

MACHINE AND ORGANIC PARADIGMS: APPROACHES TO ANALYZING ORGANIZATIONS

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ABSTRACT

This paper compares and contrasts the two popular ways of seeing an organization, machine and organic paradigms. It is argued that a better understanding of these different characteristics is a necessary requirement to obtain a more accurate assessment about organizational problems and or potentials. The both paradigms concern with ways to protect organizations from any tendency of dysfunction; they represent rational attempts to exploit the resources of the organizations in the most efficient manner, given their environmental constraints. Furthermore, both offer methods to divide organizational activities in an ordered (or hierarchical) manner. However, the two paradigms differs in, at least, five important respects, namely the criteria of effectiveness (machine: maximize efficiency and production vs. organic: maximize flexibility, satisfaction and development); organizational structure (machine: functional/division of labor vs. organic: de-emphasis of specialization); assumptions about human resource (machine: extrinsically motivated vs. organic: intrinsically motivated); control mechanism (machine: rigid standards vs. organic: create selfdevotion). Using the contingency approach, the paper suggests that the machine paradigm ought to be adopted in analyzing organizations living in a more stable environment, whereas the organic paradigm should be adopted in analyzing organizations living in a more turbulent environment.

1. INTRODUCTION

Every organization paradigm is situational in that it portrays organizations under specific boundaries. It offers a model to analyze organization phenomena from only a certain perspective and partial ways, which, to some extent, contrary to the complexity and paradoxical characteristics of organizational life. Nevertheless, it often provides some practical merits as it enables us to manage and design organizations in ways that we may not have thought possible before (Morgan, 1986).

Since there exist a plethora of organization paradigms, it is wise to gain insight some of the important properties and relative merits of them. In this way, better appreciation and appropriate utilization of the paradigms shall be obtained. In the research context, an appropriate utilization of organization paradigm can

potentially enhance the quality of the research because it enables researchers to focus their attentions on relevant variables to be observed and/or to be taken into consideration. The paradigm serves as a framework that will guide the researchers in investigating the phenomenon of interest. This paper attempts to evaluate two popular paradigms, machine and organic. The discussion therein will be divided into four parts: The Important Features of Machine and Organic Systems, The Common Features, Important Differences, and Final Thoughts.

2. THE IMPORTANT FEATURES OF MACHINE AND ORGANIC SYSTEMS

Rationality is the fundamental assumption of organization mechanism under the machine system. Organizations are viewed as instruments designed to achieve specified goals in an efficient manner. Goal specificity and formalization, then, are the main characteristics of the organizations. Scott argues (1987) that the term rationality in this context is used in the narrow sense of technical or functional rationality; it refers to the extent to which a series of actions is organized in such a way as to lead to predetermined goals with maximum efficiency (Scott, 1987).

Taylor and Weber seem to be the inspirators of this school of thought. With his division of labor principles, Taylor changed the way organizations designed and conducted their activities. Specifically, the principle of separating the planning/designing of work from its execution is often seen as the most pernicious and farreaching element of Taylor's approach to management, for it effectively splits the worker, advocating the separation of hand and brain (Morgan, 1986). Further, organizations became more concern with 'fitting' people with the job than designing the job for people. The focus of Taylor's approach is on identifying the one best way to structure work that maximizes efficiency. This most often entails reducing the complexity of the work to provide more human resource efficiency and flexibility—that is, making the work so simple that anyone can quickly and easily be trained to perform it. This (mechanistic) approach focuses on designing jobs around the concept of task specialization, skill simplification, and repetition.

Weber's concept of bureaucracy perfectly complements Taylor's idea. Weber formulated the administrative structure in an attempt to design efficient ways to conduct organizational activities. Thus, his concepts generate rationalthinking in

managing organization, which was somewhat similar to Taylor's philosophy. Weber specified several characteristics of his ideal organization structure. The four major ones are the following:

1. Specialization and division of labor,
2. Positions arranged in a hierarchy,
3. A system of abstract rules,
4. Impersonal relationship.

Thus, under this kind of condition, it is quite appropriate to perceive organizations as machines. And when managers think of organization as machines they tend to manage and design them as machines made up of interlocking parts that each play a clearly defined role in the functioning of the whole (Morgan, 1986). Worker had been assumed to be rational and to be motivated by personal economic needs.

There were two significant impetus that shifted people's perception away from the mechanistic thinking of organizations,* the realization of the important role of human beings (i.e., employees) in organizations and the fast changing nature of organization environments. Elton Mayo and his research team found the impact of employees' informal relation and employees' non-economic motivation on production. Their studies showed that work activities were influenced as much by the nature of human beings as by formal design. Mayo that workers were motivated just as much by social needs, by the satisfaction of doing a worthwhile job, and by the need to respond to the challenge of task rather than to managerial authority. Mayo findings were in sharp contrast to Taylor and Weber's assumption about workers. Since then, the crucial problem in organizations as has been defined as the problem of integrating the individual needs with organizational needs.

Organization environments have also altered significantly during these last fifty years. The increasing competition and environmental concern and the further advancement in production technology and information processing technologies have created major external threats to organizations. Organizations should be viewed as open systems that must interact with their environment if they want to survive. It should possess high degree of flexibility in the structural design to allow the flow of idea of its members and to stimulate inter-units effort in solving the problems.

Organic systems seem to fulfill these requirements. Burns and Stalker (1961) describe organic systems as ones that adapted to unstable conditions, when problems and requirements for action arise which cannot be broken down and distributed among specialist roles within a clearly defined hierarchy.

3. THE COMMON FEATURES

From the perspective of modern organization studies, these two images of organization may well represent the two extreme of the organizational evolution. While the paradigms indicate two different ways of thinking in looking at organizations, they share one common goal: protecting the organizations from any tendency of dysfunction. Using a system approach, these two paradigms reflect efforts to avoid organization from entropy, a moving from ordered arrangement into random distributions (Wenninger, 1976). Consequently, both machine and organic metaphors imply rationality in a broader sense since their main concern is, obviously, finding a better way to exploit the organizations' human resources in the most efficient manner given their environmental constraints (Burns and Stalker, 1961).

In addition, the machine and organic paradigms assume that organizations are always designed in a hierarchical form. Even though the organic paradigm does not consider organizations as strictly hierarchic as those do in the machine paradigm, it still assumes that organizations are stratified in a certain way. Hall's (1963) study illustrates this point clearly. In the study he attempted to assess the empirical evidence of the bureaucratic model of organizational structure. He used the six bureaucratic dimensions, in which hierarchy was one of them, as the attributes. He concluded that the dimensions exist in the form of continua rather than as dichotomies and the magnitude of the dimensions varied independently in the organizations studied. Hence, it may be said that every organization tends to be hierarchical to a certain degree.

4. IMPORTANT DIFFERENCES

The mechanistic paradigm stands in sharp contrast to the organic due to their different organizational characteristics and practices. The most distinct differences between the two systems are a consequence of the different effectiveness criteria each

paradigm seeks to maximize. While the mechanistic model seeks to maximize efficiency and production, the organic model seeks to maximize flexibility, satisfaction, and development.

Furthermore, the machine and organic systems differ in three major aspects, organizational structure, assumption about human resource, and control mechanism. First of all, the main feature of organizations portrayed in the machine paradigm is their high degree of differentiation in job assignments and high degree of centralization in decision making. Its emphasis on specialization of labor result in complex structure.

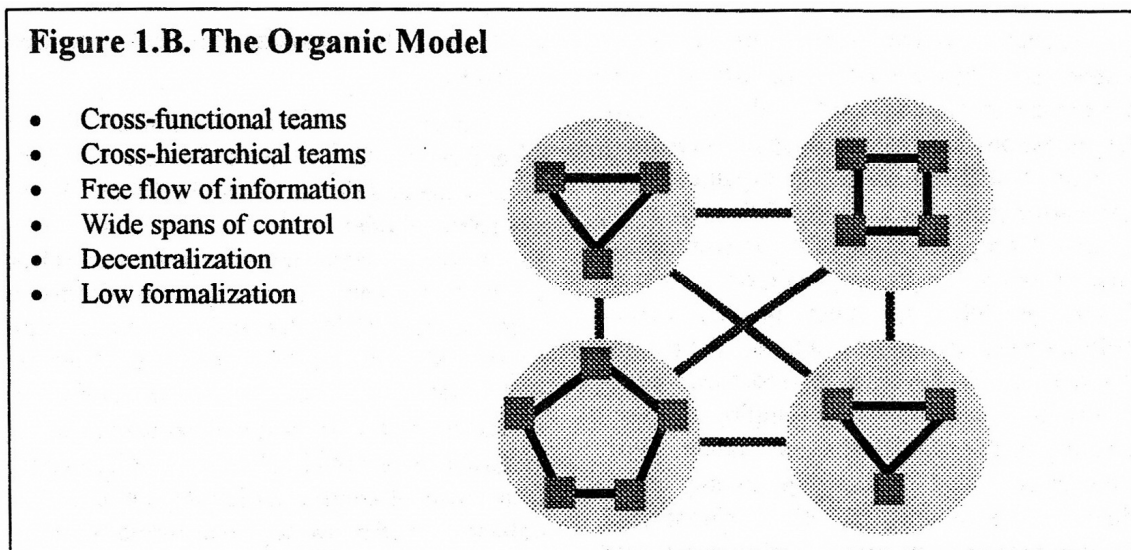
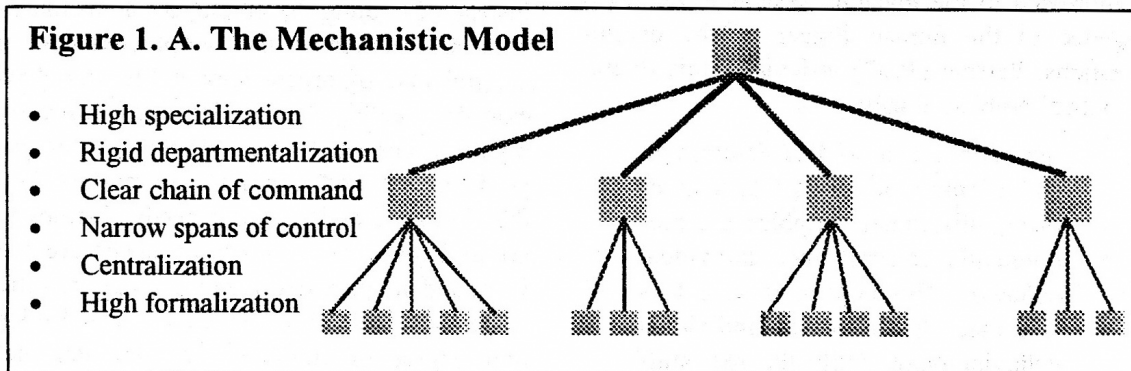
The mechanistic model is highly centralized because of its emphasis on authority and accountability. Instructions and decisions issued by higher level of management. Communication is hierarchical, mostly downward communication. The organizations are structured functionally. In these structures, each individual pursues his tasks as something distinct from the real tasks of the concern as whole, as if it were the subject of a subcontract (Burns and Stalker, 1961).

Contrary to the machine paradigm, the organic paradigm described organizations with a decrease in or low level of differentiation. Organizations are characterized by a tendency toward 'de-differentiation.' In organic system generalized roles are accepted. The structure is relatively simple because of its de-emphasis of specialization and its emphasis on increasing job range. Jobs lose much of their formal definition in terms of method, duties and powers, which have to be redefined continually by interaction with employees participating in the task (Burns and Stalker, 1961) This implies that relationship among individuals or team-work spirit is emphasized. Communication involves information and advice and is both horizontal and vertical. In most cases, the organizations are structured matrixally.

Figures 1A and 1B illustrates the organizational arrangements for machine and organic paradigms. As shown in figure 1A, the mechanistic model is characterized by high specialization, rigid departmentalization, clear chain of command, narrow spans of control, a high degree of centralization, and a high degree of formalization. On the contrary, figure 1B shows that the organic model is characterized by cross-functional teams, cross-hierarchical teams, free flow of information, wide spans of control, a high degree of decentralization, and a low degree of formalization.

Table 1. Comparison of Mechanistic and Organic Models

| Item | Mechanistic | Organic |
|---------------------------------|---|--|
| Organizational Structure | Centralized, Tasks are highly specialized, structured functionally, hierarchical, rigid departmentalization | Decentralized, Tasks are interdependent and are continually adjusted, structured matrically, flat, uses cross-functional/hierarchical team |
| Assumption about human resource | Inanimate objects, economics motives | Integral part of organizational life, full range of motives |
| Control Mechanism | Rigid rules and procedures, emphasizes fixing of blame for mistakes, high formalization, clear chain of command | Self devotion, emphasizes of self-control and problem solving, low formalization, free flow of information |



This different organizational arrangement (structure) results in different organization or management processes. The management processes for the

mechanistic model differs from those for the organic model in its leadership, motivation, communication, interaction, decision, goal setting, control, and performance goals. For example, in terms of motivation, the mechanistic model taps only physical, security and economic motives through the use of fear and sanctions; whereas the mechanistic model taps the full range of motives through participatory methods. Table 2 presents the differences in the management processes for the both models (Rensis Likert, 1967).

A Further implication of differentiation and division of labor is the so-called dehumanization. Indeed, one of the main criticisms addressed to the machine system is its negligence to the human aspect of the organizations. Perrow (1987) articulates this dilemmatical problem thusly:

'The importance of this assumption about human beings is that it gives to organizational variables the predominant control over individual behavior. This control is so extensive that we can neglect individual behavior (supposedly the real stuff of organizational life) in all its multiplicity and variability and deal with group or sub-unit behavior. It calls for simplifying models of individual behavior in order to capture the complexities of organizational behavior.'

The mechanic system assumes that individuals' behavior is motivated by only physical, security, and economic motives. The motivation process is implemented through the use of fear and sanctions. In the mechanistic system subordinates do not feel free to discuss job problems with their superiors. Opportunities given to the employees to solicit ideas and opinion are limited.

The organic system has totally different assumptions with regard to human resources. Instead of treating the employees as inanimate objects, it assumes that employees are an integral part of organizational life who have emotion, feelings, and needs. Consequently, organizations should pay attention to employees' feeling and emotion and nurture both their intrinsic and extrinsic needs. Employees are also given more flexibility in the areas of work and are provided with more opportunities to develop their ideas. This has created different degree of employees commitment between machine and organic systems. Burns and Stalker observe that the area of commitment to the concern—the extent to which the individual yields himself as a

resource to be used by the working organization-is far more extensive in organic than in mechanistic systems (Burns and Stalker, 1961).

Table 2. Organizational/Management Process: Mechanistic vs. Organic Structure

| PROCESS | MECHANISTIC STRUCTURE | ORGANIC STRUCTURE |
|---------------|--|---|
| Leadership | Includes no perceived confidence and trust. Subordinates do not feel free to discuss job problems with their superiors, who in turn do not solicit their ideas and opinions. | Includes perceived confidence and trust between superiors and subordinates in all matters. Subordinates feel free to discuss job problems with their superiors, who in turn solicit their ideas and opinions. |
| Motivation | Taps only physical, security, and economics motives, through the use of fear and sanctions. Unfavorable attitudes toward the organization prevail among employees. | Taps a full range of motives through participatory methods. Attitudes are favorable toward the organization and its goals. |
| Communication | Information flows downward and tends to be distorted, inaccurate, and viewed with suspicion by subordinates. | Information flows freely throughout the organization: upward, downward, and laterally. The information is accurate and undistorted. |
| Interaction | Closed and restricted. Subordinates have little effect on departmental goals, methods, and activities. | Open and extensive. Both superiors and subordinates are able to affect departmental goals, methods, and activities. |
| Decision | Relatively centralized. Occurs only at the top of the organization. | Relatively decentralized. Occurs at all levels through group process. |
| Goal setting | Located at the top of the organization, discouraging group participation. | Encourage group participation in setting high, realistic objectives. |

| | | |
|-------------------|--|---|
| | cipation. | |
| Control | Centralized. Emphasizes fixing of blame for mistakes. | Dispersed throughout the organization. Emphasizes self-control and problem solving. |
| Performance goals | Low and passively sought by managers, who make no commitment to developing the organizations' human resources. | High and actively sought by superiors, who recognized the need for full commitment to developing, through training, the organization's human resources. |

The final major difference between the mechanic and organic systems is in the control mechanism. In the machine system, organizational control is obtained through the application of rigid standards, budgets, and rules. Control is basically an explicit enforcement of this set of rules to individual behavior. Organizational structures and reward/punishment system are designed to facilitate this control. Organic paradigm, on the other hand, has a different notion about control. Control is achieved through self devotion to the organizations, not through hierarchic line of command. The emptying out of significance from the hierarchic command system, by which cooperation is ensured and which serves to monitor the working organization under a mechanistic system, is countered by the development of shared beliefs about the values and goals of the concern. The growth and accretion of institutionalized values, beliefs, and conduct, in the form of commitments, ideology, and manners, around an image of the concern in its industrial and commercial setting make good the loss of formal structure (Burns and Stalker, 1961).

Final Thoughts

Kuhn's (1970) paradigmatic theory posits that paradigms represent totally different worlds and world views; each paradigm has different basic assumptions and has different values.¹ It is quite speculative, then, to compare and contrast two

¹ See also Alan Sheldon in "Organizational Paradigms: A Theory of Organizational Change," *Organizational Dynamics*. Vol 8. (Spring, 1980).

paradigms using their relative values. Machine and organic paradigms indicate the paradigmatic evolution in organization studies. They represent ways of looking organization from two extremes point of views. For this reason, it is necessary to put the dimensions in perspective in evaluating both paradigms.

Organizations are replete with complex phenomena, which are very dynamic and change rapidly over time. The globalization phenomenon combined with the advancement in information technology has significantly altered the domain of business competition. The business' environment is more dynamic, change over time, and become very turbulent. Physical boundaries are now irrelevant. Furthermore, the proliferation of service businesses has changed the features of the production function and undermined the importance of human resources in organizations.

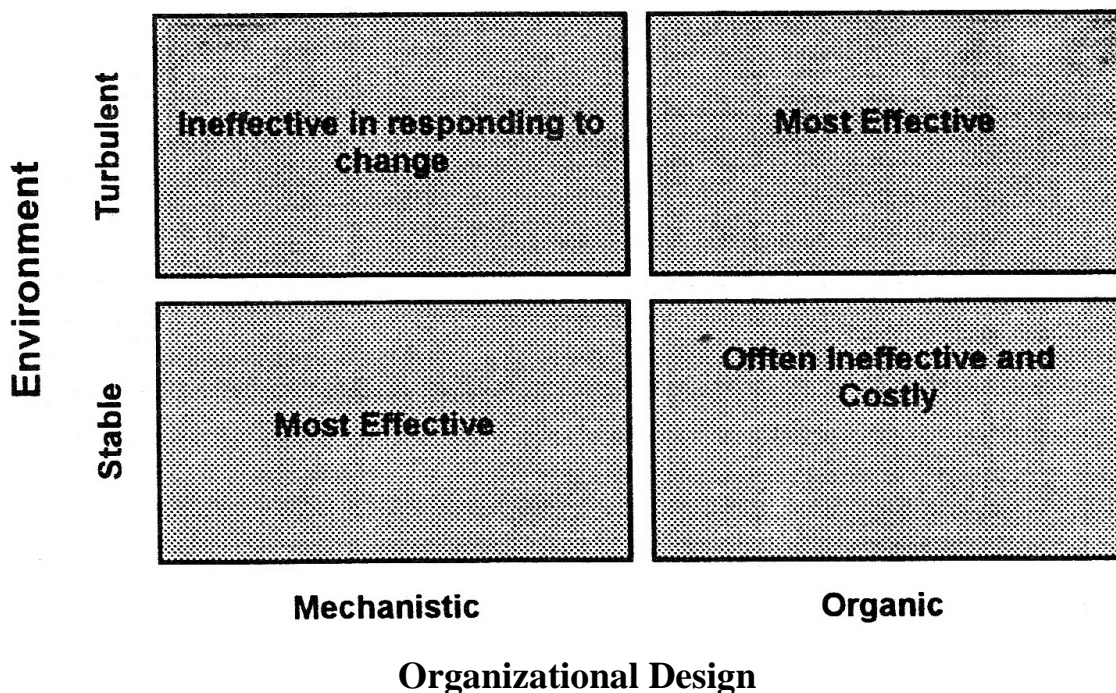
The increasing concern of the environmentalists and the increasing bargaining power of consumers have added some new nuances to organizational strategic planning.

It would be an arbitrary assumption to ignore the possibility of these phenomena to influence the organizational life. From the perspective of modern organization studies, paradigms should be judged in terms of their ability and flexibility to capture the complexity and paradoxical characteristics of organizations. It is quite obvious that the machine paradigm was not designed to capture this kind of complexity. It was designed to deal with organizations' problems in more stable and static environments. In the words of Kuhn, machine paradigm is in crises under the current condition. Therefore, the alternative paradigm, the organic, should be adopted since it provides enough room to capture many of the potential organization environments.

The organic paradigm perceives an organization as a species that has to survive in the organizational ecology. It leads us to believe that organization not actually failing must have a high degree of fit with the environment and the dimensions of technology, structure, motivations of organizational member, and the control systems (Contingency Theory). This allows us to capture the dynamic nature of organizational life. In essence, organic paradigm provides models to study organization in a polaritical or continuum way. This does not mean, however, that the

machine paradigm is worthless. It only says that organic paradigm is more adequate approach to organization studies under the current environments. In fact, it may still be used if the condition requires so. As the contingency theory posits, in a more stable business environment machine paradigm will be more useful, whereas in a turbulent, dynamic and complex, business' environment organic paradigm will be more effective. This contingency theory is supported by Paul Lawrence and Jay Lorsch's work. After studying several firms in three different industries, Lawrence and Lorsch (1967) found that more effective firms had designs that matched their environments in a manner suggested by figure 2 below.

Figure 2. Suggestions about Organization Design from the Work of Burns and Stalker and of



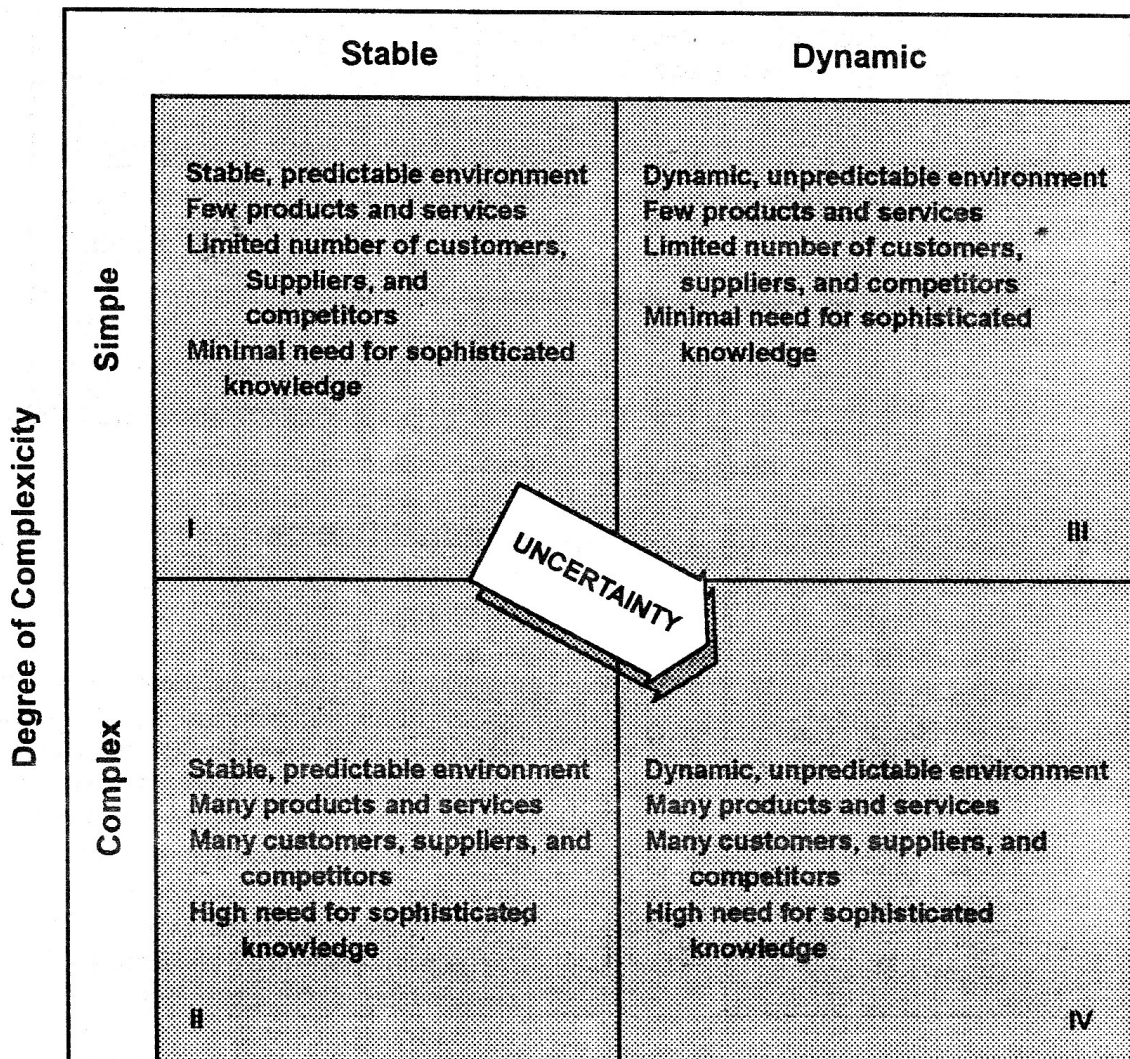
According to Duncan (1979) the turbulent environment is characterized by high degree of change and high degree of complexity. In other words, the environment is dynamic and changes in unpredictable ways quickly. On the contrary, the stable environment is characterized by low degree of change and low degree of complexity. The dimensions for the assessment of environments are shown in figure 3.

Finally, to make us aware of the limitations of model proposed by the organic paradigm, it is necessary to understand its major weaknesses. One of the major

weaknesses of organic paradigm is that it leads us to view organizations and their environment in a way that is far too concrete (Morgan, 1986). Organizations and their environments are basically constructed phenomena. They are the products of visions, ideas, norms, and visions which far less tangible than organisms. Thus, their shape and structure is much more fragile and tentative than the material structure of an organism.

The second deficiency of organic paradigm lies in the assumption of perfect functional unity. It tends to simplify the dilemmatical problem in the interdependence type of cooperation. Each unit in an organism has very a high degree of interdependence. A dysfunction of a certain unit in the system, in most cases, will destroy the function of the system as a whole. In organizational mechanism, the level of interdependence among elements does not necessarily high. Every unit within an

Degree of Change



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