference. In the present administration, 14 items were combined into a single scale entitled "Problems of Work Role" and were rated by employees on a 7 point scale ranging from very false to very true (see p. 238).

Other situational dimensions were obtained from the foremen themselves. The Leader Situation Description Questionnaire (LSDQ)

defines six situational variables that may be important in determining the conditions under which leadership is effective. The scales are defined by Yukl (1969) as follows:

1. Task Difficulty: The number of highly developed skills required to perform the subordinates' tasks, the susceptibility of these tasks to error, and the general perceived difficulty of the tasks.
2. Task Structure: The number of ways in which the task can be performed and the degree of rapid performance feedback available to the leader. Highly structured tasks have little procedural variability and considerable performance feedback.
3. Cooperation Requirements: The amount of subordinate role interdependence and the degree to which subordinates depend upon each other for successful completion of their tasks.
4. Production Pressure: The frequency and intensity of requests for faster decision-making or better group performance made by persons outside the leader's group.
5. Leader Power: The capacity of the leader for rewarding subordinates, and the extent to which the leader is authorized to give orders and enforce their implementation.
6. Error Cost: The seriousness of performance errors for the organization.

These scales were cluster analyzed by Yukl from 52 original items selected with reference to an analysis of group dimensions (Hemphill, 1956), a factor analysis of task dimensions (Shaw, 1963), and leadership research carried out by Fiedler (1967). Evidence of reliability is not presented by Yukl (1969), although an initial construct validation was carried out. When administered to samples of foremen in Companies A, B, and C, the items were rated on a six-point scale with anchors that differed according to the wording of the item stem (see p. 222).

Hypotheses

Control structure. Based on organization theory, it has been suggested that the total amount and distribution of control vary meaningfully as a function of the type of production technology employed. Tests of hypotheses were carried out to assess the linkage between technology and control for the organization as a whole, by comparing the results obtained in each of the three companies. When the nature of the overall production task is more highly structured, routine, and repetitive, a high degree of interpersonal influence may be less important to the effective functioning of the organization (Perrow, 1967). To the extent that impersonal and/or mechanical mechanisms are used to regulate the activities of the lower organizational levels, less social control would be required for accomplishing these tasks.

1a. It was hypothesized that the average total control is the greatest in the unit/small batch company (A), smaller in the mass production firm (B), and smallest in the continuous process firm (C).

With the increased predictability of work activities, multisystem, impersonal control mechanisms tend to predominate (Reeves and Woodward, 1970), and the locus of administrative control shifts upward in the hierarchy (Dubin, 1965). Under these conditions, the slope of the social control function is likely to become steeper. Mass production operations approximate the mechanistic type of organization and large fixed power differentials tend to exist between levels. In continuous process firms, although there is a great concentration of managerial personnel and many levels of authority, the structure is more closely

aligned with the organic model (Woodward, 1965), and much less differentiation with respect to power exists between managerial levels.

1b. It was hypothesized that the slope of the control function is greatest in the mass production company (B), and smaller in either the unit/small batch firm (A) or the continuous process firm (C).

Finally, the ways in which social control relates to organizational effectiveness was explored. At the lower levels in the organization, employees who describe a greater amount of social control in their immediate hierarchy are likely to be more satisfied than those that do not. Thus it is expected that the average amount of control exercised correlates positively with the various aspects of job satisfaction of work group members. Also, those foremen who exercise a great deal of interpersonal control over matters pertaining to organizational functioning are likely to be rated higher by superiors than those who are less influential. Here the average amount of control as described by subordinates is expected to correlate positively with the rated job performance of the foreman. Although the most proficient foremen are not necessarily expected to have the most satisfied work groups, the amount of social control should relate positively to both aspects of organizational effectiveness.

Worker satisfaction. The satisfaction of the individual worker was thought to vary primarily as a function of his work group supervisor's behavior style and also more globally as a function of the organization's production technology. At the level of the system,

organizational environments differ in the sources and amounts of satisfaction that are available to the production worker.

2a. The components of overall job satisfaction including satisfaction with work, supervision, coworkers, pay, and promotions were expected to differ between the three types of production systems.

While it was not feasible to predict how each of these facets might vary under different technological conditions, based on organization theory it seemed that the overall level of job satisfaction would be lowest in the mass-production company.

2b. The overall level of individual job satisfaction was hypothesized to be greater in the unit/small batch firm (A) and in the continuous process firm (C), than in the mass-production operation (B).

The combined effects of many factors including (1) a higher degree of task specialization and less variety in the nature of the work itself, (2) a high degree of machine pacing combined with less opportunity for social interaction with coworkers, and (3) administrative control standards that are difficult to meet simultaneously, might produce this overall result. The differences largely have to do with job content factors and social relationships and it is these components which seem especially important, although the rewards offered might also differ. The best available evidence (Blauner, 1964; Shepard, 1971) indicates that job satisfaction in mass-production settings is comparably low. Nevertheless, there are also large individual differences with respect to what satisfies any particular employee, and the workers have been

selected for and have themselves adapted to the demands of that production organization.

While the level of job satisfaction is likely to vary between different types of production technologies, a positive relationship between several aspects of supervisory behavior and worker satisfaction were predicted generally. The most frequent conclusion of leadership research is that considerate leader behavior associates positively with greater satisfaction.

2c. Satisfaction with the supervisor and overall satisfaction correlate positively with supervisory consideration in each of the three production systems.

This is likely to be the case regardless of individual difference variables and should extend beyond the effects of intercorrelations with other dimensions of supervisory behavior. Also in no situation would workers be more satisfied with a lesser degree of consideration on the foreman's part. Correlating subordinate descriptions of other leader behavior dimensions and their satisfaction levels, the relationships were also expected to be significantly positive.

2d. Satisfaction with supervision and overall satisfaction were hypothesized to correlate positively with supervisory initiating structure, participation, and technical competence.

However, the magnitude is likely to be smaller and to depend more on the nature of the situation. For example, the positive effects of initiating structure and participation are due in some degree to the moderate scale intercorrelations of the LBDQ; these would be much smaller

when the effects of consideration are controlled. Likewise, the additional contribution of IS would be greater in some situations than others; that is, there are conditions under which more or less of these types of behavior would be preferred by subordinates. Thus, technologically-determined situational variables affect the leader behavior desired by employees beyond the predominant effects of consideration.

Supervisory Proficiency

Based on the theoretical model (Chapter II) and a review of the literature (Chapter III), leadership was thought to be of more importance for successful task accomplishment in certain types of production systems than others. In contrast with the leadership-satisfaction hypotheses, it was also expected that a different "leadership mix" would associate with supervisory proficiency in each type of production system. In the unit/small batch technology, a broader range of behavior seemed essential for success.

3a. In Company A, initiating structure, participation, consideration, and technical competence are positively related to rated job performance of the supervisor.

There is less need for freedom of the workers in mass-production operations and participation is not a requirement of the supervisory role. Nevertheless, consideration and technical competence have correlated positively with proficiency and productivity in some cases, but not in others.

3b. In Company B, initiating structure, consideration and technical competence are positively related to rated job performance of the supervisor.

Little is actually known about the patterns of leadership in continuous process operations; what evidence there is would suggest that consideration is the most important dimension.

3c. In Company C, consideration is positively related to rated job performance of the supervisor.

Where role prescriptions differ substantially, so will the patterns of leader behavior that are required to fulfill these roles.

The second major hypothesis follows from the above reasoning; if different leader behaviors are required for successful job performance in each type of production system, then the strength of the association between behavior descriptions and proficiency ratings are expected to differ.

3d. In Companies A, B, and C, differences in the correlations between the average behavior descriptions and criterion measures are predicted.

While directional hypotheses were difficult at the onset of the study, greater participation and technical competence were thought to be important in unit/small batch operations as compared with the more advanced production technologies. Likewise, less initiating structure and technical competence seemed essential for success in continuous process operations.

Finally, the last hypothesis of a general nature concerned the relative importance of leader behavior for success in each type of production system. Leadership was seen as being essential for getting the job done in unit/small batch technologies, less so in mass production technologies, and was likely to have even less effect in continuous process technologies.

3e. Thus, it was expected that leader behavior accounts for a decreasing proportion of the variance in rated supervisory proficiency as the sophistication of the operations technology increases.

Here proficiency ratings were regressed upon the four dimensions of supervisory behavior and technologically-determined situational variables in each company separately.

Thus the comparative methodology utilized in this study enables the testing of hypotheses concerning behavior-success relationships in different types of production systems. From previous studies it was possible to state initial expectations concerning leadership effectiveness in each technological type. When the organization rather than the work group is taken as the basic unit of analysis, differences rather than similarities in leadership-success relationships should be apparent. Finally, the idea that leader behavior is more important for success under certain technological conditions than others will also be explored.

CHAPTER V

RESULTS

Conceptions of technology presented earlier appear to be useful in delineating an approach to the study of organizational leadership. At the level of the system, technological sophistication was thought to affect formal structure, administrative and social control processes, and hence the nature of the role that the supervisor is expected to fulfill. By bringing organization theory to bear upon the problem of industrial leadership, it was possible to choose production systems that have a high likelihood of having different social control processes, situational demands and supervisory roles. The findings with respect to technological type and social control are presented first, lending some initial support to the control structure hypotheses. Following this, questionnaire responses are then examined for each organization, both separately and on a comparative basis. Hypotheses concerning leadership behavior and organizational effectiveness were tested empirically using correlational methods and multiple regression techniques. While predictions concerning the similarity of the leadership-satisfaction relationships were generally confirmed, only selected leadership-performance hypotheses received any support from data collected in this study. An extended discussion of the results with implications for future studies of organizational leadership is presented in the final chapter.

Technology and Social Control

Figures 9, 10, and 11 show the control graphs for Companies A, B, and C, respectively. In the unit/small batch firm there is considerable agreement among the three levels indicating an "oligarchic" structure; that is, the section managers (superiors) appear to possess equal or greater influence over organizational activities as compared with top management. In contrast, the mass production firm has what might be called a "hierarchic" structure with the top management exerting more influence on activities than the next lower level and so on for each successively lower level. In this case it should be noted that there is less agreement between the judgments of superiors, foremen, and employees. The nonsupervisory employees tend to overestimate the power of higher levels, relative to the average control structure, and the superiors tend to underestimate influence from the top. Finally, the continuous process firm represents a hybrid structural form, being "oligarchic" at the top according to superiors and foremen, but "hierarchic" at the bottom according to both foremen and employees. Here even wider divergence in evaluation exists between superiors, subordinates, and foremen. It is interesting to note that superiors apparently overestimated the influence of the lower levels in the organization as compared with the average; similarly, it may be that employees have underestimated the influence of higher levels in the organization at least compared with the foremen's and superior's descriptions of the way in which organizational activities are influenced.

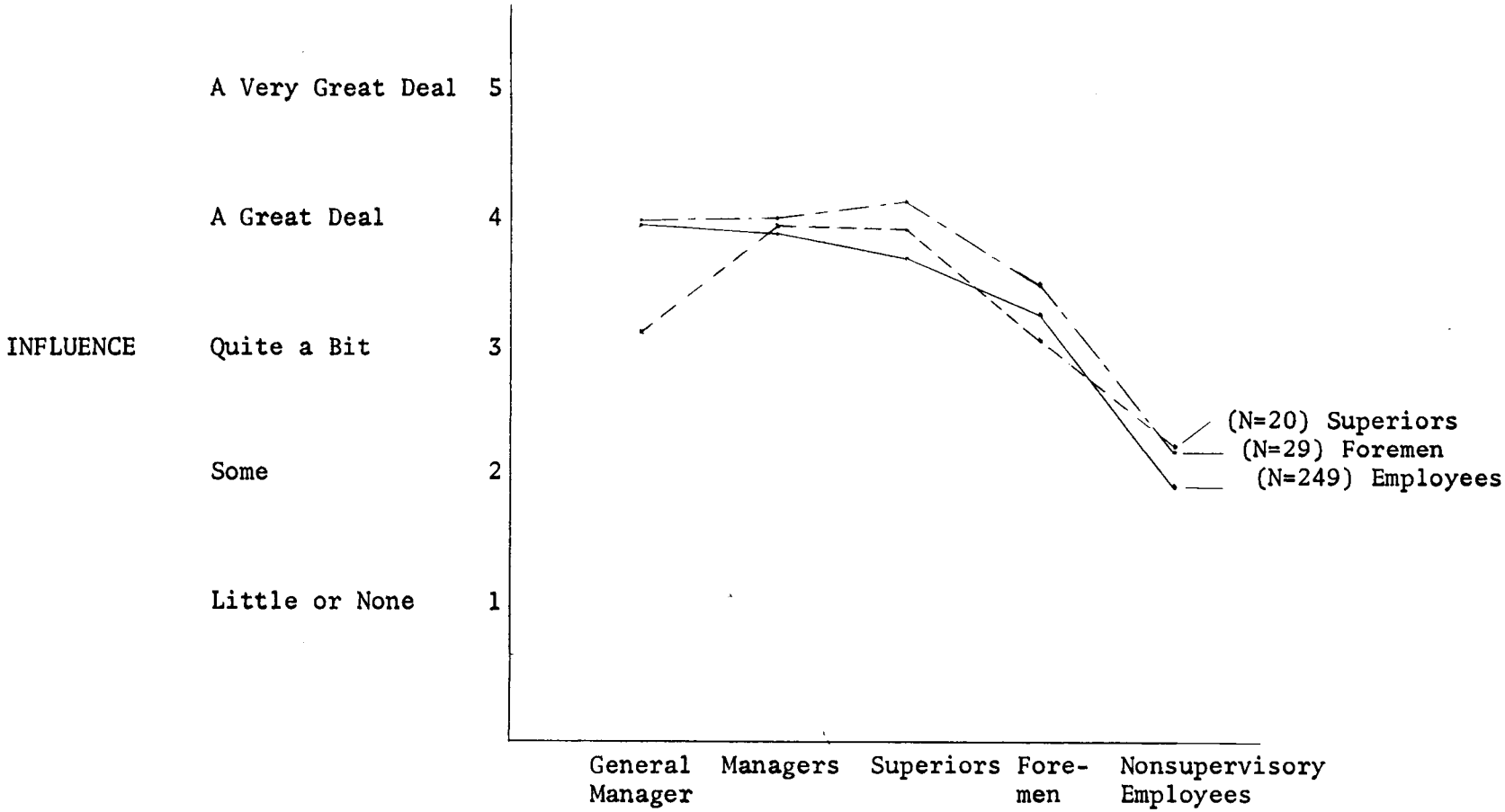


Figure 9. Company A: Total amount and distribution of control in a small batch production firm.

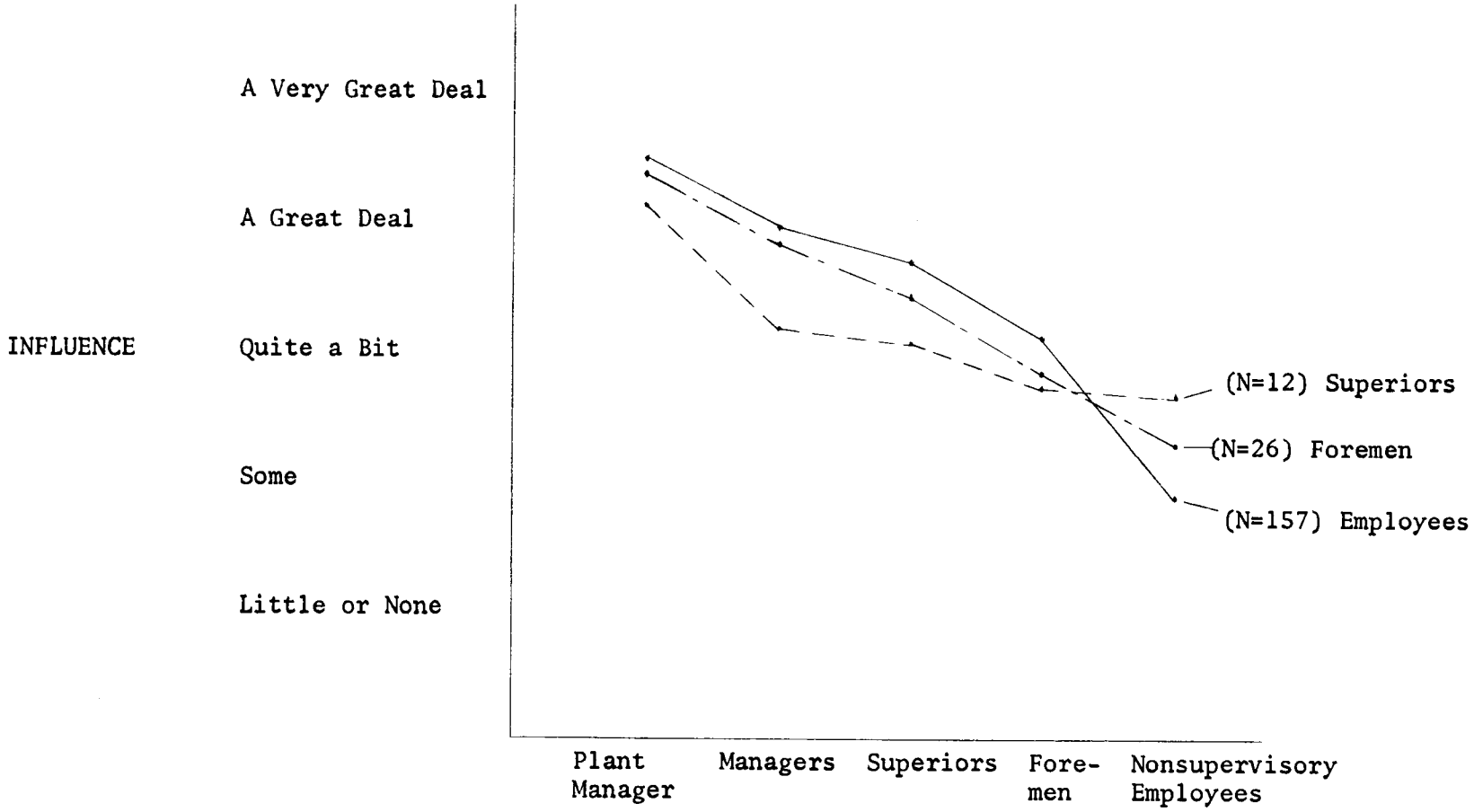


Figure 10. Company B: Total amount and distribution of control in a mass production firm.

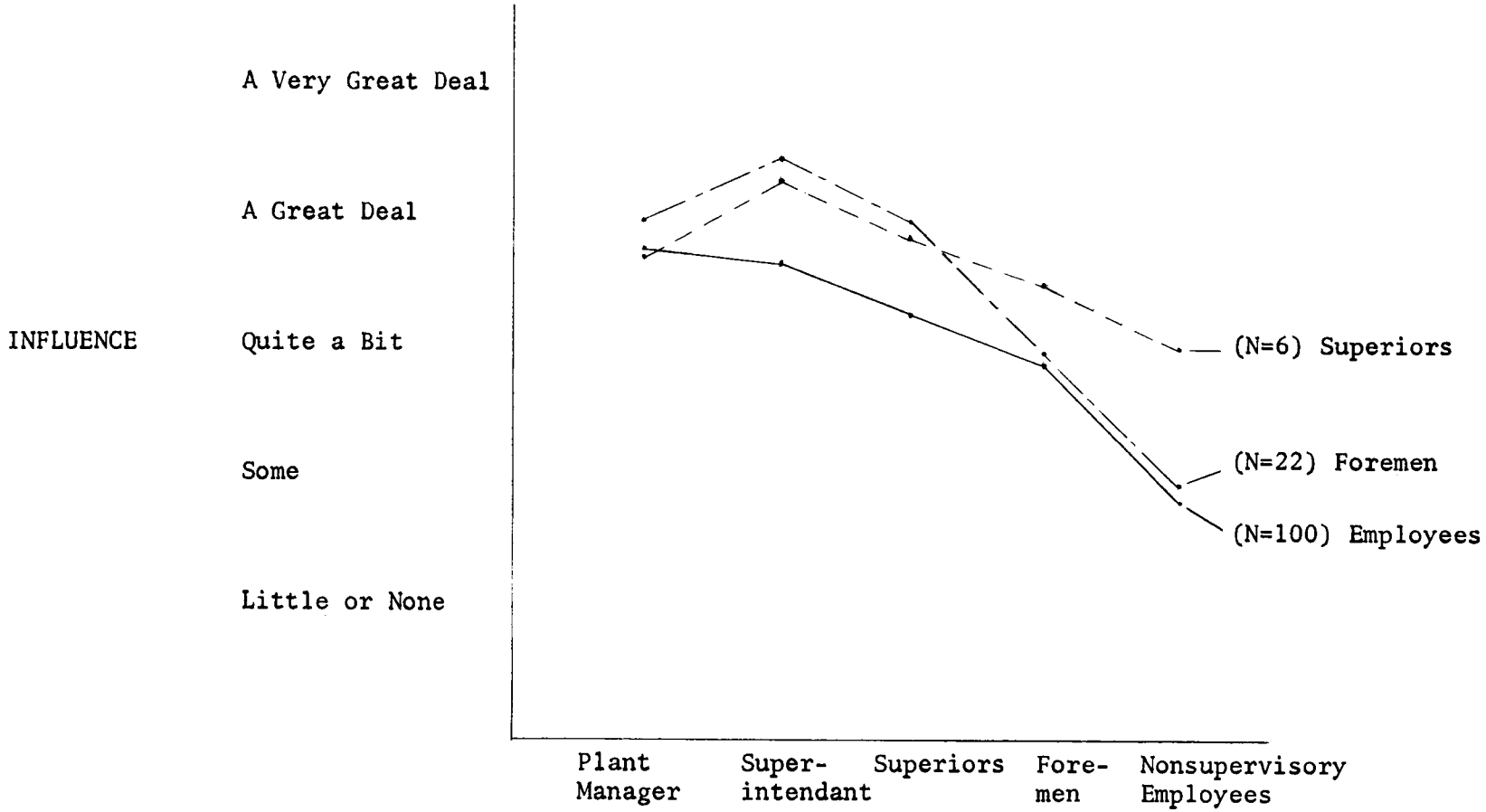


Figure 11. Company C: Total amount and distribution of control in a continuous process firm.

In order to calculate the mean total control for each organization, the judgements of respondents were averaged for superiors, foremen, and employees separately regarding each of the five levels (Tannenbaum, 1968, p. 76). This provided three separate estimates of the total control corresponding to the perceptions of the lower three levels in each company. It was hoped that the ranking for each of the three levels would be in the predicted direction, thus providing some support for the hypothesis that successively lower amounts of interpersonal influence existed in organizations with more advanced operation technologies. As the data in Table 5 illustrate, the total amount of control was quite similar for each type of production system and did not approximate the predicted rankings. However when attention is focused on the average amount of control exercised by foremen and nonsupervisory personnel, the lower two levels in each company, it appears that a successively lower amount of interpersonal influence is present in the more technologically advanced production systems. This provides some support for the notion that the locus of social control shifts upward in advanced production systems and a lesser amount of interpersonal influence is exercised at the lower levels.

From the control graphs presented earlier, by examining visually the slopes of the curves it appeared that the distribution of control was different for each of the three production systems. Measures of the slope of the control function were obtained by computing the average of the algebraic differences attributed to successively higher levels (Tannenbaum, 1968, p. 76). It was predicted that the average slope

TABLE 5

TOTAL (AVERAGE) CONTROL AND AMOUNT OF CONTROL EXERCISED AT LOWER LEVELS AS PERCEIVED BY SUPERIORS, FOREMEN, AND EMPLOYEES

Level	Company A	Company B	Company C
Superior	3.29 (N=20)	3.13 (N=12)	3.67 (N=6)
Foremen	3.62 (N=29)	3.33 (N=26)	3.47 (N=22)
Employee	3.34 (N=249)	3.43 (N=157)	3.04 (N=100)
Average Total Control	3.41	3.30	3.39
Foremen	2.92 (N=29)	2.54 (N=26)	2.40 (N=22)
Employee	2.58 (N=249)	2.45 (N=157)	2.30 (N=100)
Average Control at the Two Lower Levels	2.75	2.49	2.35

constant in the mass production firm would be the largest, suggesting the existence of greater power differentials between levels. The evidence relevant to the second hypothesis is presented in Table 6.

As would be expected, employees tend to perceive greater power differentials between hierarchical levels in the organization than do superiors in general. In Company B it can be seen that both superiors and employees both indicate greater differences between the five levels than in the other two production systems. It should be pointed out, however, that foremen in the advanced production technologies (both B and C) report similar average slope constants. In the mass production firm (B) this represented roughly equal differences across the five levels, while in the continuous process firm (C) it reflected small power differentials at the top and very large ones at the lower levels in the organization. Nevertheless, only in Company B did there exist agreement concerning the distribution of control for each set of data. Some support was noted for the second control structure hypothesis: that the existence of fixed power differentials is most likely to occur in the mass production category. While it may be that the total amount of control exercised in an organization relates to various measures of effectiveness (Tannenbaum, 1968), it may also be that technology acts as a constraint on the way in which social influence is distributed across levels. The implications of this finding will be discussed further in the final chapter.

As an intervening variable, the total amount of social control relates also to various measures of organizational effectiveness. For

TABLE 6

SLOPE CONSTANTS OF THE CONTROL FUNCTION IN THREE TYPES OF PRODUCTION SYSTEMS AS PERCEIVED BY SUPERIORS, FOREMEN, AND EMPLOYEES

	Company A		Company B		Company C	
Superiors	(N=20)	Average slope	(N=12)	Average slope	(N=6)	Average slope
level 5-4	- .90		+ .91		- .66	
4-3	+ .10	.19	+ .09	.35	+ .50	.17
3-2	+ .80		+ .41		+ .33	
2-1	+ .75		.00		+ .50	
Foremen	(N=29)		(N=26)		(N=22)	
level 5-4	- .10		+ .61		- .59	
4-3	- .14	.42	+ .35	.53	+ .64	.53
3-2	+ .66		+ .61		+1.00	
2-1	+1.27		+ .54		+1.09	
Employees	(N=249)		(N=157)		(N=100)	
level 5-4	+ .09		+ .59		+ .09	
4-3	+ .18	.52	+ .24	.70	+ .37	.50
3-2	+ .44		+ .58		+ .39	
2-1	+1.39		+1.39		+1.12	

example, an individual employee who described foremen as generally exercising greater influence over matters pertaining to the organization, also tended to be more satisfied with both the nature of the work, and his coworkers ($p < .01$) and to be more satisfied overall ($p < .001$) in all three companies. In the more advanced systems (B and C), very similar relationships between the amount of control exercised at the next highest level above the foreman (i.e., superiors) and satisfaction of employees. Thus it may be that greater amounts of social control at the lower organizational levels facilitate the maintenance aspects of the system for all production types. On the other hand high degrees of interpersonal influence may not be required for effective task accomplishment in technologically advanced production systems. It was found that the most proficient supervisors in the unit/small batch firm also had work groups that indicated a high degree of control at the foreman level ($r = .34$, $p < .05$), but this was not the case for either the mass production or continuous process organizations. In these latter cases, then, foremen need not be as influential with employees to get the job done.

Questionnaire Responses

Employees. Sample characteristics of hourly employees in the three types of industrial organizations varied widely (see Table 7). The individual difference information was collected from available records and these variables provide for some interesting comparisons between companies. Sex composition of the work force ranged from predominantly

TABLE 7

SAMPLE CHARACTERISTICS AND RESPONSE RATE OF EMPLOYEES IN THREE TYPES OF PRODUCTION SYSTEMS

	Company A	Company B	Company C
Sample size (n)	258	164	108
Number of groups	33	26	23
Response rate (%)	80.6	70.3	49.1
Average age (years)	45.5	31.1	--
Sex (% male)	54.7	6.1	100.0
Years of service	13.6	5.7	30.9
Education (% high school and above)	60.1	62.5	16.7
Average salary ($)	7877.55	5121.57	--

female (Company B) to about equally mixed (Company A) to all male (Company C). Large differences also existed in length of service and average age. It seems Company B workers consisted primarily of young females who had been on their jobs a relatively short time; in contrast, workers in Company C were considerably older males who had, on average, been employed by this particular firm for most of their lives. Characteristics of workers in Company A were in between these extremes with respect to each of these individual difference variables.

Table 7 also shows the response rate, here defined in terms of the percentage of questionnaires that were actually used in analysis. Since participation in the study was voluntary, some questionnaires were returned blank; others were incompletely or incorrectly filled out. Only those possessing complete satisfaction and leader behavior data were retained for purposes of analysis. As a result, it was necessary to eliminate three work groups from those originally selected in Company C. Even then there were several cases that had some other missing data, and consequently sample sizes fluctuated slightly for a few variables. The response rate was thought to be quite high in Companies A and B given that filling out the questionnaire was voluntary and that a number of employees described someone other than their immediate supervisor. This state of affairs was less satisfactory in Company C, since after eliminating incomplete responses only half of the original sample was retained. It should be pointed out that those who responded could have differed in important ways from those who did not, but there is no particular reason to believe that this was the case.

Several measuring instruments were contained in the hourly employees questionnaire (see Appendix B). A description of the data is presented by showing the means and standard deviations for each scale, assessing their measurement characteristics, and comparing the results obtained in the three settings. Of primary interest are job satisfaction and the description of supervisory behavior; a comparative analysis of these relationships will be presented in the following section.

Scales of the Job Description Index (Smith, Kendall, and Hulin, 1969) were found to possess reasonably good measurement properties. In Table 8, scale correlations are shown to average .26, .28, and .29 for Companies A, B, and C respectively. Also split-half estimates of reliability are presented; here half-scores for each scale were correlated and raised by the Spearman-Brown prophesy formula in order to obtain an estimate of internal consistency. Given the above, these scales appear to be entirely appropriate when production workers, some of whom have had little formal education, are used as subjects.

The means and standard deviations are provided in Table 9. In accordance with hypothesis 2a, large differences were found in satisfaction with work, promotions, and overall satisfaction (the sum of the five scales). Surprisingly enough, Company B showed the highest average level of overall job satisfaction. Much has been written about the worker alienation and/or job dissatisfaction that results from highly repetitive, routine work, and increased controls found in the mass production technologies (Blauner, 1964; Shepard, 1971). In view of these previous studies it was expected that the level of overall satisfaction

TABLE 8

SCALE INTERCORRELATIONS AND SPLIT-HALF RELIABILITY ESTIMATES FOR THE JOB SATISFACTION SCALES

	Company A (N=258)						Company B (N=164)						Company C (N=108)					
Satisfaction with:	1	2	3	4	5	r_{xx}	1	2	3	4	5	r_{xx}	1	2	3	4	5	r_{xx}
1) Work	-					.73	-					.79	-					.68
2) Supervision	.33	-				.82	.25	-				.79	.32	-				.79
3) Coworkers	.19	.42	-			.83	.37	.24	-			.83	.32	.36	-			.77
4) Pay	.30	.38	.00	-		.80	.24	.25	.29	-		.88	.30	.27	.18	-		.65
5) Promotions	.29	.28	.24	.20		.88	.14	.31	.27	.40		.84	.29	.28	.25	.36		.82
						.81						.82						.74

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR SCALES OF THE JOB DESCRIPTION INDEX

	Company A (N=258)			Company B (N=164)			Company C (N=108)		
	$\bar{X}$	s	(A-B)	$\bar{X}$	s	(B-C)	$\bar{X}$	s	(A-C)
Satisfaction with:									
Work	34.12	11.44		31.65	10.25	(z=9.86***)	20.74	7.94	(z=12.79***)
Supervision	40.78	10.79		42.12	9.59		40.20	10.83	
Coworkers	40.06	12.18		40.86	11.44		40.81	9.83	
Pay	13.90	7.05		12.73	7.02		14.08	6.63	
Promotions	8.13	7.38	(z=8.21***)	14.68	8.34	(z=6.70***)	8.00	7.85	
Overall Satisfaction	137.05	32.50		142.04	30.50	(z=5.07***)	123.86	27.85	(z=3.92***)

*** $p < .001$.

might be lowest in Company B; contrary to hypothesis 2b, the average level of overall satisfaction was significantly higher than in Company C ($z_{B-C} = 5.07$, $p < .001$) and higher than in Company A, but not significantly so. Overall worker satisfaction in the unit/small batch firm (A) was also greater than in Company C ($z_{A-C} = 3.92$, $p < .001$). The question then arises as to which components accounted for the comparatively low levels of overall satisfaction in the continuous process firm (C). It appeared to be due specifically to the very low levels of satisfaction with the work ($z_{C-A} = 12.79$, $z_{C-B} = 9.68$, $p < .001$). This was not surprising within the context of the present investigation; a short time previous to the survey this company experienced a labor dispute associated with the longer-term changeover to a more highly automated production. It seems that the immediate changes in the work rules were reflected in the overall measure. On other facets of job satisfaction, however, the results for Company C were similar to one or both of the other two production systems.

It is also likely that the subpopulation characteristics partially accounted for the large differences in job satisfaction found between the three production systems. For example, the predominantly female sample (B) showed a higher level of satisfaction with promotions than in either the mixed sample ($z_{B-A} = 8.21$, $p < .001$) or in the male sample ($z_{B-C} = 6.70$, $p < .001$). While it is possible that there exists substantially greater satisfaction with promotions in Company B, it is also true that females would tend to report higher levels of satisfaction for comparable promotion practices, thus accentuating the differences

between the types of production systems. The above illustrates that each of the components of the JDI are also affected differentially by several individual difference variables--sex, age, income, education, tenure--and community characteristics as well (Smith, Hulin, Kendall, 1969). Therefore, the differences cannot be ascribed explicitly to the type of production system, but must be interpreted in terms of the stratified norms for the Job Description Index.

Means and standard deviations for the supervisory behavior scales and the subordinate-perceived situational variables are presented in Table 10. No significant differences were noted between the average leadership scores (IS, P, C), but in Company B subordinates described their supervisors as being more technically competent than in the other two organizations ($z_{B-A} = 7.62$, $p < .001$, and $z_{B-C} = 5.85$, $p < .001$). Apparently technical competence is important in fulfilling job requirements of the supervisor on the assembly-line as was suggested in previous theoretical development. Also consistent with the higher overall satisfaction scores in the mass production firm (B) was the finding that role conflict was significantly lower than in both other companies ($z_{B-A} = 4.81$, $p < .001$; $z_{B-C} = 4.56$, $p < .001$). It would appear that the nature of this particular assembly line operation resulted in <u>less</u> role conflict for workers; likewise role conflict was greatest in Company C, perhaps relating to the technological changes that were occurring there.

Results concerning the interrelationships among the four dimensions of supervisory behavior clarified two conceptual problems found in previous studies of leadership. It had been thought that initiating

TABLE 10

MEANS AND STANDARD DEVIATIONS FOR DIMENSIONS OF SUPERVISORY BEHAVIOR AND SUBORDINATE-PERCEIVED SITUATIONAL VARIABLES

	Company A $\bar{X}$	s	(A-B)	Company B $\bar{X}$	s	(B-C)	Company C $\bar{X}$	s	(A-C)
	(N=258)			(N=164)			(N=108)		
Supervisory Behaviors									
Initiating Structure (IS)	40.95	6.20		41.37	5.40		41.43	5.86	
Participation (P)	35.21	6.89		35.56	5.98		36.70	8.41	
Consideration (C)	36.78	8.26		39.24	7.59		38.51	8.54	
Technical Competence (T)	24.39	6.74	(z=7.62***)	29.02	5.54	(z=5.85***)	24.18	7.33	
Situational Variables	(N=249)			(N=162)			(N=102)		
Role Conflict	23.51	10.33	(z=4.81***)	19.21	8.96	(z=4.56***)	27.64	11.03	(z=3.33***)
Role Ambiguity	12.98	5.24		11.91	5.75		11.50	5.51	

*** $p < .001$.

structure and consideration were orthogonal factors and that these two aspects alone accounted for the largest part of the variance in leader behavior. These assumptions concerning independence and exhaustiveness have been commonly accepted as the basis for extending the behavioral approach to leadership (Fleishman, 1971). The first of these issues was taken up by Weissenberg and Kavanagh (1972) where it was shown that the corresponding leader attitudes (LOQ) are independent, but the subordinate descriptions of leader behavior (LBDQ) are not. The current data (see Table 11) are consistent with this review in all three companies, i.e., that the revised IS and C behavior scales (Stogdill, 1963) are not independent at lower levels in the organization.

A second question concerning the comprehensiveness of the two dimensional theory has been raised by Yukl (1971). Here it was suggested that the supervisor's tendency to be participative (P), in the sense of allowing a high degree of subordinate freedom and decision-making autonomy is an additional aspect of leader behavior. What then were the interrelationships between participation, initiating structure, and consideration? First, the intercorrelations between IS and P are relatively small in Companies A and B and only moderate in Company C; this provides some additional support for the notion that separate dimensions are in fact being measured. It is particularly interesting to note that intercorrelations between IS and P were consistently smaller than those between the presumably "independent" dimensions of initiating structure and consideration. Second, the intercorrelations between C and P varied considerably in magnitude. Previous reviews of the

TABLE 11

SCALE INTERCORRELATIONS AND SPLIT-HALF RELIABILITY ESTIMATES FOR THE DIMENSIONS OF SUPERVISORY BEHAVIOR

	Company A (N=258)					Company B (N=164)					Company C (N=108)				
	1	2	3	4	r_{xx}	1	2	3	4	r_{xx}	1	2	3	4	r_{xx}
1) Initiating Structure	-				.79	-				.63	-				.68
2) Participation	.30	-			.86	.26	-			.66	.43	-			.86
3) Consideration	.55	.55	-		.87	.45	.42	-		.74	.48	.79	-		.73
4) Technical Competence	.52	.35	.67	-	.90	.44	.35	.56	-	.85	.33	.34	.60	-	.87

literature suggested that these supportive aspects of leader behavior show moderate (Yukl, 1971) to high (Filley and House, 1969) degrees of relationship. Thus consideration and participation showed a strong positive relationship in the continuous process firm (C), a considerably less positive correlation in the unit/small batch firm (A), and only a moderate relationship in the mass production firm (B). This suggests that subordinates may or may not differentiate clearly between the supportive aspects of leader behavior. It also seems that the inter-relationships between the various dimensions of leadership may be more complex than previously realized.

To further complicate the matter, technical competence (T) was expected to correlate most highly with initiating structure, the instrumental aspect of the tri-dimensional leadership scheme (see Filley and House, 1969). In both Companies A and B, the largest inter-correlations were between technical competence and consideration; in Company C the smallest r was between technical competence and initiating structure. It may be that industrial workers perceive the foreman's technical competence (T) more in connection with his job helpfulness and support (C), regardless of whether he exhibits structuring or participative behavior. In summary, it appears that P (tolerance of member freedom) should be included as a major dimension of leader behavior since it is relatively independent of IS and may or may not be correlated with C. Whether or not there exists a more adequate theoretical conception of the four dimensions of supervisory behavior may be investigated using factor-analytic methods.

It is evident from the foregoing that by choosing three production systems based on their technological characteristics that heterogeneous populations of workers were surveyed. It is also clear that the measures employed possessed adequate reliability. Differences in overall satisfaction between production systems were not as originally expected, however. Some of these can be interpreted in terms of temporary dissatisfying effects having to do with change of work procedures in Company C and in terms of individual difference variables that affect the specific components of job satisfaction. On the other hand, it may be quite possible to have quite high levels of job satisfaction within the mass-production category. Finally, it was suggested that participation should be included as a major dimension of leader behavior since it does not overlap initiating structure, nor need it correlate highly with consideration. The measures described herein were then utilized in the analysis of leadership-satisfaction relationships.

Superiors. Superiors of the foreman, i.e., those at the next higher level in each organization, completed questionnaires that called for the evaluation of supervisory proficiency along four dimensions: Human Relations Skill, Technical Skill, Administrative Skill, and Overall Performance. Each supervisor was rated on these scales by two or more individuals who were familiar with their performance. In completing the scales, superiors were asked to rate only those foremen with whom they had worked and those whose job behaviors they had observed on several occasions. Because of the method of obtaining the ratings, each superior rated a variable number of foremen and likewise, the foremen received no

fixed number of ratings. In Company A, 19 superiors rated 33 supervisors; in Company B there were 14 raters available to rate 26 supervisors. In Company C, however, only 8 raters completed the forms, and not all of the foremen in the original sample received an adequate number of ratings. A second administration of the same items was carried out with the names of those who had already received three or more ratings crossed off the list. This appeared to pose no problems for the raters; because of the rotating shift basis in the continuous process firm, all superiors were quite familiar with the job performance of each of the foremen. The average number of ratings per foreman was greater than four in each of the companies. Table 12 shows the means and standard deviations of the four rating dimensions in the three samples. It appeared that an adequate degree of variability was present to distinguish between more and less proficient supervisors.

The intercorrelations among the various rating dimensions are presented in Table 13. The degree of overlap was quite high in Companies A and B and somewhat lower in Company C. All four were retained for purposes of further analysis in spite of the likelihood of a considerable amount of rater halo, the idea being that the nature of supervisory proficiency may depend upon certain types of skills in the different production systems.

The method of obtaining the criterion data was intended to provide reliable estimates of the dimensions of supervisory proficiency. First, the raters considered only those supervisors whose job behavior was familiar to them. Thus, superiors were likely to rate foremen in their

TABLE 12

MEANS AND STANDARD DEVIATIONS OF SUPERIOR RATINGS OF HUMAN RELATIONS, TECHNICAL, AND ADMINISTRATIVE SKILLS, AND OVERALL PERFORMANCE

	Company A (N=33)		Company B (N=26)		Company C (N=23)	
	$\bar{X}$	s	$\bar{X}$	s	$\bar{X}$	s
Human Relations Skill	5.64	1.56	5.36	1.24	5.89	1.29
Technical Skill	5.31	1.71	5.42	1.53	5.60	1.56
Administrative Skill	5.57	1.72	5.17	1.31	5.61	1.41
Overall Performance	5.57	1.61	5.35	1.43	5.77	1.47

TABLE 13

INTERCORRELATIONS AMONG SUPERIOR RATING DIMENSIONS

	Company A (N=33)				Company B (N=26)				Company C (N=23)			
	1	2	3	4	1	2	3	4	1	2	3	4
1) Human Relations Skill	-				-				-			
2) Technical Skill	.67	-			.60	-			.31	-		
3) Administrative Skills	.72	.73	-		.65	.68	-		.63	.50	-	
4) Overall Performance	.83	.75	.83	-	.68	.75	.80	-	.49	.65	.61	-

own subunit and several others outside of it. By increasing the number of ratings per supervisor, within limits, the reliability of the average rating should be enhanced. Secondly, the three aspects of the skill mix (Mann, 1965) were defined behaviorally (see Cohen, 1969) in order to insure that the raters considered a number of different aspects associated with the domain of supervisory proficiency. After completing the skill scales, which were presented in a random fashion, the overall performance rating was obtained. It was hoped that this might contribute to the reliability of the overall performance measure, since the skill elements had been previously defined and evaluated. Third, ratings were carried out one scale at a time, enabling superiors to compare all foremen with one another while referencing the behavioral description at the top of the form. While these measures were expected to intercorrelate highly, the establishment of different rating sets was thought to be important.

Reliabilities of the superior ratings were estimated in terms of interrater agreement. The Harris intraclass correlation (r_H) is the ratio of systematic to total variance in these measures and provides an estimate of the reliability of a single rating. Cureton (1970) described a method for computing the intraclass correlation based on an analysis of variance procedure developed by Haggard (1954); this method is appropriate where the number of observations per individual are not equal. The formula is

$$r_H = \frac{(N-k)\ SST - N\ SSW}{(N-k)\ SST - (N-\bar{n}k)SSW,}$$

where N = the total number of observations (ratings), k = the number of categories (foremen), SST = the sum of squares total, SSW = sum of squares within, and $\bar{n}$ = the "degrees of freedom" average. Thus the ratio of systematic to total variance provides an estimate of the reliability of one rating; when raised by the Spearman-Brown formula

$$r = \frac{\bar{n}\, r_H}{1 + (\bar{n}-1)\, r_H},$$

providing an estimate of the reliability of the average rating is obtained.

Raw scores showed moderate reliabilities in Companies A and C, but were quite inadequate in Company B (see Table 14). It may have been that superiors were less familiar with the job performance of the foremen because of the more highly defined structural arrangements and/or less opportunity to interact with foremen outside of their department. For example, in Company C the rotating shift basis resulted in higher degrees of job-related interactions among superiors and foremen, and the most reliable assessment of performance was obtained in this case. In Company A also, there was a higher degree of exposure due to temporary project management operations and more frequent realignment of structure over time. The poor reliabilities obtained in Company B might also be attributed to some unknown difference having to do with the conditions of administration.

TABLE 14

CONSPECT RELIABILITY OF SUPERIOR RATINGS

	Company A (N=33)		Company B (N=26)		Company C (N=23)	
	r_H	r	r_H	r	r_H	r
Overall Performance	.2988	.6345	.0826	.2693	.4240	.7799
Human Relations Skill	.1556	.4287	.1534	.4366	.1177	.3909
Technical Skill	.2319	.5515	.1321	.3943	.4187	.7761
Administrative Skill	.2068	.5149	.1106	.3472	.1635	.4847

Foremen. Questionnaires filled out by foremen consisted of two parts (see Appendix C); the first constituted an additional assessment of supervisory proficiency and the second a description of situational variables that affected the functioning of the work group. Each respondent was asked to nominate five other first-line supervisors from the pre-specified lists. They chose people who were thought to be best in terms of human relations, technical, and administrative skills in rank order of ability. The number of nominations received by each supervisor constituted the scale score, and two derived measures were also calculated:

1. Overall performance was defined as the total number of times a foreman was chosen across all three scales, and
2. Outstanding skills was defined the number of times a foreman was nominated as being first across all three dimensions.

As can be seen from Table 15, there was a high degree of variability in these scores since some supervisors received a large number of nominations from their peers while others received none at all.

The peer nominations did not represent a complete evaluation of subjects by all other foremen, however; nonrespondents numbered 4 in Company A, 1 in Company B, and 2 in Company C. Again participation in the study was voluntary and several of those not present at the meeting of supervisors did not respond when issued a questionnaire. Because of this and the fact that only positive nominations were obtained, assessing the reliabilities of these measures was not possible. Correlations with superior ratings on the same three skill scales were moderately high in firms A and C; on the other hand, they were unrelated in Company B

TABLE 15

MEANS AND STANDARD DEVIATIONS OF PEER RATED PROFICIENCY

	Company A (N=33)		Company B (N=26)		Company C (N=23)	
	$\bar{X}$	s	$\bar{X}$	s	$\bar{X}$	s
Human Relations Skill	4.24	2.36	4.96	2.86	4.35	3.20
Technical Skill	4.21	3.14	5.04	3.18	4.04	2.70
Administrative Skill	4.18	2.70	5.14	2.41	4.35	2.92
Overall Performance	12.64	6.90	14.96	7.43	12.74	7.62
Outstanding Skills	2.55	2.84	2.88	3.29	2.39	3.34

(see Table 16). Recall that the interrater agreement among the superiors was quite low; it is also evident that no correlation exists between superiors and peers evaluation of performance effectiveness. At this point there remains a serious question about the adequacy of the criterion data obtained in Company B.

Foremen also completed the Leadership Situation Description Questionnaire (Yukl, 1969) which provided a basis for comparing the way in which the leadership situation varied from one organization to another. It had been discussed previously that the situational variables impinging upon the leader and his work group should vary with the nature of the overall production task (see Table 17). In general, foremen in production systems thought to have more advanced production technologies (B and C) perceived their situations as being similar; no significant differences were noted for any of the six variables. However, foremen in Company A reported that task difficulty was greater ($Z_{A-B} = 2.97$, $p < .01$) and the pressure for production higher ($Z_{A-B} = 2.37$, $p < .05$) than did foremen in Company B. An especially important finding was that supervisors in the unit/small batch firm (A) thought they had higher levels of leader power than supervisors in either the mass production firm ($Z_{A-B} = 3.48$, $p < .001$) or the continuous process firm ($Z_{A-C} = 2.26$, $p < .05$). This is consistent with the control structure findings in that they described a somewhat flatter social control function than did foremen in the more advanced production technologies (see p. 131). Supervisors in the unit/small batch firm apparently play a greater role in controlling both activities and the behavior of work group members as was predicted from

TABLE 16

CORRELATIONS AMONG PEER NOMINATIONS, DERIVED SCORES, AND SUPERIOR RATINGS OF HUMAN RELATIONS SKILL, TECHNICAL SKILL, ADMINISTRATIVE SKILL AND OVERALL PERFORMANCE

	Company A				Company B				Company C			
Superior Ratings	HR	TS	AS	OP	HR	TS	AS	OP	HR	TS	AS	OP
Peer Nominations												
Human Relations Skill	.32	.47	.34	.27	.10	-.06	.12	.16	.58	.34	.56	.46
Technical Skill	.22	.56	.42	.33	.32	.22	.21	.19	.11	.46	.48	.49
Administrative Skill	.26	.41	.51	.33	.02	.04	.05	.01	.37	.54	.69	.64
Overall Proficiency	.31	.58	.51	.37	.20	.10	.16	.14	.42	.51	.67	.62
Outstanding Skills	.27	.62	.43	.41	.14	.12	.25	.22	.40	.41	.47	.53

TABLE 17

MEANS AND STANDARD DEVIATIONS OF SITUATIONAL VARIABLES ASSOCIATED WITH THE NATURE OF THE OVERALL PRODUCTION TASK

	Company A (N=29)			Company B (N=25)			Company C (N=21)		
	$\bar{X}$	s	A-B	$\bar{X}$	s	B-C	$\bar{X}$	s	A-C
Task Difficulty	31.00	5.17	(z=2.97**)	26.60	5.66		28.38	5.29	
Task Structure	22.96	3.53		23.16	4.20		23.76	2.72	
Cooperation Requirements	18.57	4.43		19.84	3.72		21.19	3.93	(z=2.20*)
Production Pressure	20.50	3.73	(z=2.37*)	17.96	4.11		19.57	2.75	
Leader Power	24.11	2.90	(z=3.48***)	20.52	4.40		22.24	2.88	(z=2.26*)
Error Cost	22.25	3.16		20.84	3.06		20.52	4.42	

***p < .001.

**p < .01.

*p < .05.

theory. We might therefore expect their leadership activities to be an extremely important part of their organizational role. In Perrow's terminology (1970), the first level of management possesses greater discretion and power and intragroup activities are coordinated by mutual interaction and influence more than by adherence to prespecified plans. Also in this scheme interdependence between levels of management is thought to decrease; but apparently as technology becomes more sophisticated, within group cooperation requirements increase. These were found to be greater in Company C than in Company A ($Z_{C-A} = 2.20$, $p < .05$).

Leader Behavior and Worker Satisfaction

In the employee's questionnaire, work group members were asked to describe their foreman's behavior on four dimensions; they also completed the five scales of the Job Description Index. First, the correlations between the behavior descriptions and the satisfaction response were examined. Because of the large sample sizes and a moderate degree of scale intercorrelation, it was found that all aspects of supervisory behavior were significantly correlated with satisfaction with supervision and with overall satisfaction ($p < .001$). In support of hypotheses 2c and 2d, the relationships with consideration were clearly largest in magnitude and the question arose as to which of the others was associated with the two criterion measures. First and third order partial correlations were computed, controlling first for consideration and then for all of the other dimensions of supervisory behavior. It can be seen in Table 18 that when the effects of consideration are partialled out, many of the correlations fall to insignificance. Likewise, when the effects of all other

TABLE 18

CORRELATIONS, FIRST AND THIRD ORDER PARTIAL CORRELATIONS AMONG DIMENSIONS OF SUPERVISORY BEHAVIOR, SATISFACTION WITH SUPERVISION AND OVERALL SATISFACTION

	(1) Initiating Structure			(2) Participation			(3) Technical Competence			(4) Consideration	
	r_1	$r_{1.4}$	$r_{1.234}$	r_2	$r_{2.4}$	$r_{2.134}$	r_3	$r_{3.4}$	$r_{3.124}$	r_4	$r_{4.123}$
Company A (N=258)											
Satisfaction with Supervision	.47***	.11	.07	.49***	.16*	.17**	.59***	.20**	.18**	.73***	.43***
Overall Satisfaction	.44***	.16*	.11	.36***	.04	.05	.55***	.23***	.20***	.61***	.30***
Company B (N=164)											
Satisfaction with Supervision	.37***	.13	.05	.40***	.18*	.15	.53***	.27***	.23**	.64***	.43***
Overall Satisfaction	.40***	.22**	.20*	.25***	.05	.02	.35***	.09	.03	.52***	.34***
Company C (N=108)											
Satisfaction with Supervision	.35***	-.02	-.03	.64***	.09	.11	.48***	.04	.07	.76***	.45***
Overall Satisfaction	.29***	-.03	-.04	.54***	.07	.09	.43***	.08	.10	.64***	.31***

*** $p < .001$.

** $p < .01$.

* $p < .05$.

dimensions are held constant, only technical competence correlates significantly with both criteria, and this is true only in Company A. Apparently workers in unit/small batch technologies also prefer supervisors who allow a great deal of freedom, but participation itself does not have an impact on their level of overall satisfaction beyond the effects of consideration. In Company B, workers are also more satisfied with technically competent foremen, but those who are more satisfied overall describe their supervisors as being higher on initiating structure. In contrast to the above, workers in Company C are more satisfied with considerate leadership only, and the other dimensions do not provide additional satisfaction.

Regression analyses were carried out with satisfaction with supervision and overall satisfaction being treated as dependent variables. These regressions proceeded stepwise, allowing the independent variables to be entered in order of their predictive contribution. It will be recalled from the previous chapter that the general hypothesis concerned the similarity of leadership-satisfaction relationships in each type of production system. More specifically, consideration of the foreman was expected to be highly related with both criterion dimensions. This was generally found to be the case as shown in Table 19. In Companies A and C, consideration itself accounted for over half of the variance in satisfaction with supervision; the other independent variables increased predictability by only a small amount. In Company B also, consideration was the major factor and the combined effects of technical competence and participation increased the magnitude of R^2 by

TABLE 19

FINAL PARTIAL REGRESSION COEFFICIENTS AND COEFFICIENTS OF DETERMINATION RELATING FOUR DIMENSIONS OF SUPERVISORY BEHAVIOR, SATISFACTION WITH SUPERVISION AND OVERALL SATISFACTION

	b_{IS}	b_P	b_C	b_T	R^2	F	d/f
Dependent Variable							
Satisfaction with Supervision							
Company A (N=258)	.099	.219**	.650***	.280**	.559	80.30	253
Company B (N=164)	.083	.194	.570***	.368**	.468	35.01	159
Company C (N=108)	-.047	.158	.814***	.092	.589	36.84	103
Overall Satisfaction							
Company A (N=258)	.523	.220	1.501***	1.058**	.413	44.53	253
Company B (N=164)	1.111**	.109	1.589***	.218	.303	17.28	159
Company C (N=108)	-.183	.422	1.617**	.397	.420	18.67	103

*** $p < .001$.

** $p < .01$.

approximately 6 percent. In every case, initiating structure had little to do with satisfaction with supervision. Results for the second dependent variable, overall satisfaction, were somewhat similar except for the fact that the coefficients of determination were proportionately smaller. While consideration again accounted for the major proportion of the variance, the other supportive aspect, participation, made no significant contribution. However, in the mass-production operation, the partial beta weight for initiating structure was significantly different from zero, unlike the other two samples. Presumably structure affects overall satisfaction indirectly, since the workers were not necessarily more satisfied with high IS supervisors per se. Also it should be pointed out that the variance in overall satisfaction accounted for in this case is quite a bit smaller than in the other two companies.

Thus the hypothesis that a similar leadership mix is associated with greater worker satisfaction in different types of production systems receives tentative support from the data. Satisfaction with supervision and overall satisfaction are strongly influenced by consideration (or more satisfied workers tend to elicit higher levels of consideration on the part of foremen). Especially noteworthy is the degree to which overall satisfaction can be predicted from the worker's description of his supervisor's behavior alone; it may be, however, that supervisory behaviors are somewhat less important for employee satisfaction in mass production operations like Company B since less of the total variance was accounted for.

Further regressions were run to determine the relative effect of supervisory behavior on the various components of job satisfaction. Here

individual difference variables including sex, age, years of service, salary, and education were also included as predictors, although the information concerning age and salary was not available from Company C's records. Group membership according to technological conditions was coded as a dummy variable and included in the regression equations. In Table 20 is shown the pervasive effects of consideration on each of the components of worker satisfaction for Company A. All aspects except satisfaction with pay were affected and the general importance of considerate, technically competent supervision is apparent. Women tend to be more satisfied and men less satisfied with the nature of the work and pay practices of the company. Forty-five percent of the variance in overall satisfaction can be explained, no differences being noted with respect to production vs. nonproduction groups.

In comparison, Table 21 shows both similar and different results in Company B. Considerate supervision relates to satisfaction with the work, supervision, and promotions and consideration also has the largest beta weight in the prediction of overall satisfaction. Years of service had an impact upon both satisfaction with pay and promotions. The major difference between A and B was that initiating structure was also predictive of overall satisfaction. This operated through satisfaction with coworkers; apparently supervisors who initiate psychological structure establish a group climate in which better interpersonal relationships exist. However, only 37 percent of the total variance in overall job satisfaction could be explained from leadership and individual difference variables in the mass production setting. Again

TABLE 20

RANK ORDER OF STANDARD BETA COEFFICIENTS FOR
10 INDEPENDENT AND 6 DEPENDENT VARIABLES
IN COMPANY A

Dependent Variable	Independent Variable	Beta Value
Satisfaction with work	Sex	- .263**
	Consideration	.235*
Satisfaction with Supervision	Consideration	.484***
	Technical Competence	.196***
	Participation	.159**
Satisfaction with Coworkers	Consideration	.279**
	Technical Competence	.171*
Satisfaction with Pay	Sex	-.232**
Satisfaction with Promotions	Consideration	.216*
	Technical Competence	.172*
Overall Satisfaction	Consideration	.407***
	Technical Competence	.208**
	Sex	-.178*

*** $p < .001$.

** $p < .01$.

* $p < .05$.

TABLE 21

RANK ORDER OF STANDARD BETA COEFFICIENTS FOR
10 INDEPENDENT AND 6 DEPENDENT VARIABLES
IN COMPANY B

Dependent Variable	Independent Variable	Beta Value
Satisfaction with Work	Consideration	.330***
Satisfaction with Supervision	Consideration	.449***
	Technical Competence	.226**
Satisfaction with Coworkers	Initiating Structure	.241**
Satisfaction with Pay	Yrs. Service	-.270**
	Salary	.334**
Satisfaction with Promotions	Yrs. Service	-.401***
	Consideration	.192*
Overall Satisfaction	Consideration	.378***
	Initiating Structure	.203**

*** $p < .001$.

** $p < .01$.

* $p < .05$.

no effects with respect to production (assembly-line) vs. nonproduction groups were found.

In Company C consideration had a very strong effect upon satisfaction with supervision and overall satisfaction as shown in Table 22. The important individual difference variable in this case was educational level, those with more education tending to be more satisfied with pay, but less satisfied with coworkers. Grouping according to the observable technological differences, production control workers = -1, old technology = 0, new technology = 1, workers in the more advanced technological conditions tend to be less satisfied with the nature of the work and less satisfied overall. In this setting half of the variance in overall satisfaction could be accounted for, the effects of consideration being predominant.

Leader Behavior and Supervisory Proficiency

If there is a different pattern of leadership required for success under varying technological conditions, then the dimensions of behavior that correlate with related job performance should not be the same in each company. The average score on the four subordinate-described dimensions were correlated with proficiency ratings of superiors, then with peer ratings. Concerning the former, in Table 23 it is shown initiating structure correlated positively with several of the superior-rated criterion dimensions in Companies A and B. The only difference here was that structuring was not associated with ratings of human relations skill in the unit/small batch firm. In contrast with these findings IS bore a consistently negative, although insignificant,

TABLE 22

RANK ORDER OF STANDARD BETA COEFFICIENTS FOR
7 INDEPENDENT AND 6 DEPENDENT VARIABLES
IN COMPANY C

Dependent Variable	Independent Variable	Beta Value
Satisfaction with Work	Technological Grouping	-.201**
Satisfaction with Supervision	Consideration	.685***
Satisfaction with Coworkers	Education	-.179*
Satisfaction with Pay	Education	.193*
Satisfaction with Promotions		
Overall Satisfaction	Consideration	.489***
	Technological Grouping	-.173*

***$p < .001$.

**$p < .01$.

*$p < .05$.

TABLE 23

CORRELATIONS AMONG AVERAGE LEADER BEHAVIOR SCORES AND SUPERIOR RATINGS OF SUPERVISORY PROFICIENCY

	Human Relations Skill			Technical Skill			Administrative Skill			Overall Performance		
Superior Ratings	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)
Leader Behavior												
Initiating Structure	.3201	.4594*	-.0437	.3491**	.3945*	-.2705	.4258**	.4193*	-.1959	.4657**	.3938*	-.2487
Participation	.1176	.2293	.5141**	.3184	.1765	.1549	.1647	.1449	.2707	.2108	.2119	.1699
Consideration	.0196	.2076	.4517*	.2242	.3673	.1269	.1062	-.1317	.2667	.1493	.2357	.1527
Technical Competence	.0764	.2775	-.0168	.2676	.1346	.0709	.1555	.2567	.1209	.1962	.1642	-.0524

**$p < .01$.

*$p < .05$.

relationship with performance ratings in Company C. In the continuous process firm, both consideration and participation were correlated with human relations aspects of the job, but apparently were not essential to overall performance. While the patterns were not originally as expected, the results concerning initiating structure (in A and B) and consideration (in C) partially support the initial set of hypotheses concerning proficiency. On the other hand, participation was not correlated with success in Company A, but was in Company C, subject to the further qualification that only one dimension was so related.

When peer nominations were utilized as criterion measures, the results were not at all satisfactory (see Table 24). No significant relationship was found in either Company B or Company C, but the results in the unit/small batch firm provided an interesting comparison with the previous findings. Participation was the important dimension in this case, correlating positively with each aspect of performance. Peer-rated success did not correlate with initiating structure as was found when superior ratings were used as criteria. It may be that participation is an additional requirement for success in unit/small batch production systems as was predicted in hypothesis 3a, but the results obtained depend upon how the nature of the supervisory role is defined--by superiors or peers. In the latter case, no support was obtained using the second set of effectiveness measures for either hypothesis 3b or 3c.

Differences in the leadership mix. The general hypothesis that a different "leadership mix" would be required for success in each type

TABLE 24

CORRELATIONS AMONG AVERAGE LEADER BEHAVIOR SCORES AND PEER NOMINATIONS OF SUPERVISORY PROFICIENCY

	Human Relations Skill			Technical Skill			Administrative Skill			Overall Performance			Outstanding Skills		
	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)	Co. A (N=33)	Co. B (N=26)	Co. C (N=23)
Leader Behavior															
Initiating Structure	-.1119	-.1893	.0010	-.1019	-.1686	-.0604	.0682	-.0757	-.2428	-.0579	-.1905	-.1139	.0430	-.2115	-.0890
Participation	.4411**	-.0067	.2532	.4420**	-.0020	-.1598	.3931*	.2156	.0206	.5053**	.0583	.0574	.4244**	-.0543	-.1225
Consideration	.0311	.0679	.2482	-.0241	.0295	.0527	.0453	.1552	.1547	.0174	.0626	.1862	-.0057	.1414	-.1083
Technical Competence	-.0026	.1678	-.0009	.0149	-.1548	.1520	.0603	.0312	.1183	.0294	.0009	.0988	.0699	-.0592	-.3460

** $p < .01$.

* $p < .05$.

of production system received partial support. Here the Fisher r to z transformation,

$$z = 1.1513 \log_{10} \frac{1 + r}{1 - r},$$

was employed to convert the correlations to z-scores and to test the significance of the differences between correlations. The standard error of the difference between two z's was indicated by McNemar (1969) as being

$$\sigma_z = \sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}.$$

Two tailed tests of significance were utilized since no directional hypotheses had been stated.

Comparing different technological types, the correlations between initiating structure and several dimensions of supervisory proficiency differed significantly (see Table 25). Initiating structure is important for success in both unit/small batch and mass production technologies, significantly more so than in continuous process operations. It may be that for low to moderate degrees of task structure, IS is important for fulfilling the supervisory role, but not when tasks are very highly structured. No significant differences between other dimensions were found, however. Across the broad range of technology some differences for participation vs. peer rated effectiveness were noted. Nearly all of the differences correlating participation and success in Companies A and B approached significance ($p < .10$); in addition, two significant differences between Companies A and C were found. The interpretation that

TABLE 25

DIFFERENCES IN CORRELATIONS BETWEEN LEADER BEHAVIOR AND PROFICIENCY (SUPERIOR AND PEER RATED) IN COMPANIES A, B, AND C

	Z_{A-B}	Z_{A-C}	Z_{B-C}
Superior Ratings			
IX x Human Relations Skill		2.23*	2.27*
IX x Technical Skill		2.26*	2.11*
IX x Administrative Skill		2.63*	2.19*
IX x Overall Performance			
Peer Ratings			
P x Human Relations Skill	1.73	NS	
P x Technical Skill	1.60	2.20*	
P x Administrative Skill	NS	NS	
P x Overall Performance	1.80	1.80	
P x Outstanding Skills	1.83	1.99*	

*$p < .05$.

more tolerance of member freedom and participation is needed to fulfill the supervisor's role in unit/small batch systems receives tentative support. While not decisive, hypothesis 3d cannot be disconfirmed and the results also suggest that a broader range of behaviors are needed for successful job performance under relatively nonroutine technological conditions. When taking the role expectations of superiors as the criteria of supervisory proficiency, less initiating structure was required for successful performance in Company C than in Company A or B. Likewise when the criteria reflected the role expectations of peers, less participation is required for success in both the pass production (B) and continuous process (C) firms. While the results of this investigation with respect to each set of data are not mutually supportive, some evidence is provided that there are different patterns of leadership required for success in different types of production systems.

Relative importance of leadership. Finally the idea that leadership is less important to successful performance in technologically advanced production systems was explored empirically. Regression analyses were carried out to ascertain the proportion of variance explained by leader behaviors alone and in combination with situational variables. In general, leader behaviors by themselves are not very good predictors of foreman proficiency ratings given by superiors and peers. The results for Companies A, B, and C are shown in Tables 26, 27, and 28, respectively. About 30 percent of the variance in overall performance of Company A foremen was explainable from subordinate behavior descriptions. In Company B, on the other hand, none of the F-ratios

TABLE 26

FINAL PARTIAL REGRESSION COEFFICIENTS AND COEFFICIENTS OF DETERMINATION RELATING FOUR DIMENSIONS OF SUPERVISORY BEHAVIOR TO SUPERIOR AND PEER RATED PROFICIENCY IN COMPANY A

	b_{IS}	b_P	b_C	b_T	R^2	F	
Superior Ratings							
Human Relations Skill	.175*	.078	- .091		.178	2.099	
Technical Skill	.130	.114	- .072	.049	.228	2.066	
Administrative Skill	.193**	.073	- .070	-.014	.254	2.382	
Overall Performance	.222**	.095	- .084		.299	4.144	(p < .05)
Peer Nominations							
Human Relations Skill	-.075	.412**	- .237	.133	.284	2.849	(p < .05)
Technical Skill	-.069	.619***	- .455*	.282	.358	3.900	(p < .05)
Administrative Skill	.133	.449**	- .311	.132	.245	2.276	
Overall Performance		1.482***	-1.000**	.544	.409	6.688	(p < .01)
Outstanding Skills	.122	.561***	- .454*	.245	.348	3.742	(p < .05)

TABLE 27

FINAL PARTIAL REGRESSION COEFFICIENTS AND COEFFICIENTS OF DETERMINATION RELATING FOUR DIMENSIONS OF SUPERVISORY BEHAVIOR TO SUPERIOR AND PEER RATED PROFICIENCY IN COMPANY B

	b_{IS}	b_P	b_C	b_T	R^2	F
Superior Ratings						
Human Relations Skill	.181*		-.020	.022	.216	2.018
Technical Skill	.122	-.039	.080	-.057	.238	1.640
Administrative Skill	.157		-.038	.029	.194	1.769
Overall Performance	.120		.014	-.022	.162	1.416
Peer Nominations						
Human Relations Skill	-.542		.086	.328	.145	1.245
Technical Skill	-.276		.215	-.195	.068	.536
Administrative Skill	-.291	.205	.098		.098	.800
Overall Performance	-.012	.285	.301	.188	.084	.484
Outstanding Skills	-.500	-.157	.432	-.089	.150	.925

TABLE 28

FINAL PARTIAL REGRESSION COEFFICIENTS AND COEFFICIENTS OF DETERMINATION RELATING FOUR DIMENSIONS OF SUPERVISORY BEHAVIOR TO SUPERIOR AND PEER RATED PROFICIENCY IN COMPANY C

	b_{IS}	b_P	b_C	b_T	R^2	F
Superior Ratings						
Human Relations Skill	-.093*	.078	.108	-.074	.466	3.927 (p<.05)
Technical Skill	-.147	.061	.042		.180	1.394
Administrative Skill	-.117	.031	.085	-.014	.233	1.366
Overall Performance	-.137		.130	-.061	.213	1.710
Peer Nominations						
Human Relations Skill	-.158		.348	-.179	.138	1.017
Technical Skill	-.079	-.639	.560*		.223	1.821
Administrative Skill	-.335	-.406	.570	-.041	.234	1.376
Overall Performance	-.572	-.010	.014	-.197	.161	.865
Outstanding Skills	-.050	-.276	.387	-.343	.167	.903

for the regressions were found to be significant; it may be that leadership is less important for success in this type of setting. In Company C, 46 percent of the variance in human relations skill was predictable from the leadership dimensions. Comparison of the results using peer nominations also shows that leadership accounts for a significant proportion of the variance in overall performance, but only in Company A. Again it should be noted that different aspects of leadership were important in fulfilling conflicting role expectations of superiors and peers. One interpretation of these findings is that leadership is important in fulfilling the foreman's task role requirements in unit/small batch firms, but not in mass production or continuous process operations. In Company C it seems that leadership is strongly related to human relations skill, i.e., the maintenance aspect of the supervisory role. While no simple relationship such as that implied in hypothesis 3e seems to exist, the degree of prediction might have approximated the expected ranking, had the criterion measures in Company B been more reliable. In any case, it does seem that leader behavior is more important for effective task accomplishment in unit/small batch production systems.

CHAPTER VI

DISCUSSION AND SUMMARY

The dominant view of leadership in the behavioral sciences has stressed social and psychological factors far more than the structural and situational factors that characterize the formal organization; until the latter are fully incorporated into theory and methodology, understanding of leadership effectiveness in its natural environment will be incomplete. By developing a theoretical framework and a conceptual model for investigating leadership under varying technological conditions, it was possible to bring knowledge of the structure and functioning of organizations to bear on the problem of leadership. The initial thrust was to suggest how technology as a complex organization context variable indirectly affects the structural arrangements, the control processes utilized, and the role requirements that the first-line supervisor is expected to fulfill. Secondly, at the level of the work group, technology more directly exerts demands upon the work group and its supervisor; within-organization situational variables are also likely to yield differences in leadership effectiveness. Therefore, the study of organizational leadership involved a comparison between different types of production systems, combined with further investigation of the pattern of leadership that relates to success in each setting.

Social Control in Industrial Organizations

Organizations that vary across a broad range of operations technology are likely to differ in many respects of structure and process; social control structure seemed to be of major importance for the investigation of organizational leadership. The control graph was utilized as an intervening rather than an exogeneous construct, the general idea being that technology constrains the total amount and distribution of influence in the organization, and this in turn affects the nature of leadership in that setting. While the total amount of control was not necessarily less in the advanced production systems, the amount exercised at the lower levels did tend to decrease when moving from unit/small batch to continuous process systems. The slope of the control function was found to be greatest in the more mechanistic mass production firm as hypothesized. These results parallel Dubin's contention that responsibility for quantity and quality of production tends to shift upward in mass production operations. But this was not more the case for the continuous process firm; here social control was evenly diffused across the four managerial levels with a sharp decline for non-supervisory employees. The results in Company C confirm Woodward's original findings, if the smaller power differentials can be taken as an indication that the firm has organic characteristics. The unit/small batch and continuous process firms were similar in that less emphasis was placed on the vertical hierarchy in describing how influence is distributed, explaining the apparent paradox concerning "similarities at the extremes" of the scale of technical complexity.

Tannenbaum's focus on the total amount of control in organizations (which largely has been limited to the low technology condition) leads to strategies of increasing social interaction among and between levels, in order to improve organizational effectiveness. Often this scheme is invoked in support of prescriptions for the introduction of democracy into organizations by increasing the influence of the lower levels. However, if the nature of the overall production task strongly constrains the amount and distribution of social control, organization development efforts may be less effective in mass production firms where large power differentials are expected and accepted by all participants. To the extent that certain organization development procedures flatten the shape of the control function (i.e., power equalization) as well as increase the total amount of interpersonal influence, these may be more appropriate for some technological types than others.

Since the distribution of social control varies as a function of the organization's production technology, the role prescriptions of the first-line supervisor are likely to differ between production systems. Unit/small batch supervisors reported a significantly greater degree of power as would be expected in nonroutine task conditions and their behaviors appeared extremely important for effective task accomplishment. Thus in Company A, foremen exerting greater social control were also rated as being more proficient by their superiors. In contrast, a hierarchical distribution of control indicates that supervisors may exert less influence, and the average amount of social control as described by subordinates did not correlate with superior-rated

performance. Similarly in Company C it was found that a higher degree of social control was not associated with better proficiency ratings of foremen. Nevertheless, groups of workers who described their foremen as having a great deal of influence over matters pertaining to the organization were also more satisfied regardless of the company's production technology.

Leadership and Organizational Effectiveness

The question as to whether leadership makes any difference at all with respect to the effectiveness of the organization can be divided into two parts, one concerning the effects upon individual satisfaction of the worker and the other concerning supervisory proficiency and productivity. The second interrelated question concerned whether similar or different patterns of leader behavior fulfilled supervisory role requirements under differing technological conditions. Results generally showed that leader behavior is universally important to worker satisfaction and somewhat similar patterns of behavior associate with this criterion. On the other hand, the relative importance of leadership for achieving high job performance may be less in technologically advanced production systems, and that different patterns of leader behavior tend to correlate with this aspect of organizational effectiveness in each type of production system.

The finding that satisfaction with supervision is primarily a function of consideration is consistent with the great majority of studies in the literature. A more surprising result was that 30-40 percent of variance in overall satisfaction was accounted for by leader

behavior itself. This was a function of consideration in all three production systems, yet other dimensions made some contribution in Companies A (participation and technical competence) and B (initiating structure). The latter is in direct contrast to the findings of Fleishman, Harris and Burtt (1955) who found that initiating structure was negatively related to subordinate satisfaction in mass production operations. In this case lower role conflict and higher satisfaction with coworkers were found for individuals who also described their foreman as being high in initiating structure. Overall these results suggested that consideration is universally important, but that other dimensions relate to overall satisfaction in certain instances. Both individual difference and situational variables are important determinants of whether structuring, participative, or technically competent behaviors are desired additionally by subordinates; this conclusion is consistent with the discrepancy model of satisfaction presented by Yukl (1971).

While the above results were largely as expected, there still remains the serious question of whether leader behavior and technical competence in fact make a difference with respect to accomplishment of the work group's tasks. From the conceptual model it was predicted that leadership would be more important in fulfilling role requirements in unit/small batch operations, less important in mass production, and even less so in continuous process operations. Overall performance was significantly predicted from subordinate descriptions of leader behavior only in Company A. This appeared to be a function of higher

levels of initiating structure, allowing work group members greater freedom to carry out the task, and providing technical assistance where necessary. More proficient mass production supervisors tend to initiate higher levels of psychological structure, but they do not provide freedom for work group members to do the job in their own way. Under these technological conditions leadership is unlikely to have much impact on measurable productivity, and the other dimensions of leadership do not contribute additionally to the prediction of proficiency ratings. This also seemed likely the case in the continuous process firm, but participation and consideration were significantly related to one aspect of the supervisory role--human relations skill. Here it was suggested that leadership itself may not be essential for task accomplishment, but may be extremely important with respect to the maintenance aspects of the supervisory role, i.e., maintaining activities of the work group over time and making its functioning resistant to external and internal stress. This would be especially true under conditions of major technological advancement where the workers were experiencing very high degrees of role conflict due to changes in job content and work procedures. When differences in the correlation coefficients between leader behavior and supervisory proficiency were examined, it was found that more initiating structure was required for superior-rated success in Companies A and B than in Company C. When peer nominations were used as criteria, greater participation was required in the unit/small batch firm than in the continuous process firm. Thus, some evidence was presented to show that different patterns of leadership are required for

success in different types of production systems while in general it appeared that both more initiating structure and participation were required for success in the unit/small batch firm, these findings were subject to possible alternative explanations. On the other hand, the findings are not inconsistent with the main theoretical development.

Recommendations for Future Research

The approach for investigating leadership described previously was an attempt to extend a comprehensive low-level theory of industrial leadership. Here the "type" of organization or production system was taken as the basic unit of analysis and comparisons made between leadership-success relationships. The major alternative approach is to take the interacting group as central in the development of theory and to classify the nature of the situation according to a limited set of dimensions (i.e., "situational favorability"). However this approach may fail to identify some of the possible sources of contingency that relate to the larger organization context. It seems that organizations themselves represent a unique patterning of variables and the situational factors that affect leadership processes will be different in each setting. For example, higher degrees of task difficulty and pressure for production were found in the unit/small batch firm and greater requirements for within-group cooperation were found in the continuous process firm in comparison with others contained in the study. While task structure is an essential construct in both this and the Fiedler contingency model, leader-member relations and position power are thought to be affected greatly by the particular organization's

structural characteristics. In this sense the present model allows for additional sources of contingency and suggests how the nature of the situation is embedded in the larger organizational context.

Also in support of the approach utilized here, it is maintained that the general relationship between leader behavior and worker satisfaction is equally important as that between leadership and productivity. Generally the most effective supervisor is one who both obtains high productivity and meets the needs of his workers, although this is not necessarily the high IS, high C foreman under all circumstances. It has often been suggested that the first-line supervisor generally plays a very difficult role in this respect; that is, the behavior pattern that is most appropriate for obtaining high levels of work group performance is inconsistent with that for achieving high satisfaction. This was somewhat the case in Company A since subordinates generally preferred considerate leadership, while those rated highest by superiors exhibited a greater amount of structuring behavior. It should be pointed out that participation and technical competence contributed to both satisfaction and productivity, however. In the mass production firm, the data did not support the above contention. Initiating structure contributed positively in the prediction of superior-rated job performance as well as higher individual satisfaction when workers apparently expected a great deal of structuring. In the continuous process firm, however, leadership may be quite important in achieving maintenance of organizational activities, but task effectiveness is more a function of the advanced technology itself. Thus it

would appear that different mixes of leader behavior are effective to the extent that they are suited to the specific role requirements of certain organizations; in some circumstances these may be conflicting, but in others they are not. Thus, additional research concerning the interrelationship of the effectiveness criteria would be desirable, and the effects of leader behavior on both should be ascertained.

Organizational characteristics and individual difference variables tended to covary with the type of production system. In some sense, then, differences in the leadership mix required for successful performance were likely from the outset. Nevertheless, this approach differs substantially from taking a single organization and trying to find the one best leadership style for all organizations and situations. The tendency to take a single organization and to carry out a "two variable" study of leadership and performance will lead only to a proliferation of conflicting results. Conceptually and methodologically it is preferable to search for the sources of contingency that have led to the enormous number of conflicting studies in the research literature. All field studies of leadership must describe and measure the technology or nature of the production task as well as aspects of the situation in which the study was carried out. In the future, the emphasis should be placed upon obtaining a homogeneous subset of organizations, identifying differences between them and assessing leadership effectiveness as a function of between group situational differences. Only if such studies are grounded in organization theory can leadership-performance relationships be understood, predicted, and controlled.

The effects of choosing three specific organizations according to availability is also likely to have affected the results obtained. For example, the question arises as to whether Company B was truly representative of the mass-production category. It was found that worker satisfaction was highest in this firm, the opposite of what was predicted from organization theory. The implications are that several organizations should be chosen for each technological category and the results for each compared; the cumulative effect will be that generalities can be established for each of the subsets, taking into account situational differences as they affect the operation of different work groups. In conclusion it is apparent that the relationship between leader behaviors and satisfaction is clearer and more predictable than the leadership-performance relationships. But the attempt to identify both organizational factors and situational factors that affect these relationships should result in some generalizability for different production types.

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APPENDICES

APPENDIX A

COVER LETTERS

[Company Letterhead]

September 19, 1972

Dear Fellow Employee:

We are pleased to participate in a research project currently being carried out by the University of Tennessee.

This project will attempt to measure those skills that are needed by a supervisor in order for him to effectively perform his duties.

A questionnaire is being provided for your consideration. The responses will be held in strict confidence. No attempt will be made to individually identify responses. The total results however will be valuable to the Department.

This study has our approval. Your participation will be greatly appreciated.

The University of Tennessee
Knoxville 37916

College of Business Administration

September 19, 1972

[Company Address]

Dear Sirs:

The Department of Industrial and Personnel Management of the University of Tennessee is currently carrying out a research project concerning the nature of management and supervisory practices in several aspects of industrial management in the . Managers, Foremen, and randomly chosen hourly employees will be asked to complete questionnaires requiring approximately one-half hour.

The information collected in this study will be used for research purposes only and is strictly confidential, seen only by the researcher who will analyze the results for the plant as a whole. It will not be necessary for each participant to identify his questionnaire, although they will be coded numerically to permit matching of these responses with other data collected in the study. Information provided by specific individuals will not be released to higher level management; rather, a brief report describing the overall group results will be compiled. Three copies of the project findings comparing your company with other organizations in the study will be made available in December, 1972, upon its completion.

Participation of individuals in this study is voluntary. During the period September 19-26th, meetings will be scheduled for Supervisors and Foremen, and questionnaires will be distributed to several hourly employees on a take-home basis. A self-addressed envelope has been provided for the return of the completed questionnaires. It is important that all questions be answered, and that the envelope be sealed before returning. For the collection of the hourly employees envelopes, or if there are any particular questions concerning how to fill out the questionnaire, I will be available at the gate on the day following distribution. Your assistance in conducting this study is most appreciated.

Sincerely,

Douglas M. Garber
Department of Industrial and
Personnel Management

APPENDIX B

SUPERIOR'S QUESTIONNAIRE

PERFORMANCE RATING

Instructions: You will be rating the work performance of several supervisors whose names are listed on the attached sheet. This information will be used for research purposes only and is strictly confidential, seen only by the researcher who will analyze the results for the group as a whole. From the attached sheet, write the names below of all those foremen 1) with whom you have worked and 2) those whose job performance you have had a chance to observe on several occasions.

Rater_____ Level/Title_____

Foremen:

1)_____

2)_____

3)_____

4)_____

5)_____

6)_____

7)_____

8)_____

For purposes of the study, it is essential that you carefully consider the job performance of each of these individuals, and rate every person as accurately as possible on the following scales.

1) This scale is designed to measure the human relations skill of each foreman relative to the requirements of the job. Carefully read the definition below and refer back to it after each rating. Circle the number on the following scales that best describes the human relations skill of each individual being rated.

Human relations skill: Ability to get along with others. Showing a personal concern for others. Getting those one leads to do the best they can. Letting workers know where they stand and how they can improve themselves. Treating others fairly.

___ 1 2 3 4 5 6 7 8 9

x		x		x		x		x
Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

___ 1 2 3 4 5 6 7 8 9

x		x		x		x		x
Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

___ 1 2 3 4 5 6 7 8 9

x		x		x		x		x
Not currently meeting skill requirements needed for acceptable job performance		Exeeeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

2) This scale is designed to measure the technical skill of each foreman relative to the requirements of the job. Carefully read the definition below and refer back to it after each rating. Circle the number on the following scales that best describes the technical skill of each individual being rated.

Technical skill: Being an expert in the work specialty one supervises. Technical "know-how" of work methods, equipment, and procedures. Clearly understanding complex technical problems and being able to solve them. Seeing future technical problems before they arise and taking steps to prevent them.

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

3) This scale is designed to measure the administrative skill of each foreman relative to the requirements of the job. Carefully read the definition below and refer back to it after each rating. Circle the number on the following scales that best describes the administrative skill of each individual being rated.

Administrative skill: Being able to plan, schedule and organize work for those he leads. Giving the right job to the right man. Clearly explaining work, inspecting it, and following up on it until it is finished. Setting realistic deadlines. Carrying out company work policy and procedure. Also, showing a willingness to assume one's managerial responsibilities.

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

	1	2	3	4	5	6	7	8	9
___	x		x		x		x		x
	Not currently meeting skill requirements needed for acceptable job performance		Exceeds minimum skill required for acceptable job performance		Meets skill requirements in all respects		In many cases exceeds skill required by job		Far exceeds the skill requirements of the job

4) This scale is designed to measure overall job performance with respect to the requirements of the foreman's job. Considering both the strengths and weaknesses of each individual, circle the number on the scales below that best describes the extent to which each individual meets his job requirements.

—— 1 2 3 4 5 6 7 8 9

Not currently meeting minimal standards for acceptable job performance	Exceeds minimal standards for acceptable job performance	Meets job requirements in all respects	In many cases exceeds job requirements	Far exceeds the job requirements

—— 1 2 3 4 5 6 7 8 9

Not currently meeting minimal standards for acceptable job performance	Exceeds minimal standards for acceptable job performance	Meets job requirements in all respects	In many cases exceeds job requirements	Far exceeds the job requirements

—— 1 2 3 4 5 6 7 8 9

Not currently meeting minimal standards for acceptable job performance	Exceeds minimal standards for acceptable job performance	Meets job requirements in all respects	In many cases exceeds job requirements	Far exceeds the job requirements

—— 1 2 3 4 5 6 7 8 9

Not currently meeting minimal standards for acceptable job performance	Exceeds minimal standards for acceptable job performance	Meets job requirements in all respects	In many cases exceeds job requirements	Far exceeds the job requirements

ORGANIZATIONAL INFLUENCE

Purpose of the questionnaire. You will be asked to describe on the scales below, the amount of say or influence that each of several hierarchical groups or persons have on matters pertaining to the operation of your organization. Place an "X" in the appropriate column.

Name_____ Level/Title_____

1. In general, how much say or influence do you think each of the following groups or persons have on what goes on in your organization?

	little or no influence	some influence	quite a bit of influence	A great deal of influence	A very great deal of influence
*a. Plant Manager					
*b. Superintendent					
*c. Supervisors and Shift Foremen					
*d. The Line Foremen					
e. Non-supervisory Employees					

*Titles of management levels correspond to those used in the particular company.

APPENDIX C

FOREMAN'S QUESTIONNAIRE

SUPERVISORY SKILLS

Instructions: You will be asked to choose several foremen that possess a high degree of certain supervisory skills needed for successful job performance. This information will be used for research purposes only and is strictly confidential, seen only by the researcher who will analyze the results for the group as a whole. On the attached sheet is a list of randomly chosen foremen; carefully read the definition of each skill, then choose the person who is best in terms of that particular skill. Write the name of that individual on the first line, the next best on the second line and so on, in order of preference.

Rated by_____ Level/Title_____

1) Human relations skill: Ability to get along with others. Showing a personal concern for others. Getting those one leads to do the best they can. Letting workers know where they stand and how they can improve themselves. Treating others fairly.

Best_____

Next best_____

Third best_____

Fourth best_____

Fifth best_____

2) Technical skill: Being an expert in the work specialty one supervises. Technical "know-how" of work methods, equipment, and procedures. Clearly understanding complex technical problems and being able to solve them. Seeing future technical problems before they arise and taking steps to prevent them.

Best_____

Next best_____

Third best_____

Fourth best_____

Fifth best_____

3) Administrative skill: Being able to plan, schedule, and organize work for those he leads. Giving the right job to the right man. Clearly explaining work,inspecting it, and following up on it until it is finished. Setting realistic deadlines. Carrying out company work policy and procedure. Also, showing a willingness to assume one's managerial responsibilities.

Best_____

Next best_____

Third best_____

Fourth best_____

Fifth best_____

LEADER SITUATION DESCRIPTION QUESTIONNAIRE

Instructions: This questionnaire will use several types of items to try to measure various aspects of your leadership situation. Occasionally it was necessary to ask the same question in two different ways, because the wording can influence the reader's interpretation of the question. Do not worry about this, just answer each question separately. Please be as honest and accurate as possible, and answer every item.

IMPORTANT: In the questionnaire the terms "your subordinates," your "group," and your "work section" all refer only to your immediate subordinates. The terms do not include subordinates of your subordinates.

All of the item formats used in the questionnaires are straightforward except for one type which is explained below.

Sample item: The weather today was (circle one)

very hot 6 5 4 3 2 1 very cold

Explanation: The numbers in this type of scale have no meaning in themselves, they simply represent equal intervals along a continuum having as extreme points, the terms on either side of the numbers. In each item of this type, you will be asked to circle the number that best locates whatever is being discussed on the continuum given to describe this thing. For the sample item, if you thought that it was very hot today, circle 6. If you thought that it was extremely cold, circle 1. The remaining numbers represent intermediate temperatures, and the weather on most days would best be described by circling one of these numbers.

1. How often do superiors or outsiders request faster or better performance from your group or work section:

   regularly 6 5 4 3 2 1 hardly ever

2. How much authority do you have to hire, fire, or promote people in your group or work section?

   a great deal 6 5 4 3 2 1 none

3. How difficult are the tasks performed by your subordinates?

   extremely difficult 6 5 4 3 2 1 very easy

4. How much influence does your formal authority provide you over the behavior of your subordinates?

   a great deal 6 5 4 3 2 1 almost none

5. How much do your subordinates depend upon each other's performance to aid them in attaining their own task goals or in carrying out their own assignments?

   completely 6 5 4 3 2 1 not at all

6. How much time do you have to make your decisions?

   all that is needed 6 5 4 3 2 1 much less than is needed

7. How much power do you have to discipline people in your group or work section for not carrying out instructions that you give them?

   a great deal 6 5 4 3 2 1 none

8. How much do others pressure you to improve the performance of your group or work section?

   a great deal 6 5 4 3 2 1 none

9. How many of your subordinates' tasks assignments require highly developed skills to be performed properly?

   all of them 6 5 4 3 2 1 none of them

10. How interdependent are the tasks performed by the people in your group or work section?

    completely independent 6 5 4 3 2 1 completely interdependent

11. How much authority, if any, do you have to give direct orders regarding assignments to persons in your group or work section?

    a great deal 6 5 4 3 2 1 none

12. My subordinates' tasks are very difficult and demanding.

    1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

13. My group or work section works closely with other groups.

    1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

14. My subordinates' assignments and tasks are important enough so that mistakes would be a serious matter.

1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

15. The people in my group or work section are unable to complete their assignments and duties by acting alone, but instead must work together as a team.

1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

16. Errors made by my subordinates are considered by others to be due to inadequate leadership by me.

1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

17. It takes a relatively long time before the effects of my subordinates' decisions and performance can be determined and evaluated.

1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

18. If one of the people in my group or work section fails to perform his assignments, the performance of the other people will be impeded.

1. Hardly ever 2. Seldom 3. Sometimes 4. Often 5. Usually 6. Nearly always

19. How soon (on the average) after one of your subordinates completes a task or assignment is it possible to determine how well he did it?

1. Only a few minutes 2. ten min. to fifty-nine min. 3. one to four hours
4. four to eight hours 5. two to seven days 6. longer than a week

20. My subordinates' assignments and tasks are such that any errors that might be made by them would have only minor consequences.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

21. The exact procedures to be used by my subordinates in performing their tasks are specified by organization rules and standard operating procedures which they have to follow.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

22. My subordinates' tasks are simple and repetitive.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

23. I have so little power over my subordinates that they can choose to ignore my requests without fear of my doing anything much about it.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

24. My group or work section has definite rules and "standard operating procedures" which guide its activities.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

25. My subordinates' assignments and tasks are so easy that even a stupid person could perform them adequately.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

26. It is possible to determine the "one best way" to perform my subordinates' tasks and assignments.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

27. I am free from pressures for hurried decisions.

1. Nearly always 2. Usually 3. Often 4. Sometimes 5. Seldom 6. Hardly ever

28. What percentage of your subordinates' tasks are important enough so that mistakes would be a serious matter?_____%

29. What percentage of your subordinates' tasks and assignments are so simple that they could be done by almost anyone with only one or two days training?_____%

30. What percentage of your subordinates' tasks and assignments are so simple and straightforward that errors would only occur if they were careless?_____%

31. What percentage of your subordinates' tasks and assignments are "rush jobs?"_____%

32. _____% each subordinate works along at <u>independent</u> tasks. (They may or may not do the same thing.)

ORGANIZATIONAL INFLUENCE

Purpose of the questionnaire: You will be asked to describe on the scales below, the amount of say or influence that each of several hierarchical groups or persons have on matters pertaining to the operation of your organization. Place an "X" in the appropriate column.

Name_____ Level/Title_____

1. In general, how much say or influence do you think each of the following groups or persons have on what goes on in your organization:

	little or no influence	some influence	quite a bit of influence	A great deal of influence	A very great deal of influence
*a. Plant Manager					
*b. Superintendent					
*c. Supervisors and Shift Foremen					
*d. Line Foremen					
*e. Non-supervisory Employees					

*Titles of management levels correspond to those used in the particular company.

APPENDIX D

HOURLY EMPLOYEE'S QUESTIONNAIRE

JOB DESCRIPTION INDEX (JDI)

Describe the nature of your job on the following scales. Put "Y" beside an item if the term describes the particular aspect of your job, "N" if the item does not describe that aspect, or "?" if you cannot decide.

Work

___ Fascinating

___ Routine

___ Satisfying

___ Boring

___ Good

___ Creative

___ Respected

___ Hot

___ Pleasant

___ Useful

___ Tiresome

___ Healthful

___ Challenging

___ On your feet

___ Frustrating

___ Simple

___ Endless

___ Gives sense of accomplishment

Y = Yes

N = No

? = Cannot decide

Supervision

___ Asks my advice

___ Hard to please

___ Impolite

___ Praises good work

___ Tactful

___ Influential

___ Up-to-date

___ Doesn't supervise enough

___ Quick-tempered

___ Tells me where I stand

___ Annoying

___ Stubborn

___ Knows job well

___ Bad

___ Intelligent

___ Leaves me on my own

___ Around when needed

___ Lazy

Y = Yes

N = No

? = Cannot decide

People

___ Stimulating

___ Boring

___ Slow

___ Ambitious

___ Stupid

___ Responsible

___ Fast

___ Intelligent

___ Easy to make enemies

___ Talk too much

___ Smart

___ Lazy

___ Unpleasant

___ No privacy

___ Active

___ Narrow interests

___ Loyal

___ Hard to meet

Y = Yes

N = No

? = Cannot decide

Pay

___ Income adequate for normal expenses

___ Satisfactory profit sharing

___ Barely live on income

___ Bad

___ Income provides luxuries

___ Insecure

___ Less than I deserve

___ Highly paid

___ Underpaid

Promotions

___ Good opportunity for advancement

___ Opportunity somewhat limited

___ Promotion on ability

___ Dead-end job

___ Good chance for promotion

___ Unfair promotion policy

___ Infrequent promotions

___ Regular promotions

___ Fairly good chance for promotion

LEADER BEHAVIOR DESCRIPTION QUESTIONNAIRE - Form XII

Originated by Staff Members of
The Ohio State Leadership Studies
and Revised By The
Bureau of Business Research

Purpose of the Questionnaire

On the following pages is a list of items that may be used to describe the behavior of your supervisor. Each item describes a specific kind of behavior, but does not ask you to judge whether the behavior is desirable or undesirable. Although some items may appear similar, they express differences that are important in the description of leadership. Each item should be considered as a separate description. This is not a test of ability or consistency in making answers. Its only purpose is to make it possible for you to describe, as accurately as you can, the behavior of your supervisor.

Note: The term, "group," as employed in the following items, refers to a department, division, or other unit of organization that is supervised by the person being described.

The term, "members," refers to all the people in the unit of organization that is supervised by the person being described.

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College of Commerce and Administration
The Ohio State University
Columbus, Ohio

Copyright 1962

Individual Being Rated_____ Rated By_____

Level/Title_____

Directions:

a. READ each item carefully.

b. THINK about how frequently the leader engages in the behavior described by the item.

c. DECIDE whether he (A) always, (B) often, (C) occasionally, (D) seldom or (E) never acts as described by the item.

d. DRAW A CIRCLE around one of the five letters (A B C D E) following the item to show the answer you have selected.

A = Always
B = Often
C = Occasionally
D = Seldom
E = Never

e. MARK your answers as shown in the examples below.

Example: He often acts as described . . . . . A (B) C D E

Example: He never acts as described . . . . . A B C D (E)

Example: He occasionally acts as described . . . . . A B (C) D E

---

1. He lets group members know what is expected of them . . A B C D E

2. He allows the members complete freedom in their work. . A B C D E

3. He is friendly and approachable . . . . . A B C D E

4. He encourages the use of uniform procedures . . . . . A B C D E

5. He permits the members to use their own judgment in solving problems . . . . . A B C D E

6. He does little things to make it pleasant to be a member of the group . . . . . A B C D E

7. He tries out his ideas in the group . . . . . A B C D E

8. He encourages initiative in the group members . . . . . A B C D E

9. He puts suggestions made by the group into operation . A B C D E

A = Always
B = Often
C = Occasionally
D = Seldom
E = Never

10. He makes his attitudes clear to the group . . . . . A B C D E

11. He lets the members do their work the way they think best . . . . . A B C D E

12. He treats all group members as equals . . . . . A B C D E

13. He decides what shall be done and how it shall be done . . . . . A B C D E

14. He assigns a task, then lets the members handle it . . A B C D E

15. He gives advance notice of changes . . . . . A B C D E

16. He assigns group members to particular tasks . . . . . A B C D E

17. He turns the members loose on a job, and lets them go to it . . . . . A B C D E

18. He keeps to himself . . . . . A B C D E

19. He makes sure that his part in the group is understood by the group members . . . . . A B C D E

20. He is reluctant to allow the members any freedom of action . . . . . A B C D E

21. He looks out for the personal welfare of group members . . . . . A B C D E

22. He schedules the work to be done . . . . . A B C D E

23. He allows the group a high degree of initiative . . . . A B C D E

24. He is willing to make changes . . . . . A B C D E

25. He maintains definite standards of performance . . . . A B C D E

26. He trusts the members to exercise good judgment . . . . A B C D E

27. He refuses to explain his actions . . . . . A B C D E

A = Always
B = Often
C = Occasionally
D = Seldom
E = Never

28. He asks that group members follow standard rules and regulations . . . . . A B C D E

29. He permits the group to set its own pace . . . . . A B C D E

30. He acts without consulting the group . . . . . A B C D E

Individual Being Rated_____ Rated By_____

Level/Title_____

TECHNICAL COMPETENCE

Instructions: Circle the alternative below that best describes the job behavior and knowledge of your immediate supervisor.

1. You have found that he doesn't know something about the job that he should.

   a) frequently b) occasionally c) rarely d) almost never e) never

2. When a tough job comes up, he has the technical "know-how" to get it done.

   a) rarely b) occasionally c) usually d) almost always e) always

3. He plans ahead, keeping in mind the future needs of the department.

   a) rarely b) occasionally c) usually d) almost always e) always

4. When one of the men at your level doesn't know how to do a job, can he show how it is done?

   a) rarely b) occasionally c) usually d) almost always e) always

5. He has failed to do a good job because of poor technical skill or lack of knowledge.

   a) frequently b) occasionally c) rarely d) almost never e) never

6. How much does your supervisor know about doing each of the jobs in your area?

   a) little b) some c) quite a bit d) a great deal e) a very great deal

7. How much does your immediate supervisor know about the equipment that you are responsible for?

   a) little b) some c) quite a bit d) a great deal e) a very great deal

PROBLEMS OF WORK ROLE

Instructions: Circle the number on the scales below that indicates whether each statement is very true or very false concerning your job.

Name_____ Level/Title_____

1. I have to do things that should be done differently.

   very false 1 2 3 4 5 6 7 very true

2. I feel certain about how much authority I have.

   very false 1 2 3 4 5 6 7 very true

3. I receive an assignment without the manpower to complete it.

   very false 1 2 3 4 5 6 7 very true

4. Clear, planned goals and objectives for my job.

   very false 1 2 3 4 5 6 7 very true

5. I have to buck a rule or policy in order to complete an assignment.

   very false 1 2 3 4 5 6 7 very true

6. I know that I have divided my time properly.

   very false 1 2 3 4 5 6 7 very true

7. I know what my responsibilities are.

   very false 1 2 3 4 5 6 7 very true

8. I work with two or more groups who operate quite differently.

   very false 1 2 3 4 5 6 7 very true

9. I know exactly what is expected of me.

   very false 1 2 3 4 5 6 7 very true

10. I receive incompatible requests from two or more people.

    very false 1 2 3 4 5 6 7 very true

11. I do things that are apt to be accepted by one person and not accepted by others.

very false 1 2 3 4 5 6 7 very true

12. Explanation is clear of what has to be done.

very false 1 2 3 4 5 6 7 very true

13. I receive an assignment without adequate resources and materials to execute it.

very false 1 2 3 4 5 6 7 very true

14. I work on unnecessary things.

very false 1 2 3 4 5 6 7 very true

ORGANIZATIONAL INFLUENCE

Purpose of the questionnaire: You will be asked to describe on the scales below, the amount of say or influence that each of several hierarchical groups or persons have on matters pertaining to the operation of your organization. Place an "X" in the appropriate column.

Name_____ Level/Title_____

1. In general, how much say or influence do you think each of the following groups or persons have on what goes on in your organization?

	little or no influence	some influence	quite a bit of influence	A great deal of influence	A very great deal of influence
*a. Plant Manager					
*b. Superintendent					
*c. Supervisors and Shift Foremen					
*d. Your Line Foreman					
e. Non-supervisory Employees					

*Titles of management levels correspond to those used in the particular company.

APPENDIX E

TECHNOLOGICAL CLASSIFICATION FORM
(TAYLOR, 1970)

TECHNOLOGICAL CLASSIFICATION FORM

PART I - SOPHISTICATION OF INPUT

1. Standardization of material (i.e., the objects transformed by the group)

: 5	: 4	: 3	: 2	: 1 :
The materials or the objects transformed by employees are treated in a totally standardized or routine fashion.	Objects transformed are treated as containing mostly standardized elements.	The objects transformed are considered partly standardized or routine. That is the average or normal object can be considered partly standardized and partly unique.	Objects transformed are treated as being composed of mostly unique elements.	Objects transformed are treated as virtually unique entities, one from another.

2. Predictability (of objects transformed) in those characteristics important to production operations.

: 5	: 4	: 3	: 2	: 1 :
When working with the normal case in this group, employees nearly always experience certainty and predictability in the objects they are transforming or manipulating.	Average employees usually experience certainty in the input or objects they are transforming in the average case.	Employees consider that raw materials in the normal case are sometimes predictable and sometimes not.	Employees in this group usually consider the input or material transformed in the average case as uncertain and unpredictable.	The objects transformed in the average case are always considered unpredictable by the employees.

3. Knowledge of raw material enabling analytical approach to problems.

: 5	: 4	: 3	: 2	: 1 :
So much is known about the objects transformed that employees in the group can approach nearly all non-routine problems in a logical, analytical way.	Enough is known about the raw material, or objects transformed so that the average employee can resolve many exceptions in a systematic logical way.	Something is known about the objects transformed which enables employees in this group to resolve some non-routine problems in a systematic analytical way.	A little is known about the raw material so that employees can resolve a few exceptional cases in an analytical, systematic way.	So little is known about the objects transformed that employees in this group cannot be expected to approach any nonroutine cases in an analytical way.

PART II - SOPHISTICATION OF THROUGHPUT

4. The proportion of routine operations which are not handled by machines.

: 1	: 2	: 3	: 4	: 5	: 0 :
The jobs in this group contain a great proportion of routine operations which although, it is presumed may be handled by machines, are not.	These jobs have a sizable proportion of such routine operations which could be taken care of by machines and are not.	The jobs in this group have a moderate proportion of routine operations which have not been mechanized.	This group performs jobs which contain a low proportion of routine operations which have not been mechanized.	These jobs include virtually no routine operations which have not been mechanized.	These jobs originally had a low proportion, or no routine operations in a nonmechanized state, so they've had none to mechanize.

5. Predominant type of mechanical operation--regardless of how much or little machine operation is involved in the job.

1	2	3	4	5
Mechanical operations performed in jobs in the group are primarily via human effort: Manual tools, nonautomatic, nonpower assisted.	Most machines in the group are power-driven but not automatic (i.e., very few routine operations are controlled automatically).	Power-driven tools or machines with automatic control of some routine operations account for the typical mechanical operation.	Power-driven machines with automatic control or most routine operations are the typical mechanical vehicle in this group.	The predominate mechanical device in this group is power-driven machines with automatic and programmatic control of most unexpected or nonroutine, as well as routine operations.

6. The extent the machine is dependent upon the operator--when that machine is being used. (The machine as servitor)

1	2	3	4	5	0
The employees cannot leave their machines or work place at all during any portion of the task without stopping work.	The employee can leave his machine while it is running for only two or three minutes at a time.	The employees operate a machine with continuous feed from some distance, but cannot leave the control equipment for more than a few minutes while the machine is running.	The employee operates a machine which can perform a production operation itself for longer than a few minutes and will shut down automatically in the event of unprogrammed disruption.	The employee operates a completely automatic machine with continuous feed which will shut down by itself in the event of trouble.	The employees utilize machines to a very limited or no extent.

PART III - SOPHISTICATION OF OUTPUT

7. The supervisor as a source of evaluative feedback.

: 1	: 2	: 3	: 4	: 5 :
The supervisor can provice close or nearly continuous watch, help, and evaluation of the quality of performance of the average employee in this group.	The supervisor can provide some technical help and daily evaluation of the quality of performance.	Occasional evaluation of performance quality (less than daily) and technical help in nonroutine problems can be provided by the supervisor.	The supervisor can provide occasional supplemental evaluation of employee performance quality (less than weekly and provides some technical help.	Except for annual, or other periodic appraisals, the supervisor cannot provide evaluation of employee performance or technical help.

8. The supervisor as an initiator of evaluative feedback.

: 1	: 2	: 3 :
The supervisor usually initiates what feedback he provides to the average employee in this group.	The supervisor initiates evaluative feedback about half the time, and the other half it is requested by the employees in this group.	The supervisor usually responds with the evaluative feedback and technical help he provides on request of the average group member.

9. Time lag in feedback.

: 5	: 4	: 3	: 2	: 1 :
In this group, the average time lag between performance and evaluative feedback is usually longer than 16-18 hours after completion of the article.	The time lag between performance and evaluative feedback falls usually within the same day the article is finished.	Feedback following performance of the average task in this group is usually within an hour of completion.	The time lag of feedback following performance for the average task in this group is usually within a few moments of completion of each article.	The time lag between performance and evaluative feedback for the average task in this group is nearly instantaneous.

10. The type of primary source(s) of evaluative feedback.

: 2	: 1 :
The primary source(s) of feedback for the average job in this group is (are) human--the Supervisor, or work group members, quality control engineers, or other persons in associated groups.	The primary source(s) of feedback in this group is (are) nonhuman --e.g., dials, guages, measuring devices, reports or printed statements, audible signals, etc.

VITA

Douglas M. Garber was born on April 26, 1944 in Bridgeport, Connecticut. He attended New Hartford High School, New Hartford, New York, graduating in June, 1961. Thereafter, he entered Bucknell University, Lewisburg, Pennsylvania, and received an A.B. in Economics in June, 1965.

In September, 1965, he enrolled at the University of Rochester, Rochester, New York, and obtained the Master of Business Administration degree in June, 1967. Shortly after he entered the United States Army and served as an officer in the Military Intelligence Branch for two years. In the fall of 1969 he entered the University of Tennessee and was awarded a Doctor of Philosophy Degree in Organizational Psychology in December, 1974. Since January, 1972, he has been an Assistant Professor of Management at Bucknell University.

He is married to the former Beverly Anne Kolb of New Hartford, New York, and they have a son and a daughter.