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An Entrepreneurial Theory of Formal Organizations

Part I: Patterns of Formal Organizations[1]

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Introduction

A major problem of science is the ordering of relevant data. Students of formal organizations currently face this problem because of the rapid accumulation of data about organizational behavior. Lacking a viable framework for integrating more or less disparate findings, the very magnitude of the data has led as much to confusion as to clarification.

Our attempt at a theory of formal organizations includes, as a first step, the development of a taxonomy which will allow us to order relevant data. This taxonomy is based on two variables, the nature of organizational procedures and the nature of the organization's resources. Classifying organizations by these two variables yields information not only about bureaucratic structures but also about the manner in which authority is exercised in these structures. Further, use of the taxonomy allows us to make inferences about the environmental conditions associated with the emergence of the various bureaucratic structures. Before discussing these structures, however, we will make explicit our assumptions about the nature of formal organizations.

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are social units ". . . established for the explicit purpose of achieving certain goals."[3] Barnard defines formal organization as a ". . . system of consciously coordinated activities or forces of two or more persons."[4] Based on these definitions it seems clear that organizations arise when someone expends resources and establishes some procedures for their use, in order to achieve his goal. Little attention has been paid, however, to who provides the resources and what part of the system, or social unit, has property rights with regard to those resources. This is an important consideration, for only those who have rights to the resources have legitimate legal or societal sanctions at their disposal to enforce procedures for their use. In other words only the holder of the property rights is socially sanctioned to impart direction to the system. The person(s) who by virtue of his rights to the organization's resources has the right to shape and mold (as well as to dissolve, sell or otherwise transfer) the organization to attain his goal is in essence the owner(s) of the organization. The owner may be a single individual; a small group, like a committee or a board; or the total citizenry of a nation.[5]

The assertion that formal organizations are owned means that formal organizations can be treated as property. The view that formal organizations are property is a central assumption of this theory and since property has many meanings for many people it is essential to carefully explore what we mean by the terms "property" and "property rights."

According to Kingsley Davis, property "consists of the rights

and duties of one person or group (the owner) as against all other persons or groups with respect to some scarce good."[6] This definition of property includes societal as well as legal sanctions. The characteristics of property rights are that they are transferable (either by exchange or transmission from one generation to the next) and that they do not imply actual use of the object by the owner. In discussing whether property rights refer only to concrete external objects Davis states that "What property rights really refers to in all cases is the right to demand certain kinds of behavior from other individuals. . . ."[7] Davis also distinguishes between two types of property: public and private. "The term 'private property' should apply to rights by individuals or groups acting in their own interest, and 'public property' should apply to rights held by the community-at-large and administered by individuals or groups acting as agents of the community."[8]

In discussing the property rights in productive technology, Davis states that "there are always (italics ours) two mutually contradictory principles at work: (1) the tendency of men to retain their rights in productive property but to let others work it for them; (2) the tendency of those who work the property to acquire rights in it. The first is made possible by the separability of use and ownership; the second by a counteracting affinity between the two."[9] He further states that the persons actually connected with the productive instruments are in a position to use them for their own advantage as against the advantage of the titular owner, i.e., "the share of the

product that goes to capital may not always be forthcoming if the persons who furnish the capital stand apart from the production itself."[10]

Our conception of formal organization, i.e., one that includes an owner, is based on the premise that a formal organization is property and that the property rights in them are transferable either by exchange or by transmission from one generation to the next. We recognize that the owner need not actually manage or operate the organization--he can allow the property to be operated by a manager or director. We further assume, following Davis, that property rights are not restricted to concrete objects but include the right to demand certain kinds of behavior from other individuals. Specifically, we are thinking of the owner's right to demand certain kinds of behavior from his labor force, his human resources.[11] At the same time, however, we recognize that the right may or may not be honored, because, following Davis, we assume that there is a tendency for those who work the property to acquire rights in it. The owner of a formal organization, then, has a dual problem: (1) to utilize his property so that his goals are attained; and (2) to prevent the erosion of his rights by those who operate the property.

In summary, ownership of a formal organization resides with the person or persons who have property rights to the total organization. The owner's resources are the elements that comprise the formal organization; differentiation of structure and function arise, in part at least, as a result of the procedures established by him.

Definition: Formal Organization. A formal organization is a purposely developed system, i.e., an ongoing interaction of procedures and resources, to which an owner has property rights.

We assume that the reason an owner seeks to attain his goal by creating (using, buying, renting, etc.) an organization is to obtain the economic or psychological advantages that result from coordination. We further assume that the rational owner aims to achieve his goal in as efficient a manner as is possible and to prevent the operators of the organization from usurping his property rights. When the owner decides to attain his goals through organization he acquires resources necessary for goal attainment and coordinates them in productive effort. He can do this in ways which give greater or lesser discretion to the human resources. Maximal discretion is given labor when the owner informs them of his goal, places capital at their disposal, allows them to expend it for machinery and/or raw material as they see fit. Least discretion is given labor when the owner decides for what and how his capital will be expended: when he informs labor of his goal and also tells them exactly how to get there.

Maximal coordination by the owner is possible only when all discretion resides in him. As we use it, to coordinate is to impart direction to the system, i.e., to specify procedures for the utilization of the resources of the system. The maximally coordinated organization is the end point of a continuum and in the real world usually is not reached. An owner may either choose to coordinate the resources by himself or delegate the responsibility to coordinate to some decision-making components within his organization. The coordinating, decision-making components of the organization constitute what we consider the <u>managers</u> of the organization. The coordinating, non-decision-making components constitute what we

consider the bureaucrats (clerks, bookkeepers, strawbosses, etc.). In other words, the difference between a manager and a bureaucrat is the degree of discretion each has in determining his, and others, organizational activities. Bureaucrats, though engaged in the coordinating process, have little or no discretion in the performance of their functions, nor do they determine the activities of others. Managers, on the other hand, have some discretion over their own activities and also determine the activities of bureaucrats (and others) in the organizations. Most coordinators fall between the extremes of having full discretion or no discretion. This variation in degrees of discretion allows us to classify coordinators in terms of a ratio of discretionary to non-discretionary activities. Coordinators thus are operationally defined according to their activities within the organization.

Persons not primarily engaged in the coordinating process we consider producers. Producers work toward the attainment of the owner's goal directly through their own activities rather than by facilitating or increasing the effectiveness of the activities of others. Consider, for example, the different roles played by the craftsmen and the foreman in building a house. The foreman, i.e., the coordinator, does not drive nails, saw wood, etc. He performs no act directly, tangibly, immediately related to building a house. His contribution lies in increasing the efficiency of those who do build the house. The house could be built without a coordinator, though probably, it would be more costly.

Producers, like coordinators, also have more or less discretion over their organizational activities. Producers who determine

their own activities (e.g., have discretion), we designate as professionals.[12] Producers whose activities are determined by others we term workers. These four organizational roles are determined by their function and manner of performance, as shown in Table 1.

Insert Table 1 about here

To this point we have discussed some assumptions basic to our view of formal organization. Next we will define and discuss the variables which determine the bureaucratic structures of formal organizations.

The Variables. Our premise is that the kind of organization which develops is determined by two variables: (1) the degree to which resources are stored in specific or general form, and (2) the degree to which procedures are organizationally specified.

We consider a resource any factor--(labor or capital)--that produces a good or service. Just as Davis considers "good will" an intangible which has associated with it property rights, so do we consider as a resource any organizational property, intangible or not, which is exchangeable for capital or transferable in any other sense. Both good will and credit are examples of exchangeable or transferable non-tangible resources. Property rights, whether associated with tangible or non-tangible resources, may be owned outright or they may be leased. Rights to owned resources may be held indefinitely while rights to leased resources

are obtained only for a limited period of time. While most resources can be either leased or owned, labor, except under unusual circumstances, must always be leased.

Storage of resources refers to possession of them during the period of time between their acquisition and their consumption. We define organizational resources as those resources which are stored within an organization. The "specific-general" dimension is analogous to the notion of committed and uncommitted resources. When a resource is in specific form it is earmarked for a particular use; when it is in general form its use is undetermined.[13] The analogy is not a perfect one, however, because we consider the factor of storage as well as commitment in our concept.

Definition: Specific-General Resources. Any resource is a specific one if it is stored by an organization in the form necessary to implement a program with the owner's intent that it be used, modified or consumed within the organization in the process of obtaining his goal. Any resource is a general one if it is stored by an organization with the expectation that it will be converted to a specific resource.

Operationally, the ratio of specific to general resources is the present investment in specific resources over the present value of general resources; where present investment equals initial cost of the specific resources times the unused proportion of those resources; and where present value equals market price of the general

resources. (The present investment in leased resources is the total payment [rental fee, contract or salary] times the remaining unexpired percentage of the lease period.)

Uncommitted money, or the ability to borrow, is the most usual general resource. However, organizations which utilize and consume money within the organization to implement a program at the behest of an owner also can store it as a specific resource. Money might be a specific resource to a lending institution or foundation because their programs require its consumption by or within the organization rather than its conversion to another resource. Even these instituions, however, may maintain money as a general resource if they store it prior to determining its use.

Labor usually is a specific resource; however, it too, can be a general resource. For example, when a baseball team buys a player merely for trading purposes, that player is stored as a general resource until a trade involving that player is made. If no trade is completed, the player can be converted to a specfic resource by deciding to use him on the team--by fiat allocating him for consumption by or within the organization.

The lending institution example illustrates how a usually general resource can be employed as a specific one; the baseball team illustrates how a normally specific resource can be used as a general one. In both cases the resources can be converted from one form to another, by the owner's fiat. These are exceptional cases, however, for usually money is a general resource and labor

a specific one. Conversion of resources from one form to another by fiat also is rare because conversion frequently involves recourse to the goods and services of an individual outside the organization or to another, autonomous organization.

The second variable is the degree to which procedures are self- or organizationally-specified. A procedure is self determined when the human is given discretion in achieving the organization's goal. He is given general instructions to achieve an organizational objective but is not given specific instructions about how to achieve it. The former we refer to as a general procedure, the latter a specified one. Procedures are conceived of as distributed on a continuum from absolutely specified to totally generalized.

Definition: Specified-Generalized Procedures. Procedures are completely specified when an owner, or his agent, requires a volitional resource to perform a series of planned activities such that the entire working period is consumed in the performance of those behaviors. Procedures are completely generalized when the volitional resource is required by the owner to specify all his own procedures in attaining the organization's goal.

Operationally, the ratio of specified to generalized procedures is the proportion of time volitional resources spend carrying out procedures planned by others above them in the administrative hierarchy over the total time spent on organizational activities.[14]

We hypothesize that <u>the structure of the formal organization and its concomitant authority pattern is dependent on the ratio of specified to generalized procedures and on the ratio of stored specific to stored general resources</u>.

The variables, proportion of procedures which are specified, and proportion of resources stored in specific form are continuously distributed. Nevertheless, for expository purposes we will consider only the end points of these two continua. Where P+ stands for a high proportion of specified procedures and P- for a low proportion, and where R+ stands for a high proportion of stored specific resources and R- for a low proportion, there are four possible combinations of procedures and resources: (1) P+R+; (2) P+R-; (3) P-R+; (4) P-R-.

In the first situation, P+R+, a high proportion of the procedures are specified and a high proportion of the resources are stored in their specific forms. The P+R+ organization is exemplified by an automated factory in which all the machinery and people necessary to achieve the goals of the organization are stored, and where all their activities are planned or programmed.

In the second situation, P+R-, the owner specifies a high proportion of the procedures, but he stores a low proportion of the organization's resources in specific form. In the construction

industry, for instance, the owner does not know whether he will use glass, brick or cement on his future construction projects. To store all resources for any construction exigency would obviously be costly and for most contractors, impossible. This is true of any industry, such as fashion or show business, which has a relatively unpredictable demand.

The third case, P-R+, is one where the owner stores the specific resources necessary to goal achievement but he does not or cannot specify the procedures for their coordination. Hospitals, research organizations, universities, are more or less characteristic of this type of organization. In these organizations resources are stored in specific form (surgical instruments, doctors, computers, professors, etc.) but the owner does not specify their use.

The last situation, P-R-, where there are few specified procedures and few specific resources is one where there is low probability of the emergence of a viable organization. With little planning and few resources to coordinate there is little reason to maintain even the semblance of a formal organization. Other than this last case, each of the (idealized) combinations of procedures and resources results in a distinctive pattern of formal organization.

Bureaucratic Structures

The Complete Bureaucracy. The most widely discussed type of formal organization is the monocratic, bureaucratic organization. Weber states that one characteristic of monocratic bureaucracies is

that they are "organized in a clearly defined hierarchy of offices."[15] He also states that this form of organization is ". . . capable of attaining the highest degree of efficiency and is . . . the most rational known means of carrying out imperative control over human beings."[16] This can be taken to mean that, among other things, bureaucracy is a control mechanism to insure coordination.[17] In Weber's formulation coordination and control are achieved within the framework of an executive authority pattern. Marcson describes this authority pattern as "a system of controls in which a superior in a hierarchical organization exercises ultimate control over his subordinates. It is . . . based on incumbancy in a position and occurs within the framework of pre-existing rules of the organization."[18]

The Weberian ideal bureaucracy exists only when the owner (or his surrogate) does the following two things: (1) exercises executive control over and coordinates the activities of (2) the people and tools necessary to achieve the goals of the organization. Effective executive control and coordination is dependent upon extensive planning. Planning and coordination only can be carried out when people and other resources necessary to plan and carry out that coordination are available within the organization. Thus, conditions necessary for the emergence of an organizational form approximating the Weberian Model are, in our terminology, a high proportion of specified procedures (P+), and a high proportion of stored specific resources (R+). The Weberian ideal bureaucracy can only occur when virtually all procedures are specified and all resources

required for goal achievement are stored in specific form. We term this kind of organization a Complete Bureaucracy.

Definition: Complete Bureaucracy. A Complete Bureaucracy is a formal organization which in the process of goal attainment stores all the managerial hierarchies necessary to maximize coordination and control.

As we previously implied, one of the closest approximations to the Complete Bureaucracy is the automated factory. Here the activities of all the resources, including the human ones who tend the machines--push buttons, watch for red lights, etc.--are completely programmed. Almost all the resources are stored in specific form and almost all the procedures are specified. The procedures are specified by the owner and (generally) through a chief executive down the hierarchical levels to the worker. This kind of authority pattern has been called an executive authority pattern and we associate it with the Complete Bureaucracy. Although a Complete Bureaucracy maximizes coordination, often it is undesirable or impossible for the owner to specify a high proportion of the procedures or to store specific resources. Not doing one or the other modifies the Complete Bureaucracy.

The Truncated Bureaucracy. First, let us examine the effect on the organization of not storing a high proportion of specific resources. As we stated earlier this situation is characteristic of industries, such as fashion and construction, which have relatively unpredictable demand. It is our contention that when demand is unpredictable human resources are among the first specific resources

not to be stored. This is so because humans are one of the more expensive resources to store. The high storage costs primarily are due to the fact that human resources cannot, except in unusual circumstances, be owned outright. Human resources almost always must be leased. A major difference between owned and leased resources is the rate at which they lose value when in use and when not in use. Owned resources tend to depreciate more slowly when not used. On the other hand, because the rent for leased property remains constant the rate of depreciation of leased property is unaffected by use. Therefore, per dollar invested it frequently costs more to store leased resources than owned resources.[19] Consequently, when demand is unpredictable, i.e., when the probability of non-use of stored specific resources is high, human resources are among the first not stored by the organization.

Generally, the more unique the skill of the resource, the less available it is and the more costly it is to replace. As a result an owner prefers to store unique or difficult to obtain resources in preference to less unique or easily obtained resources. One of the most unique skills a human resource can possess is knowledge of how and why a particular formal organization operates. This applies with greater generality to the manager than to the worker--with greater generality the closer each hierarchy is to the top of the organization. Not only does the uniqueness of skills increase as one moves from the lowest to the highest administrative levels, the responsibility for coordination and planning also increases. Consequently, the potential benefits to be derived from the

coordination and planning associated with each bureaucratic level increases from the lowest to the highest administrative levels. Thus, owners prefer to store higher level managers to lower level ones. When all necessary levels are stored the higher ones are leased for longer periods of time. That is, high level managers are contracted for by the year and lower level ones hired by the month or week. The tendency of organizations with unpredictable demand not to store lower administrative levels (or if stored, to lease them for shorter periods of time) is reinforced by the fact that storage costs vary inversely with level. That is, the combined salaries of an entire level generally exceed the combined salaries of the entire level above it.[20] The failure or inability to store the lower levels results in what we call a Truncated Bureaucracy.[21]

Definition: Truncated Bureaucracy. A Truncated Bureaucracy is a formal organization where one or more of the lowest managerial levels necessary to maximize coordination and control in the production of a good or service are not permanently stored within the organization.

Where the lower administrative levels needed for coordination and control are not stored within the organization and cannot be obtained on demand, their functions must be performed by persons outside the organization.[22] In the construction industry, the craft union, in large measure, has fulfilled these functions. It is difficult for organizations other than craft unions to judge the ability of workers who move from job to job in the practice of

their occupations. The definition of acceptable performance and the rating of employees based on that definition is an administrative service performed by the craft union for the owner of the formal organization. The craft unions then, perform a dual function. On the one hand, they represent their members in bargaining with the formal organization and on the other they function as an administrative adjunct to the organization. Since these functions are performed outside the truncated bureaucracy we characterize the attendant authority pattern as an executive-external one. Obviously the importance of the external authority and the consequent loss of authority by the owner is directly related to the degree of truncation.

Thus, when procedures are highly specified and resources are stored in general rather than specific form (P+R-) the departure from a Complete Bureaucracy occurs through a truncation of the lower administrative levels. The pattern of authority associated with this form of bureaucracy is the executive-external authority pattern. This departure from the Complete Bureaucracy differs radically from the one observed when procedures are not highly specified and when resources are stored in specific form (P-R+).

The Enucleated Bureaucracy. In a P-R+ organization the owner does not tell the volitional resources how to achieve the organization's goals, but merely tells them what they are. In this situation the owner relies on the specific resources to specify their own procedures, to decide how, when, and with what to achieve the organization's goals. An example of such an

organization might be a small school, whose owner gathers together ten professors, a building, a library, pencils and paper. "Teach the youth of the country the wisdom of the ages; teach them how to think," he states as the goal of the organization. Of course, in attempting to implement the owner's aims each professor utilizes his own methods. No one tells him how to transmit his wisdom; each professor specifies his own procedures. Conforming to our definitions of organizational roles, the producers in our hypothetical school are, therefore, professionals rather than workers.

Where producers specify their own procedures the necessity for a coordinator is, of course, sharply reduced. Self-regulation, however, generally is not so extensive that some coordination of resources is not beneficial. Where it is beneficial the professionals tend to coordinate themselves since only they can anticipate which procedures they will employ and which resources they will need. The faculty in this case, acting as a collegial group, determines the allocation of resources and regulates the use of common resources such as classrooms.

In the P-R+ organization we have described, the need for coordination is reduced and where necessary, self-coordination occurs. Therefore, the number of managerial levels between the owner(s) and the producers is sharply reduced. In fact, if each volitional resource specified <u>all</u> his own procedures, all levels between the owner and the producers would be or should be eliminated. Such an organization we call a totally Enucleated

Bureaucracy. Though the extreme enucleation which we have described rarely if ever occurs, approximations are readily found in professional organizations such as law firms and medical groups, universities, research institutes, etc.

Definition: Totally Enucleated Bureaucracy. A totally Enucleated Bureaucracy is a formal organization where all of the hierarchic levels necessary to maximize coordination and control are eliminated between the owner and the producers.

To the extent that the producers coordinate their own activities they perform the function of the enucleated bureaucratic levels. This coordination is achieved by what we term a consensual specification of procedures and allocation of resources. Divisions of labor are agreed upon, uses of physical facilities are planned through the professionals' consensus rather than by executive directive. When administrative functions are performed by a group each member of which has a voice in decision-making and when those decisions are based on a consensus, coordination is achieved through collegial decision-making.[23] In the totally enucleated bureaucracy the professionals constitute such a decision-making body. It seems clear then that a colleague authority pattern is associated with the totally Enucleated Bureaucracy.

The remaining combination of procedures and resources, P-R- is a condition where no formal organization occurs. If the procedures are not specified, the hierarchy between the owner and the

lowest management levels is enucleated; if resources are not stored in specific form the lowest levels of management are truncated; if all the levels of the hierarchy below the owner are excised there can be no formal organization. The patterns are summarized in Table 2.

Insert Table 2 about here

Optimal Bureaucratic Structures. Both a Truncated and an Enucleated Bureaucracy are modifications of the Complete Bureaucracy. The proposition that these modifications occur under certain conditions suggests that the Complete Bureaucracy is not always the optimal organizational form for attaining the owner's goal. Indeed, as we will show, the Complete Bureaucracy rarely, if ever, is an optimal form of organization.

An optimal bureaucracy is one which stores only that number of levels which maximizes the benefits of coordination while the Complete Bureaucracy stores all the hierarchical levels necessary to maximize coordination itself. A maximally coordinated organization 1) has available, as they are needed, all the volitional and non-volitional resources necessary to perform all the interdependent tasks; and 2) plans all the interdependent tasks to the extent that the performance of any one of these tasks does not hinder the performance of any other and when possible will enhance it. A Complete Bureaucracy not only stores the hierarchies

necessary to plan all the interactions of the human and non-human factors of production but it also stores the hierarchies necessary to insure that planning is being carried out, thus attaining both coordination and control. Just as benefits can be gained from coordination, so are there costs associated with the processes of coordinating and controlling. The optimal bureaucracy occurs at the point when the gains which would accrue to the owner from increased coordination and control are outweighed by the costs of obtaining that increase--by the costs of adding an additional hierarchical level.

One example of movement from a complete toward a more nearly optimal bureaucracy was described in Time Magazine. In the example the owner of a retail chain made reductions in coordination and control which resulted in a net gain for his organization. Inventory replacement cards, sales receipts, time clocks, etc. were eliminated. Undoubtedly, there was some loss due to less coordination and control, but the owner ". . . wiped out so much record keeping that he has junked 120 tons of paper forms, saved $14 million. He was able to cut prices 5% and was rewarded with an 18% sales increase. . . . Some 8,000 jobs out of 28,000 have been eliminated. . ."[24] Each of the changes made in this case eliminated a specified procedure and so decreased the ratio of specified to generalized procedures. In effect, the granting of increased discretion to the lower administrative levels tended to change the organization from a more complete toward a more enucleated one.

Whether change toward optimality takes the form of greater enucleation, as in the example, or of greater truncation generally is determined by the nature of the organization's interaction with its external environment.[25] The speed with which an owner can specify procedures is directly related to the complexity of the organization's interaction with the environment. Complexity increases as 1) there is an increase in the number of environmental factors to be considered before an appropriate response can be selected; and/or 2) there is an increase in the intricacy and difficulty of the response. Stocking a nation-wide chain of supermarkets is an example of a complex interaction on an environmental level, while surgical removal of a cancer exemplifies a complex interaction on a response, or procedural, level. When the interaction is complex and rapid specification of procedures is required of the organization, the owner is forced to allow the lower hierarchic levels to specify their own procedures, an occurrence which tends to enucleate the bureaucracy.

Given the tendency to enucleate, coordination by means of a colleague system is desireable if the producers in the organization share common resources. Because the producers, in this case professionals, specify their own procedures, only they can determine what resources they will need. Further, they are best able to allocate these resources across the entire organization, (i.e., among themselves), and so take advantage of economies of scale.

However, coordination by a collegial system depends on the emergence of consensus and so is a time consuming mechanism. Consequently, the collegial system of coordination is efficient to the extent that resource requirements are relatively stable.

An Enucleated Bureaucracy, employing a collegial system, facilitates rapid specification of procedures but limits the rapidity with which resources can be converted. When both rapid change of resources and rapid specification of procedures are required, alternate, more complex organizational structures must be employed. However, as we later will demonstrate, these structures further reduce the benefits of coordination. Enucleation of the Bureaucracy, then, is optimal a) when environmental interaction is complex, making owner specification of procedures difficult; and b) when there is need for rapid response, making owner specification nearly impossible. Coordinating an Enucleated Bureaucracy by a collegial system is optimal a) when the professionals share common resources; and b) when the resource requirements are stable.

In addition to complexity, the interaction between an organization and its external environment also can be characterized by its diversity. By diversity we mean an environmental state where for goal achievement there must be performed a number of different functions each requiring a more or less different set of procedures and resources. That is, given one environmental condition the owner achieves his goal by utilizing one subset of procedures and resources and given a different environmental condition he employs

a separate subset of procedures and resources. The more diverse the interaction the more diverse will be the resources required for goal attainment by the organization. The more sporadic the demand for each of the diverse functions the greater are the costs and risks associated with storing all the necessary resources. When the storage costs outweigh the benefits of coordination the owner should obtain the necessary volitional and nonvolitional resources only after the demand for them has been made. This would tend to truncate the bureaucracy. Thus, when interaction is diverse and in addition the environment is unstable the optimal organizational form tends toward a Truncated Bureaucracy.

This tendency is mitigated, however, if the organization is forced to respond rapidly to environmental demands. It takes time to acquire resources so in order to respond rapidly the organization must have on hand the resources necessary to make any of its diverse responses. Storage of large quantities of alternative specific resources which perform no immediate function, and indeed may never perform a function, is costly. Highly diverse interaction, coupled with sporadic demand and the necessity for rapid response, normally increases the cost of storage of all the necessary resources to the point where organization does not occur. There are, however, some instances where the possible costs of not storing all alternative resources are so great that they outweigh the costs of storing them. This is particularly true of the military establishment which must be prepared to respond rapidly

to a highly diverse environment and where demand for military functions is sporadic. The sale of surplus military equipment is testimony to the costs of storing alternative resources. Only under such extraordinary conditions does storing of all alternate resources reduce the degree of truncation. Ordinarily the costs of such storage prevent organization.

In summary, a Complete Bureaucracy is optimal when the environment is stable. Once the environmental factors in a stable environment are understood there is no need to reexamine them. A stable environment thereby decreases the effect of complexity of interaction. Further, a stable environment by definition, eliminates sporadic demand. Thus, in a stable environment where the owner can specify the organization's responses the optimal organizational form approaches the Complete Bureaucracy. Since these conditions rarely, if ever, occur, a Complete Bureaucracy rarely, if ever, is optimal.

Movement away from a Complete Bureaucracy depends on the interrelationship of three variables: 1) complexity of environmental interaction; 2) diversity of environmental interaction; 3) the need for rapid response. An increase in the complexity of interaction tends toward enucleation. The tendency is enhanced as a function of the need for rapid specification of procedures. An increase in the diversity of interaction along with sporadic demand tends toward truncation.

Complex Organization Structures. To this point we have only

considered "simple" organizational types and the authority patterns associated with each of them. An organization is a complex one when its authority relationships cannot be described by a single authority pattern. An example of such a complex organization is a hospital where the administrative group and the group of doctors each operate under a different authority pattern, the administrative group under an executive authority pattern, and the doctors under a (more or less) collegial system. Obviously, attainment of the hospital's goals is directly dependent on the activities of the members of the collegial group. The function of the administrative component is to facilitate the activities of the colleagues. The nature of the activities performed by the administration are, therefore, dependent on the needs of the collegial group. When the activities of one group are directly determined by the needs of a second group within the same organization, the first group is coupled to, and in service to, the second group.

Definition: Internal Coupling. <u>An internally coupled bureaucracy is a formal organization which contains two or more authority patterns, one in service to the other</u>.

The when and why of internally coupled organizations can be understood by looking at the organization from the owner's point of view. He has a need to maintain procedures at the specified end of the continuum, and to store resources in their most specific form if he is to maximize coordination. Should achievement of his goal require the use of volitional resources for whom he

cannot specify procedures then a collegial coordinating mechanism may be optimal for maximizing the benefits of coordination. Should the colleagues require some services or functions to be performed for which procedures can be specified (and these are of sufficient number and size to make it economically or psychologically feasible), the rational owner will couple a small, more complete bureaucracy to the collegial group to perform those functions. Under these conditions, the Complete Bureaucracy is in the service of the colleagues and their activities are determined by the needs of the colleagues.

On the other hand, when the owner of a Complete Bureaucracy, for better attainment of his goals, requires the performance of some functions where he cannot specify procedures, then he will couple a colleague authority pattern to his executive authority pattern, and the activities of the colleagues will be determined by the needs of the Complete Bureaucracy. A research and development division whose research objectives are established by the sales organization is a case in point.

Another sort of coupling occurs when the services of two kinds of bureaucracies are needed to produce a good or a service but the owner of one of the bureaucracies does not store in specific form all the resources necessary to staff two bureaucracies. An example of this type of coupling might be a manufacturer who needs the services of a market research organization. He does not need them frequently enough to internally couple so

he momentarily converts some general resources to specific ones by hiring an independent research group. Such a situation we call external coupling.

Definition: External Coupling. Externally coupled bureaucracies are formal organizations where one bureaucracy specifies or approves the procedures (or determines the goals) of the other.

External coupling by specifying or approving procedures occurs when an organization like Sears Roebuck hires a "job shop" to make a part for one of its appliances. The "job shop's" procedures are specified or approved through Sears' setting up minimum requirements. The earlier example of a manufacturer hiring a market research organization illustrates external coupling through goal determination. These examples highlight two differences between internal and external coupling. The first one is that in external coupling no volitional resources are common to both organizations. The second is that internal coupling always involves two different authority patterns while external coupling may occur between organizations having similar or different authority patterns. One further distinction must be made which concerns the difference between external coupling and two independent organizations with one simply buying the goods or services of the other. When the bureaucracy in service to the other cannot exist without the dominant organization the two organizations are in an externally coupled relationship. In other words the dominant bureaucracy must have an oligopsonistic relationship with the

bureaucracy to which it is externally coupled.

A third type of complex organization is the decentralized organization. As we use it, decentralization is related to the degree of autonomy across organizational units. Autonomy is equated with the extent to which the activities of one component of the organization are independent of the activities of other components of the organization. In other words, the degree to which an organizational unit is autonomous varies inversely with the degree to which its activities are coordinated with other organizational units. The autonomy of an organizational unit theoretically can vary from total interdependence to almost total independence. Total independence of organizational components would be indicative of separate organizations rather than one decentralized organization. If all organizational units, however autonomous, are somewhat less than totally independent then there must be interdependent areas which require coordination. This necessitates a central bureaucracy which coordinates the activities of the autonomous units wherever feasible, and which performs other noncoordinating functions to take advantage of the economies of scale.[26] Based on these assumptions we define the decentralized organization as follows:

Definition: Decentralization. <u>A decentralized bureaucracy</u>

is a formal organization when it consists of two or more semi-autonomous units, neither of which is in service to the other.

Autonomy arises when a unit manager not only is given discretion over the unit's procedures but also is given discretion over the conversion of general resources to specific ones. If a manager is given a goal and specific resources to use in achieving that goal, his range of activities is much more curtailed than when he is given general resources to use at his own discretion in achieving the owner's goal. The former condition we consider as delegation and the latter as autonomy. Delegation results in a single enucleated bureaucratic structure[27] while autonomy leads to two or more semi-independent organizational units. Granting a manager authority to independently convert resources is, in effect, establishing a semi-independent organizational unit.

The degree of organizational decentralization can be measured by the degree of autonomy given to organizational units. That is, the amount of general resources over which the unit's manager has control. Stated more formally, the degree of organizational decentralization is determined by the amount of general resources which managers are permitted to allocate without approval from the owner or his chief operating executive, divided by the total

resources of the organization.[28] The extent to which a sub-unit is decentralized can be determined as follows: the general resources of the sub-unit which can be allocated by the manager of the unit without the permission of either the owner or of any other managers, divided by the total resources of the unit.

When he decentralizes, the owner gives up control over some of his resources. As a consequence the possibility of usurpation is increased and some potential benefits from coordination are foregone. Thus, decentralization involves costs which, for the rational owner, must be offset by gains resulting from decentralization. We contend that the potential benefits from decentralization increase as the necessity for rapid response increases. In fact, we will demonstrate that the necessity for decentralization arises as a result of time pressures.

We hypothesize that decentralization arises as a function of the complexity of the organization's interaction with its external environment and the rapidity with which the organization must respond to that environment. As we have stated, complex interaction results either from procedural or environmental complexity. We further hypothesize that the optimal form of decentralization differs as a function of the different kinds of complexity. When

procedures are so complex that a great deal of time is required in order to specify the appropriate responses, one way of saving time is to specify some of the complex procedures simultaneously rather than sequentially. This can be accomplished by allowing components of the organization to specialize in a set of procedures leading to achievement of sub-goals. In this way each component simultaneously specifies the procedures for its sub-goal achievement. Presumably, near simultaneous achievement of the set of sub-goals results in achievement of the organization's over-all goal.

Organization of autonomous units around sets of different sub-goals is, in effect, functional decentralization, as example of which might be Scott Paper Company, which has timber, paper processing, and paper towel divisions. All the divisions specify their own sets of complex procedures and they do so simultaneously. However, since the supply and demand of the units affect one another their activities must be interrelated if the final products are to be efficiently produced. That coordination is provided by a central bureaucracy.

When complex interaction arises from environmental complexity and response must be rapid, decision time can be reduced by setting up parallel bureaucracies so that each bureaucracy can deal with a segment of the environment. (The environment can be segmented on the basis of population or geographical differences, or on any other relevant characteristic.) This has the effect of

reducing the number of hierarchies through which information from the environment must pass. Let us take a simplified view of a supermarket chain. If a Complete Bureaucracy were to deal with all segments of the population the number of administrative levels would be greater than if parallel bureaucracies were set up, each to handle one population segment. This results in a larger number of managers at each level (one of the costs of decentralization), but fewer levels. Though each orders from a central warehouse, the bureaucracies are paralleled because each one semi-independently buys, sells and displays its own merchandise. Each of the merchandising decisions is duplicated, and each decision is simultaneously and independently arrived at by the parallel bureaucracies. Since the acts of one parallel bureaucracy have relatively little effect on another, little coordination is required of the central bureaucracy. The role of the central bureaucracy is primarily to prevent usurpation, and to maximize the economies of scale. In the case of our supermarket chain such an economy might be affected if the central bureaucracy buys staple items for national distribution while local units determine the weekly specials.

The advantages of parallel bureaucracies in dealing with an unstable environment become apparent if one makes two assumptions. First, that knowledge of changes in the environment enters the organization through the bottom layers and travels through the intermediate ones to the top layers. Second, that the time

necessary for a given quantity of information to pass through a layer of bureaucracy is a constant. Under these assumptions, as one adds or subtracts a bureaucratic layer, there is a corresponding arithmetic increase or decrease in the time required to perceive, initiate and evaluate new procedures to cope with an environmental change. This can be illustrated by comparing a two with a three layer bureaucracy. In the two layer bureaucracy the lower level: (1) reports an environmental change to the upper level; (2) the upper level specifies a new procedure to deal with the changed environment, and (3) the lower level reports on the adequacy of the new procedure. Three communication time units have been consumed. In a three layer bureaucracy each of the three steps requires two communication time units, or six time units, to complete the cycle. This is illustrated in Table 3.

Insert Table 3 about here

In the same time that a two level bureaucracy can make and evaluate three independent changes, a four level bureaucracy can institute and evaluate only one procedural change.

The major benefits from parallel decentralization result from processing information through fewer hierarchic levels. However, because the parallel bureaucracies also are simultaneously specifying procedures there is a time saving in response rates. Function decentralization, on the other hand, derives its major benefits

from the savings in response rates due to simultaneous specification of procedures, and this situation, too, has secondary benefits. If a single bureaucratic unit were to specify all the complex procedures, a larger number of hierarchies would be necessary so functional decentralization realizes some benefits from more rapid information processing.

Since both forms of decentralization (differentially) eliminate some hierarchic levels between the owner and the producers, the distinction between these organizational forms and enucleation may not be entirely clear. The distinction rests on the different coordinating mechanisms used by these organizations. Coordination in an enucleated bureaucracy is accomplished by the colleagues who form themselves into a single bureaucratic unit for that purpose while coordination in a decentralized organization is achieved within and between multiple semi-autonomous units.

A collegial system dependent upon the emergence of consensus requires considerably more time for decision making than does a small number of single executives, each independently making decisions. A single coordination mechanism, however, is better able to allocate resources across the entire organization. On the other hand, a decentralized mechanism enables more rapid response but limits the extent of coordination. Whether enucleation or decentralization is optimal depends on the necessity for rapid decisions about resources.

In summary, the decision to decentralize and extent of

decentralization is a function of a) the necessity for rapid specification of procedures and rapid resource decisions, and b) the degree of complexity of the interaction between the organization and its environment. Slow response, given the necessity for rapid response, is costly, When slow response costs more than the benefits gained from coordination the result is a decentralized organization. When the slow response is due to procedural complexity we hypothesize that functional decentralization will occur where each unit simultaneously specifies a set of procedures to attain a part of the organization's goal. In order for the over-all goal to be efficiently attained the central bureaucracy must coordinate to some extent the efforts of the functionally decentralized units. Parallel decentralization results from environmental complexity, where each of the duplicated bureaucracies achieves a miniature of the over-all goal of the organization. The major function of the central bureaucracy is to take advantage of economies of scale in purchasing and allocating resources commonly used by the parallel units.

In developing this typology for purposes of exposition we have dealt more or less with pure organizational forms. Before concluding this section on complex organizational patterns, we will try to point out just how complex these patterns can become. In an organization with autonomous units, the central bureaucracy may have one type of structure while the decentralized units have other structures. For instance, a university may have an enucleated

dominant bureaucracy (colleagues) and a series of parallel bureaucracies (research projects), each of which may approximate a Complete, Enucleated, or Truncated Bureaucracy. Each of these parallel bureaucracies, in turn, may have decentralized units. Another example might be General Motors, where some parts of the organization are decentralized on the basis of function and others on the basis of environmental differences, while still other parts remain under the direct control of the central bureaucracy. Obviously, there are a very large number of possible combinations of organizational units.

In presenting this taxonomy we hope that we have accomplished two things. First, that ordering organizations on the basis of our schema provides insight into the relationship between structure and authority patterns. Second, that we have increased our understanding of the environmental conditions which lead to the emergence of these patterns. The attempt to impose order on such complexity by the use of two structural variables plus three environmental variables is an oversimplification which is bound to leave many facets of organizations unexplained. We hope, however, that the taxonomy here presented will provide a basis for subsequent elaboration. In a future paper, we will define a third variable, visibility of consequences. Based on these major variables we then will attempt to elaborate the dynamic aspects of a theory of formal organizations. Organizational conflict, change, usurpation, innovation, goal structures and informal organizations

will be discussed and some empirical evidence will be presented in support of our contentions.

[1]Many of our colleagues and students deserve thanks for their valuable suggestions but special thanks for their cogent and constructive criticisms go to Odin Anderson, David Green, Jr., Sue Marquis, George Sorter and Thomas Whisler.

[2]Development of this paper was partially supported by The National Aeronautics and Space Administration, Grant #NSG-370.

[3]Peter M. Blau and Scott W. Richard, Formal Organizations (San Francisco: Chandler Publishing Company, 1962), p. 1.

[4]Chester I. Barnard, The Functions of the Executive (Cambridge, Massachusetts: Harvard University Press, 1951), p. 73.

[5]For a discussion of the nature and types of multiple ownership see Robin M. Williams, Jr., American Economic Institutions (New York: Alfred A. Knopf, 1960).

[6]Kingsley Davis, Human Society (New York: The Macmillan Co., 1949), p. 452.

[7]Ibid., p. 455.

[8]Ibid., p. 457. Similar views are also expressed by R. M. Williams, Jr., op. cit., p. 188.

[9]Ibid., p. 463. A similar distinction can be inferred from Williams' discussion of control and beneficial rights. R. M. Williams, Jr., op. cit., p. 189.

[10]Ibid., p. 465.

[11]Simon writes "...a primary function of organization is to enforce the conformity of the individual to norms laid down by the group, or by its authority wielding members," H. Simon, "Decision Making and Administrative Organization," Public Administration Review, IV, Winter, 1944, p. 18. We see the right to demand certain kinds of behavior as the distinguishing feature between property right and social norm, for the social norm is the right to expect behavior.

[12] This definition of "professional" differs from many commonly accepted definitions. See, for example, T. Parsons, "The Professions and Social Structure," Soc. Forces, 17 (May, 1939); E. C. Hughes, Men and Their Work (Glencoe, Illinois: The Free Press, 1958); E. Greenwood, "Attributes of a Profession," in S. Nosow and W. H. Form (eds.), Man, Work and Society (New York: Basic Books, 1962). Most of these definitions combine role perquisites and social evaluations of the role as determiners of professionalism. Since modern society is characterized by rapid technological and social change, social evaluations of roles frequently neglect changes in the role demands. Our definition bases increasing or decreasing professionalism on functions within the organization, and thereby avoids cultural lag in role evaluations.

[13]Our definition and use of resources was influenced by James Thompson and Frederick L. Bates, "Technology, Organization and Administration," Admin. Sci. Q., 1957, pp. 325-43.

[14]Our use of specified procedure is akin to March and Simon's concept of programmed activity. James G. March and Herbert A. Simon, Organizations (New York: Wiley, 1958).

[15]Max Weber, "The Essentials of Bureaucratic Organization: An Ideal-Type Construction," in R. Merton, A. Gray, B. Hockey and H. Selvin (eds.), Reader in Bureaucracy (Glencoe, Illinois: The Free Press, 1952), p. 21.

[16]Ibid., p. 24.

[17]Frank Knight, The Economic Organization (Chicago: University of Chicago, 1933), pp. 5-10.

[18]Simon Marcson, "Organization and Authority in Industrial Research," Soc. Forces, XL, No. 1 (October, 1961), 73.

[19]This statement is truer for short term than for long term leases.

[20]Thomas L. Whisler, "Measuring Centralization of Control in Business Organizations," in W. Cooper, H. Leavitt and Shelly (eds.), New Perspectives in Organization Research (New York: John Wiley and Sons, Inc., 1964).

[21]Our thinking on the Truncated Bureaucracy was greatly influenced by Arthur L. Stinchcombe, "Bureaucratic and Craft Administration of Production," Admin. Sci. Q., 4 (1959).

[22]In instances where the managerial skills required are so simple that they are abundantly available, the managerial functions are performed by temporary employees. In terms of its dynamics, this type of organization acts like a Complete Bureaucracy.

[23]Marcson has defined this authority pattern as a "system of control in which authority is shared by all members of the working group. Authority is deemed to rest in the group rather than in an individual." Simon Marcson, "Decision Making in a University Physics Department," Amer. Behav. Scientist, VI, No. 4 (December, 1962), 38.

[24]Time Magazine, January 13, 1961.

[25]Our development of optimal forms of organization, as well as our later treatment of decentralization, is heavily dependent on March and Simon's discussion of the relationship between complex environments and organizational search behavior. March and Simon, op. cit.

[26]If, for instance, a single standardized part is needed by all the autonomous units, then purchase of enough parts for all the units by the central bureaucracy can result in savings.

[27]The colleagues would be autonomous, rather than forming a single bureaucratic structure, if each had a proportionate share of the organization's resources to do with as he wished. Generally, the colleages jointly decide on the conversion of general resources to specific ones, i.e., they form a single bureaucratic structure in order to coordinate. Similarly, partners in a law firm would be completely autonomous if no resources were controlled by the partnership sui generis.

[28]Use of general resources/total resources makes it possible to develop measures of the extent of decentralization, i.e., which

level has discretion and which does not. Measures of the distribution of power or discretion at an individual level also could be derived with these concepts.

Table 1

Function and manner of performance

of four organizational roles

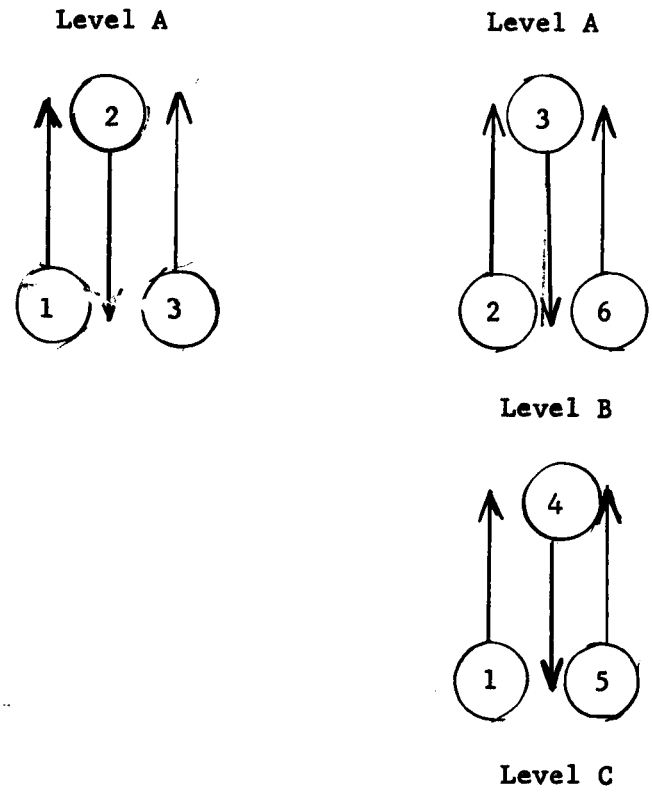
		Manner of performance	
		Discretion	No discretion
Function	Coordinator	Manager	Bureaucrat
	Producer	Professional	Worker

Table 2

The determinants of bureaucratic type and associated authority patterns

Determinants	Bureaucratic type	Authority pattern
*P+R+	Complete bureaucracy	Executive
P+R-	Truncated bureaucracy	Executive-External
P-R+	Enucleated bureaucracy	Colleague
P-R-	No organization possible	None

*P+ symbolizes a high proportion of specified procedures, P- a low proportion; R+ a high proportion of stored specific resources, R- a low proportion.

Table 3

Communication time and bureaucratic levels