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AUTOMATING RED TAPE: THE PERFORMATIVE VS INFORMATIVE ROLES OF BUREAUCRATIC DOCUMENTS

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ABSTRACT

Bureaucratic red tape involves communications that are not only informative, but also performative, representing the exercise of bureaucratic authority. Automation efforts, to be effective in reducing red tape, will need to include these authority aspects as design variables. A concept of bureaucratic software is suggested.

Keywords: performatives, deontic logic, bureaucracy.

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by

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INTRODUCTION

> *red tape* n {so called from the red tape formerly used to tie up legal documents in England}: bureaucratic procedure, especially as characterized by mechanical adherence to regulations, needless duplication of records, and the compilation of an excessive amount of extraneous information resulting in prolonged delay or inaction. (Webster's 3rd International Dictionary).

Red tape is an irritation that most people accept with a certain amount of fatalism, like catching colds in winter. Just as medical science has had little impact on the common cold, management science and information technology seem to have had little effect on reducing bureaucratic red tape. It seems to be a natural by-product of organizational and societal rationalization.

Office automation, however, would seem to have as an implicit goal the reduction of red tape. Part of this is (rightly) seen as the elimination of paper flows. Documents can be handled much more quickly and efficiently in electronic form than as physical paper. But there is another component to red tape, a sociological one, which tends to be ignored. Red tape arises as authority structures become specialized and distributed across numerous organizational roles.

Much of what we call red tape involves the processing of a particular request through a series of authority nodes (typically offices) in the organization. Thus another part of the problem, beyond speed of communications, is the resource time at these nodes —i.e., the time taken by the particular clerk or manager to authorize the request. Still another part is finding the appropriate authorities in the first place. (Another piece of informal terminology applies here: 'passing the buck.')

The general argument we want to make is that the problem of red tape involves not merely information flows but also authority flows. Here we do not mean the broad types of authority typically drawn on organization charts, but rather the detailed, formalized types of authority prescribed in bureaucratic rules and regulations. An important aspect is that often these types of authority have also come to be ritualized, that is, no longer relevant to the organization's interests.

Authority is of course a sociological phenomenon. That is not to say it is not analyzable. The more specific point of this paper is to sketch an approach to the analysis of red tape.

The approach is introduced through a linguistic distinction between performative vs informative documents. These are regarded as the basic medium of bureaucratic authority. These are generally recognized by the inclusion of a signature by the authorizing person or a special stamp or seal of the authorizing office. The sociological importance of the non-duplicatability of these documents is discussed.

The content of authoritative documents is analyzed using the primitive operators of deontic logic (obligation, permission, prohibition). The relationship of these distinctions to a broader theory of bureaucracy is examined, and a concept of bureaucratic software is suggested.

DOING THINGS WITH WORDS

The linguistic concept of a performative was first introduced by Austin (1962) and elaborated by Searle (1969) and others. The performative aspects of contracts and financial instruments was discussed in Lee (1980, 1981). The relevance of performatives to office processes was first noted by Flores (1981).

A performative is an utterance that not only conveys information but also, by its being spoken, accomplishes some socially significant act. For instance, the sentence "I now pronounce you man and wife" when spoken by a priest during a marriage ceremony not only describes the relationship between the couple, but actually *creates* it. This example brings out several key features of performatives. One is that the state created by such an utterance is generally some type of social artifact. Obviously, the mere speaking of a few words has very little physical effect. Rather, it places one or more people in different states of social perception. Often,

this involves a certain set of obligations, e.g., of fidelity, economic responsibility.

The roles involved in a linguistic utterance are usually cast as speaker and listener. However, in the case of performatives, the listener role must be divided between 'addressees' and 'by-standers'. Clearly, not everybody attending the marriage ceremony becomes socially obligated by the priest's pronouncement, only the two people specifically addressed.

Also, it is not always the addressees of performatives who acquire the social obligation by the utterance. For instance, a major class of performatives is the class of *promises*, in which case it is the speaker who acquires the obligation. In other cases the addressee may in fact be an object, e.g., a ship: "I christen them the Queen Elizabeth." These latter are, however, fairly rare types of performatives.

The social contract surrounding a performative is not always institutional, as with marriage. For instance, such remarks as "I promise to do the dishes tomorrow," are also performatives. In this paper, however, our attention is limited to performatives in institutional environments. In these cases the speaker and addressee must have certain social qualifications in order for the performative to have force. For example, only priests, ministers, ship captains, justices of the peace, etc., can pronounce marriages, and only unmarried couples of a certain age can become married. Further, apart from the broad social context that enables the performative to have force, for instance the church as an institution, there is also a narrower, 'conversational' context where the performative must appear; e.g., the marriage pronouncement must appear at a certain point

near the end of the marriage ceremony, not at the beginning, nor afterwards, during the reception, etc.

WRITTEN PERFORMATIVES

Linguists generally refer to performatives as a type of *utterance*, that is, a spoken communication. What is sometimes overlooked is that written communications, too, may be performative. In these cases, however, the execution of the performative takes on a somewhat different character. In a spoken performative, the person making the performative is obviously identified as the speaker. In written performatives, the issue of authorship arises. Also, with spoken performatives the addressee hears the performative at the time it is spoken. Written communications, however, endure throughout time and so the addressee may receive the communication considerably later than when it was initially made. The question then arises: when during this interval does the performative come into force?

These issues of authorship and timing are commonly resolved by a very simple device, namely the author's handwritten signature, accompanied by the date on which it was signed. The ritual of signing one's name to a document is so pervasive that its fundamental role is often not recognized. Indeed, as a rough heuristic, one can usually distinguish purely informative documents from those with a performative component by whether or not it has a personal signature. For instance, printed announcements, bulletins, etc., seldom have signatures; contracts to pay money (checks, etc.) always do. The effect of the signature is roughly the declaration:

"I hereby acknowledge that my beliefs and intentions are accurately described by this associated text."

Signed documents, as performative instruments, also acquire a unique feature not possessed by their purely informative counterparts: the performative effect of the original signature is not carried over to its mechanical duplicates. For instance, in legal documents, such as contracts, wills, etc., when several copies are made, each must be separately signed by the author(s) to have legal validity.

The unique role of the original in written performatives has, by the way, its counterpart in spoken performatives as well: repeated playbacks of a tape recording of a spoken promise, for instance, do not create new promises. With written performatives the assumption of course is that the signature provides a unique identification of the author. However, the authenticity of the signature is seldom called into question (handwriting analysts are seldom needed in court). A more important effect is that it signals the author's declaration of *personal responsibility* for the associated statements. In the act of signing such a document the signer typically becomes acutely aware of its language and contents (especially if the text has been written by someone else, as in a standardized lease or loan contract), since (s)he is henceforth expected to behave in accordance with this declaration.

The social significance of this ritual, committing the signer to having the beliefs, attitudes or intentions as expressed in the document, has been accepted by nearly every literate culture for centuries. It is a extremely useful historical convention, being the hallmark of honesty and good faith in all kinds of institutional and governmental transactions and

agreements. It should be noted, however, that a signature is not the only way of marking a performative document. In many cases, a special seal, stamp or sticker operates similarly, especially where the effect of the document is standardized and commonplace. Typically, these special performative symbols are designed with a special, intricate pattern that would be hard to mimic. Often, these serve effectively as the signature of an institution, rather than a single individual. Common examples are coins, bills, and postage stamps.

DEONTIC PERFORMATIVES

In the context of organizational procedures, the informative/performative distinction can be refined further. One aspect of these procedures is certainly to transmit and store information. Another, however, is to control and standardize the behavior of the personnel involved. Procedures are thus means of standardizing the exercises of *authority* of certain individuals in the organization over others.

Authority, of course, includes a wide variety of aspects. With regard to red tape, however, one particular form of authority seems prominent. This is where a certain type of behavior is in general forbidden, except under special circumstances. The exercise of authority in these cases amounts to some person's evaluation of the circumstances, and the granting of *permission* where appropriate. In many instances of red tape the action in question is divided into a number of sub-actions each requiring separate permission. The delay or inaction inherent in the definition of red tape thus results not for reasons of information collection or processing, but rather due to the wait times in the personal queues of these

various permission granting individuals.

A familiar example of this is automobile registration. In general it is forbidden to drive an automobile on public roads. There are, however, several conditions that together permit this. First, the driver needs to be able to drive. This is demonstrated by an examination by state employees with the authority to certify driving skills. If the driver succeeds in this exam, the examiner signs the examination form that permits the driver to obtain a specially designed (performative) card, the driver's license.

Next, one must have an automobile. In purchasing the auto, another special form is required — the bill of sale and/or title certificate — which is signed by both the previous and new owners (another performative document). Next, the automobile itself must be in safe driving condition. Here, a different individual, e.g., a state licensed mechanic, makes the certification. This is typically signified by a special (again performative) sticker attached to the auto's windshield or fender, signed by the mechanic. Next, if not already done, the vehicle must be registered, i.e., recorded in the state books. Here, typically, the vehicle manufacturer's serial number is recorded by another state agent on another special form, which (s)he signs. This permits the owner to obtain a license plate for the auto (analogous to a performative seal). Lastly, in some places, a separate road tax must be paid. Here again, receipt of payment is acknowledged by a special receipt form and/or sticker (more performative items).

The sum of all these procedures amounts to permission from the state to drive the vehicle on its public roads. Note that the component performatives in this case were sometimes marked by a signature, sometimes by a special seal or sticker, and sometimes both.

Similar types of permission structures exist within organizations. Here a common example is the request of some department to purchase a large item. Often such a request must be approved by a number of individuals to verify for instance that the item is technically sound, compatible with similar items in the organization, competitively priced, etc. In each step along the way, the permission performance is inevitably signaled by the signature of the authorizing individual.

Another common type of organization performative is order giving. Interestingly, this seems to be a more efficient process than permission granting. The difference seems to be that orders are generally given by a single individual to a number of others, whereas permission often needs to be granted by a number of people together for a single person. For this reason, perhaps, order giving seems less involved in the concept of red tape.

There is, however, an interesting duality between permission granting and order giving. This was first observed by the logician Georg Henrik von Wright (1968) in what he called a 'deontic' logic. The term 'deontic' is derived from a Greek term meaning roughly 'ought' or 'obliged'. This logic is thus an effort to formalize the aspects of obligation.

Let "q" symbolize some particular type of action. Then the following operators are introduced:

O q (q is obligatory)

P q (q is permitted)

F q (q is forbidden/prohibited)

Without going into any more logical details, two interesting points can be brought out. The first is that permission and prohibition are negates. That is, to permit some action is not to forbid it and vice versa. Symbolically,

$$P\,q \leftrightarrow \sim F\,q$$
$$\sim P\,q \leftrightarrow F\,q$$

The more interesting insight, however, is that obligation and permission are logical duals. That is, to be obliged to perform some action, q, is equivalent to not being permitted not to do it. Conversely, being permitted to do a certain action is to not be obliged not to do it. Symbolically,

$$O\ q \leftrightarrow \sim P \sim q$$
$$\sim O \sim q \leftrightarrow P\ q$$

The relevance of this to the discussion at hand is that it suggests a family of what might be called 'deontic performatives' that are inter-definable. A deontic performative document is one that obliges, permits or forbids some action. These are important in that they indicate the link between performative documents and authority structures.

Let x and y indicate two people or roles in the organization. Then the preceding notation can be modified to indicate three basic types of authoritative action:

$$(x\ O\ y)\ q = x \text{ orders } y \text{ to } q$$
$$(x\ P\ y)\ q = x \text{ permits } y \text{ to } q$$
$$(x\ F\ y)\ q = x \text{ forbids } y \text{ to } q$$

The enabling requirement in each of these cases is that x has the *authority* (within the organization) to control y's behavior in doing q. The argument we want to make is that signed, performative documents nearly always signal a change in deontic status.

Lee (1980 and 1981) analyzes the deontic structure of contractual relationships *between* organizations. Indeed, nearly all inter-organizational transactions — with the exception of cash sales — involve a deontic aspect.

For example, credit sales and bank loans, bonds, certain types of preferred stock, etc. create an obligation to a later payment action. Insurance contracts establish a contingent obligation of the insurer to the insuree. Easements and licenses of various kinds establish a permission relationship between the parties.

In each case, the signing of the contract creates a change in deontic status. For example, signing a bank note creates an obligation to pay that previously did not exist. An easement creates a permission to limited use of another's land, altering the general prohibition against trespassing.

Our suggestion here is that a similar view applies to transactions *within* an organization. The red tape within organizations shares many characteristics of contractual relationships between organizations.

THE INDIVIDUATION PROBLEM

In the last couple of decades, the analysis of document processing and flows in organizations has become closely coupled with efforts to apply computer based information technology to the task. The most substantial change introduced when a particular document process is automated is that the documents themselves no longer have a fixed physical counterpart as paper, but are instead only magnetic or electronic patterns. This offers enormous flexibility for information transmission and processing; transfer of the document from one geographic location to another is effectively instantaneous. Likewise, several people can simultaneously work on different parts of the document at the same time, since they may all access a centralized representation of it.

While this technology is especially well-suited to handling the *informative* content of documents, it does not accommodate documents having a *performative* aspect. This is due to the fact that in paper form, a performative document has a physical uniqueness that it loses when converted to a magnetic medium. For physical representations, we have clearly developed concepts of individuality and uniqueness. When we move a physical document from one place to another, we know for instance, that it is the *same* document; whereas, if we see two duplicate documents, we know they are not the same since they occupy different physical locations at the same time.

The sameness problem is an old philosophical chestnut. It is often illustrated by the so-called 'ship of Theseus.' Imagine a wooden boat. We replace one plank. Is it the same boat? Now systematically replace all the planks. Is the second boat now the original boat? (A whole navy of the same ship can be built by iterating this process). Clearly, where we draw the line between the original boat and its duplicates is a matter of consensus. And that is the key point about performative paper — the uniqueness characteristic is a matter of long developed social convention. Kent, (1978), discusses similar difficulties in the context of database design.

In electronic form, the original recording of a document is indistinguishable from any of its duplicates. Indeed, what appears as the electronic movement of a document from one place to another is actually copying its information pattern from one magnetic device to another, then erasing the original. Thus, the concepts of individuality and uniqueness of an original and its copies become blurred when a document is converted to magnetic form. Our social conventions delineating uniqueness are not yet refined for electronic media.

Strawson (1959) presents philosophical discussion of the individuation problem. He observes that the entities for which we have a clear concept of individuality and uniqueness are those that can be situated, either directly or by a unique chain of associations, in the general framework of space and time.

Thus, hard, physical objects which undergo only minor transformations have a unique location in the spatial temporal framework at any point in time. More diffuse objects are more difficult to individuate. An

example might be a disease. Asserting that two patients have the same disease typically means that the bacteria or virus are biologically of a common category, or it may mean that they are of a common population. The latter assertion includes a conjecture of contagion. A population has a spatial/temporal location whereas a generic type does not.

Moving into the domain of conceptual objects individuation becomes more difficult. Consider for instance a musical composition. We may know it through various performances or its various representations as printed musical scores. But to claim that any two of these are the same typically reduces down to identifying a chain of reproductions back to a original event when the piece was composed, i.e., locating it in space/time.

Other conceptual entities whose historical origins have been forgotten are notoriously difficult to individuate. For example, people typically distinguish various forms of socialism by relating them to their original authors, e.g., Marxism, Maoism. However, the various forms of capitalism are not so clearly distinguished, since the historical origins are not so well known.

In database management it is common to distinguish between *type* and *instance*. A typical example is the generic concept EMPLOYEE vs individual instances of employees, John Doe, Mary Smith, etc. Our point here is that this distinction is fairly well understood in the case of physical objects, but becomes blurred as one considers less tangible entities.

The above example of music compositions is an important intermediate case. Books and other printed materials have similar individuation

characteristics, namely that they are easily reproducible (Thompson 1981). Computer software and data have this feature in the extreme. Indeed, in virtual memory systems and distributed databases, a particular program or data set may be automatically copied to and from hundreds of locations without the user's awareness. It is the extremely facile reproducibility of computer media that presents a challenge to the management of performative documents, for these require non-reproducibility.

But why does originality and uniqueness of representation play such an important role in the case of performative documents? Basically, it is due to the above mentioned observation that the document serves as social evidence of someone's personal commitment to a belief, attitude, or intention. In physical form this evidence is much easier to control, e.g., I can void a check by tearing it up. The cases where this is most sensitive are when the document serves to obligate the author (or sometimes another party) to the performance of some actions, for instance, paying a sum of money. Here it is essential that the document have a unique, non-duplicable representation so that the author cannot be forced into further obligations by simple mechanical reproduction.

Note that encryption methods for producing digital signatures (e.g., Diffie and Hellman 1979) do not address this particular problem. They guarantee the identities of the sender an recipient of a communication, but do not block the reproducibility of the document once it has been received.

The major application of computer management of performative documents is the case of electronic funds transfer system (EFTS), used for financial transfers between banks and other financial institutions. Here the individuation problem is controlled by a neutral third party (the Federal Reserve in the US), which monitors the transactions and insures against illegal reproduction.

This is similar to the role of a witness in verbal contracts, or to the role of a notary in other types of legal transactions. The notary function, or some analogous form of social convention, is one way of resolving the individuation problem arising from the electronic representation of performative communications. Unfortunately, this increases the amount of human overhead of the system's operation and so reduces its cost/effectiveness.

DEONTIC PERFORMATIVES AND BUREAUCRACY

The medium for representing deontic performatives, discussed in the last section, is only one aspect of the red tape problem. Here we investigate certain aspects of the contents of deontic performatives and their relationship to the nature of bureaucracies.

The term "bureaucracy", as both a popular and scientific term, has come to have a variety of often overlapping definitions. The definition used here is due to Weber (1956/1978). To Weber, the process of bureaucratization is a shift from organizational management based on the interests and personalities of specific individuals, to one based on explicit *rules* and *procedures*. These rules and procedures are identified with *roles* in the organization rather than individual people. Bureaucratic

organizations thus take on an impersonal, mechanical character. To Weber, this is a positive development leading to greater effectiveness and efficiency:

> Bureaucracy develops the more perfectly, the more it is "dehumanized," the more completely it succeeds in eliminating from official business love, hatred, and all purely personal, irrational, and emotional elements which escape calculation (Weber 1956/1978:975).

Bureaucracies in this sense are becoming of increasing importance in both planned and free market economies though the roles are somewhat different.

In a planned economy, the rationalization of management is central to the ideology. However, to Marx, bureaucracy was a major evil to be abolished:

> Bureaucracy becomes an autonomous and oppressive force which is felt by the majority of the people as a mysterious and distant entity — as something which, although regulating their lives, is beyond their control and comprehension, a sort of divinity in the face of which one feels helpless and bewildered (quoted in Abrahamsson 1977:38).

Here the term 'bureaucracy' is used in a slightly different sense from Weber, denoting government bureaucracies in particular. The relevance for Marx was that these are an important concentration of social power.

In market economies, bureaucracy seems to be regarded more as a concession to inadequacies in market mechanisms. Here we need to distinguish bureaucracy from hierarchy. Williamson (1973) discusses 'markets vs hierarchies' as a problem of economic organization. In certain cases resources are allocated via market mechanisms, in other cases they are allocated within an organizational hierarchy, which may be

under either public or private control. Hierarchies become bureaucracies (in the sense used here) when their administration becomes rationalized, embodied in explicit rules. In the case of hierarchical organizations in the private sector, this rationalization process tends to evolve gradually, as the organization discovers regularity in its environment.

Governmental hierarchies, by contrast, are typically created by legislation and so become bureaucracies from the outset. Downs (1967:32,34) cites a number of factors for the creation of governmental hierarchies. One is the case of consumer goods with large 'external' costs or benefits. An external cost or benefit is one not reflected in the good's free market price—for instance, the smog created by automobile exhaust, or non-biodegradable detergents which pollute rivers. The point is that market mechanisms do not take these external costs into account in selecting an equilibrium consumption level. To compensate for these inadequacies, a bureaucracy is often created.

The rationalization of organizations, in itself, would seem to be inherently positive and equitable. Indeed, this is the implicit goal behind most of management science and operational research. However, there seems to be an undesirable side effect that accounts for much of the negative connotations we attach to the term bureaucracy, namely, that highly rationalized organizations apparently become inflexible and unresponsive to changes in the environment. Weber comments:

> Once fully established, bureaucracy is among those social structure which are hardest to destroy. Bureaucracy is *the* means of transforming social action into rationally organized action... the ruled, for their part, cannot dispense with or replace the bureaucratic apparatus once it exists, for it rests upon expert training, a functional specialization of work, and an attitude set

> on habitual virtuosity in the mastery of single yet methodically integrated functions...
>
> Such an apparatus makes "revolution," in the sense of forceful creation of entirely new formations of authority, more and more impossible—technically, because of its control over the modern means of communication (telegraph, etc.), and also because of its increasingly rationalized inner structure (Weber 1956/1978:987-989).

One aspect — at least in market economies — for the unresponsiveness of bureaucracies is that they typically have achieved a monopolistic or protected position where they are not forced to change by competitive pressures. Nonetheless, newly elected politicians and corporate presidents often recognize and attempt to relieve the problem, though typically with little success.

Jay Galbraith (1973, 1977) offers a useful framework for analyzing the problem. A currently popular theory of organizations is the information processing view, due principally to Simon (e.g., Simon 1955, March and Simon 1958). The key concern is how the organization copes with the *complexity* of its environment, given the bounded rationality (cognitive limitations) of its managers. Galbraith extends the information processing view of organizations, to a 'contingency theory' approach. He regards the complexity of the organizations task as only one dimension of its information processing difficulties.

Another dimension is added to the organizational design problem, what Galbraith calls *uncertainty*. This refers to the degree of unpredictability of the tasks performed in the organization:

> Uncertainty is defined as the difference between the amount of information required to perform the task and the amount of information already possessed by the organization (1973:5).

The importance of this relates to the organization's ability to plan or pre-program its activities:

> The greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance (1973:4).

Galbraith classifies the nature of the organization's overall cognitive task (as well as any of its subtasks) on a two dimensional framework of complexity and uncertainty. This may be viewed as a matrix (Figure 1) characterizing the different types of cognitive tasks which organizations face. In situations of high complexity but low uncertainty, the organization is able to plan and routinize its activities. These are the conditions when bureaucracy is most effective. In situations of low complexity and high uncertainty, by contrast, the organization is constantly being surprised by changes in the environment. Here, the most effective form of administration seems to be one that relies heavily on the discretion of its employees. Burns and Stalker (1961) use the terms 'mechanical' and 'organic' to describe these contrasting forms of administration.

The problem, of course, is what form of administration is appropriate when the environmental demands are both highly complex and highly uncertain.

As observed, rationalization is the typical response to complexity. An apparent difficulty with rationalization, however, is that when a once stable environment becomes more uncertain, the organization seems to have difficulties de-rationalizing, that is, removing rules and procedures and relying more on individual discretion in order to become more adap-

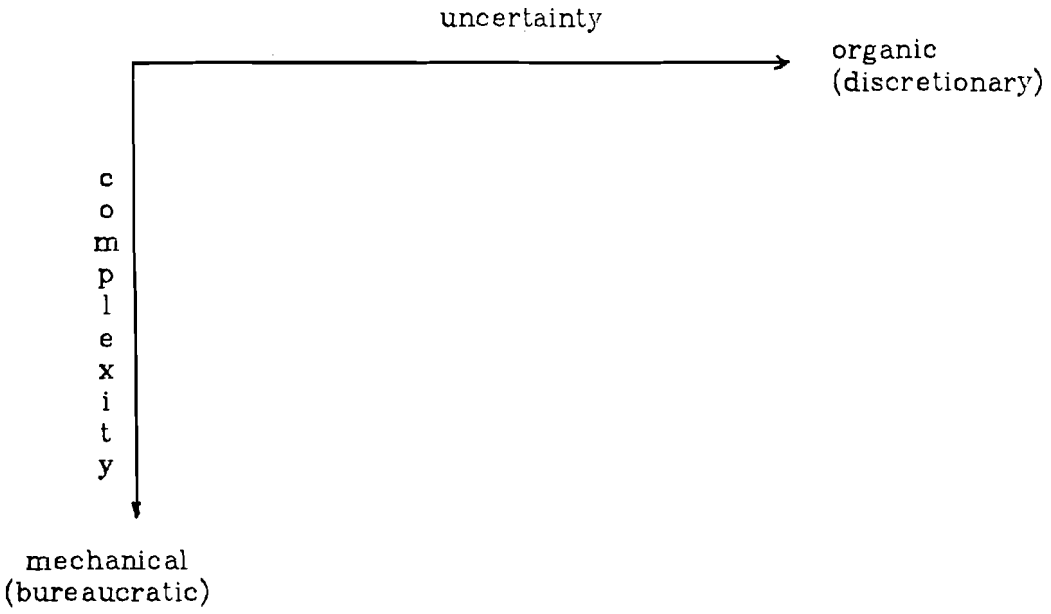

Figure 1.

have difficulties de-rationalizing, that is, removing rules and procedures and relying more on individual discretion in order to become more adaptive. One factor is likely to be that it has reached a level of internal complexity that cannot be maintained in a less rationalized type of organization.

The desired response would be to move quickly to another highly rationalized configuration. However the complex of bureaucratic procedures represents a large scale intellectual effort of many people over time. Bureaucracies are not built in a day. The time required to construct a new configuration may be too long compared to the rate of environmental change.

CORPORATE CULTURES

The information processing views invite the comparison between (human) organizations and (mechanical) computers. However, people have a characteristic that computers (as we know them) do not have, namely *preferences* (intrinsic goals, values, drives, motivations, etc.). People may *prefer* chocolate to vanilla, computers don't.

Computer programs are composed of commands. We can describe their behavior in a logic of imperatives, where the default is inaction. However, as argued in much of the recent sociological literature on organizations, people are not naturally idle (Maslow 1943, McGregor 1960, Cyert and March 1963, March and Olsen 1979). This leads to the observation that a major effect of bureaucratic red tape is not to invoke action but rather to constrain it. It is for this reason that deontic logic, rather than imperative logic, is here suggested as the appropriate model of bureaucratic authority. Subordinates are not automatons. Bureaucratic rules and procedures *restrain* rather than dictate their behavior. (Consider the union strategy 'work to rule' which can be nearly as effective as strikes in worker protests.)

An important aspect of bureaucracies is the substitutability of personnel. This is accomplished through detailed job descriptions, which prescribe and limit the activities of the people in these roles. It is through this device that the bureaucracy maintains a uniformity of response throughout its geographical and temporal extension. Idiosyncratic behavior of individuals is restricted in a complex of prohibitions, obligations and permissions.

In the bureaucratic philosophy, idiosyncratic behavior is regarded as bad, something to be eliminated. The implicit assumption is that this behavior will not be directed towards the organization's goals, but to purely personal ones. However, idiosyncratic behavior which furthers the organization's interest is *initiative*. This is the source of adaptation and innovation.

In the matrix drawn above the unexplained quadrant included organizations facing environments that are both highly complex and highly uncertain. Yet such organizations exist and flourish — e.g., IBM, Dupont, General Electric, as well as 'Japan Inc.'. Deal and Kennedy (1982) introduce an additional explanatory component in their concept of 'corporate cultures'. From a number of case studies of large corporations in various industries and circumstances, they observe 'strong culture' to be an important success factor. Culture is of course a difficult variable to define.

They intend it in the anthropological sense indicating a commonality of interests, beliefs, and values. Further, this is not an accidental coincidence: people identify themselves as members of the culture and accept the collective views and interests as major influences on their own. Thus in such multi-culture countries as Switzerland, Canada, or Belgium, there are few remaining racial differences between the cultural subgroups. Rather people become members of the culture at birth and are socialized to accept the local norms and habits. Amongst these dialect is an especially important aspect of cultural identification (e.g., Swiss-German vs Austrian German vs Bavarian German).

Identification and socialization are major aspects of corporate cultures as well. Initiation into the culture begins with employment interviews which are often conducted with great care. Deal and Kennedy cite an example from Tandem, Inc. (to them, a strong culture company) where an employee was interviewed four times for a position as purchasing clerk. The point is that these companies screen very carefully for cultural compatibility.

Once accepted, the socialization in these companies is very strong. Aside from normal task related concerns, these companies sustain elaborate structures of corporate ceremonies, mottos, heros, and legends. The employee, in addition to membership in the social culture, is reinforced in his/her membership in the organizational culture. Thus while Americans, French, Germans, etc. each share certain similarities in mentality, work ethics and values, so too do the IBM, the Procter and Gamble, the General Electric cultures, even though they span several social cultures.

Through membership in the organizational culture, employees do not necessarily come to think alike, but rather they think *together*. Rather than simply following bureaucratically defined communications channels, the informal communication becomes an important integrating aspects. Informal socializing is an major aspect in all organizations. The key point here is that in a strong corporate cultures it becomes organizationally directed.

Through socialization, the organization's goals are a strong influence on the employee's goals. Personal interest tends to correspond more closely with the organization's interest. On the other hand, the

organization's interests are more likely to be influenced by the consensual interests of its employees as well. Since the employees maintain a dual cultural membership, in the organization and in the surrounding society, the employees' influence helps to ensure a more appropriate relationship between the organization and its social environment.

MANAGING BUREAUCRATIC SOFTWARE

The concept of corporate culture is an enthusiastic one. It has something of the flavor of a large scale football rally, complete with mottos such as 'progress is our most important product' (General Electric), 'better things for better living through chemistry' (Du Pont), and so on. However, a football team does not succeed only on team spirit. Rationalization is also important, e.g., football plays, specialized skills of the players. Likewise, rationalization is a vital complement to organizational culture. The point is that, to be effective, it mustn't supercede the culture (this applies on a societal level as well). Rationalization is a tool, a component of administration, but not the whole thing.

This suggests that rationalization is a thing to be managed, just as the organization manages other assets and technology. The information processing metaphor invites a concept of 'bureaucratic software'.* Bureaucratic software is the collection of rules, procedures, job descriptions, etc. in the organization. The issue is whether this can be managed, perhaps drawing on the experiences from managing computer software. Indeed, the metaphor converges at the level of automation in the organi-

* Dobrov (1979) has a related concept he calls 'orgware'.

zation, computerization being an extreme form of rationalization (Lee 1983a).

The advantages of a concept of bureaucratic software would be to apply such concepts as program libraries and various programmer aids to the design and maintenance of organizational rules and procedures. The eventual goal would be towards improved bureaucratic software engineering.

This raises the issue of language. Bureaucratic software at present is largely in a natural language form. However, it typically occurs in a restricted style and content, somewhat like the 'legalese' of commercial contracts or legislation. There is little poetry in job descriptions and procedure manuals. The conjecture is that an substantial part of this could be codified in a more formal language, capable of mechanical inference. It is here that mechanical aids could be developed to aid in the adaptation of bureaucratic structures. The difficulty, as with computer software, is in assessing the consequence of a proposed change (Lee 1983b). Bureaucratic procedures, like subroutine calls, inter-lock in a complex network. We need aids to reduce the intellectual overhead.

As discussed above, the underlying structure of bureaucratic software languages is deontic rather than simply imperative. (Further epistemological and semantic issues are discussed in Lee (1980 and 1981)). The essential difference is that humans, as information processors, have individual preferences, motivations, ego which is vital to the organizational culture. This is the source of initiative, enabling organizational adaptability and innovation. These aspects are constrained by considerations of efficiency and coordination. At present they are also

constrained by our inability to effectively manage complex rule systems.

It is here that red tape arises and where computational aids offer promise.

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