

David (P.G.) Herbst

Alternatives to Hierarchies¹

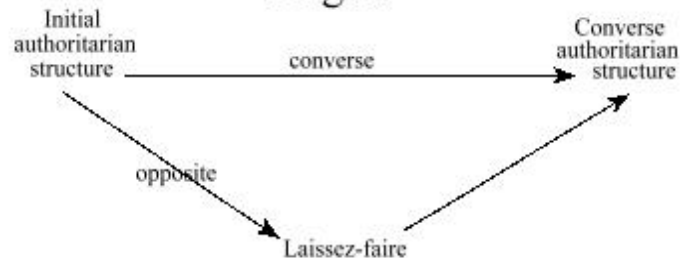
Processes of social change often move from a given state to its opposite or to its converse. Moving in either of these directions, the transformations achieved remain contained within the logic of the given.

Moving out of an authoritarian structure which has become discredited, obsolescent or inefficient, a transition may occur to a converse authoritarian form. Alternatively, if an authoritarian structure becomes simply eroded, as happened in the Victorian middle class structure of parent/child relationship, then a transition may go to its opposite--a laissez-faire relationship. From here a transition may occur at the next stage to an authoritarian form in new institutional settings such as paramilitary youth movements. Changes of this type are shifts within an essentially one-dimensional conception of society. It is more difficult to find and achieve a fourth alternative that is neither authoritarian nor laissez-faire and that lies outside the logic which generates this type of process cycle (Figure 1). In much the same way, transition from a pattern of competitive individualism within an academic community may take the form of establishing the opposite--making group decisions on all issues.

In the case of bureaucratic hierarchical organizations, an attempt to move out of

¹Slightly revised from Chapter 3 in Alternatives to Hierarchies. Leiden: Martinus Nijhoff, 1976.

Figure 1 Locked-in Authoritarian and Laissez-faire Logics



this system may be perceived as going in the direction of the opposite, that is, a chaotic unstructured state. Alternatively, transition from, say, a centralized to a decentralized system produces the converse without necessarily changing the basic mode of operation of the organization.

There has been a view that a hierarchical organization is the only possible form of organization. This would be true if each of the component parts were restricted to a specialized function. In this case a single structure of hierarchical levels is generated to coordinate the functioning of the specialized parts.

The alternative argument has been that since each element is part of a larger whole, which is again part of a larger whole, and so on, a pattern of hierarchical domination is inevitable. This assumes that development of part/whole relationships is the only way in which elements can be related to one another.

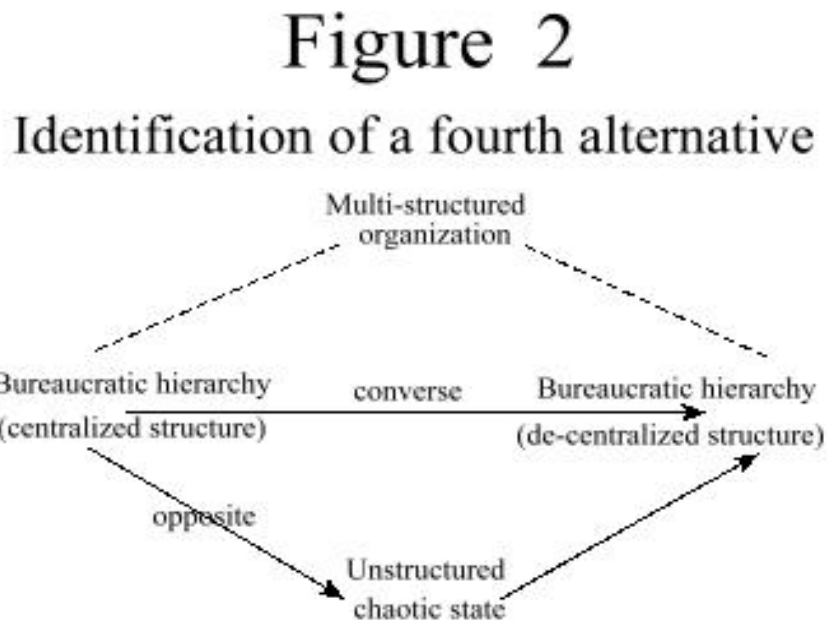
Here again, the process of social change can become locked within, and unable to go beyond, the inherent organizational logic. The steps required to find a way out are to

- Identify the basic assumptions which generate the organizational logic.

- Search for an alternative set of assumptions.
- Derive the characteristics of alternative types of organization.

The basic assumption which generates bureaucratic hierarchical structures is that each member is restricted to a single specialized task. As a result, a single structure of hierarchical linking relationships is established within which the functioning of each level is controlled by the next higher level.

If the one person/one task principle is abandoned, then the requirement for a hierarchical organization disappears and organizations result which, instead of having a single rigid structure of relationships, have the capacity for multi-structured functioning (Figure 2).

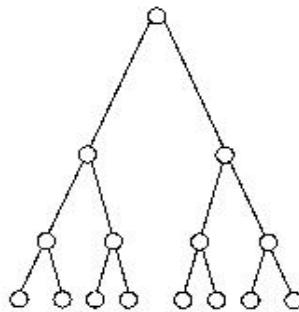


The first case of an alternative type of organization which was studied in some detail is the composite autonomous group. This is based on the principle that each member is able to carry out all, or at least most, tasks. More recently it was discovered that if the principle

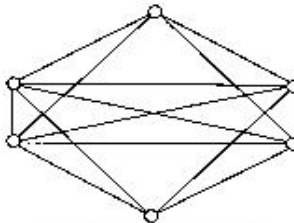
is adopted that each member has a specialist function, but at the same time an overlapping competence with other members, then what is generated is a matrix organization. Figure 3 shows the type of organization generated by each of these design principles.

Figure 3

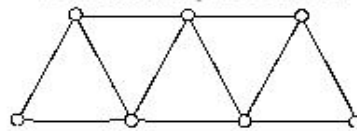
Alternative types of Task Allocation leading to different types of Organization Structures



One person / one task
generates a single structure
of hierarchical levels.



Each person / all tasks,
provides the conditions for
a composite autonomous group,
and allows any structure of
work relationships to be utilized



*Each person has an overlapping competence
with other members,*
provides the conditions for a Matrix Organization.
In the above case, each person is capable of
carrying out 2 to 4 tasks. This type of organization
has a basic structure, but at the same time
allows a variety of possible
work relationships to be utilized.

The study of nonhierarchical organizations of this type shows that these have the capacity for functioning by way of directive correlation of the activities of members who may be working independently or in smaller subsets. That is, although members may work independently for shorter or longer periods, the work of each supports and facilitates the work of others in the direction of the achievements of a joint aim.² This makes it possible to identify the operating principle of a network in which members may be geographically dispersed and have no form of direct control over one another.

In the following we shall discuss the characteristics of composite autonomous, matrix and network organizations, first at the level of small groups, and then consider the feasibility of these types of organization at the level of larger social units.

The common characteristics of each of the different types of nonhierarchical organization are

- The capacity for multi-structured function.
- The capacity for achieving and maintaining directive correlation of on-going activities.

Each of the nonhierarchical types of organization points to the possibility for developing organizational relationships which not only permit but also support the individual autonomous development of members, going beyond the choice between the Scylla of competitive individualism and the Charybdis of collectivist and authoritarian solutions, thus avoiding the sacrifice of the individual to the overriding needs and demands of a social system.

Historically, the first nonhierarchical type of organization which was discovered

²The concept of directive correlation was formulated by Sommerhoff (1950). Its relevance to the study of social systems was pointed out by F. Emery (1967).

and described in some detail was the *composite autonomous group*. Within this type of group all members are capable of carrying out all, or at least most, tasks. The members of the group being equipotential, none has a special leadership function. The special characteristic of this type of organization is that it has no specific structure but can adopt any temporary structure that is judged by the members to be appropriate at any one time. Thus, there is no necessary requirement for all members to work together on any task or to make group decisions. They may at any one time each work individually or in subsets. However, the requirement in this case is that the activities of individual subsets of the group remain directly correlated toward the joint achievement of a specified aim. The requirement that all members are able to carry out all tasks has a consequence that the required competence range for the total task will need to be within a feasible range. The size of the group is generally relatively small. However, there are examples of linked sets of autonomous groups which can operate as a unit of up to 40 persons.

In a *matrix group* each member has a specialist function but each has an overlapping competence with some other group members. In this case there is a structural constraint. At the same time a large variety of alternative structures can be generated and utilized depending on task requirements. The special characteristic of the matrix group is that, as far as the design principle is concerned, there is no necessary limit to the size of the group. However, there is no practical experience so far which might indicate the approximate limits to a viable group size. The design principles for this type of organization were initially theoretically formulated, and it is only quite recently that an implementation has been carried out on board a ship (Herbst, Vol. II, "A Learning Organization in Practice: M/S Balao"). This does not mean that matrix groups have not existed in the past without having been recognized. A

recent study has shown that some of the characteristics of a matrix organization have been traditionally evolved in some banking organizations.

A *network group* can be described as the converse of an autonomous group. The members of a network are normally dispersed individually or in small subsets. It is only infrequently that they come together as a joint group in a work session and for direct communication. In an autonomous group, on the other hand, the members normally work in close association with one another and network type properties emerge in the work situation only temporarily and for shorter periods, whenever the group splits into smaller subsets in carrying out its task.

The basic characteristic of a network is the maintenance of long term directive correlations, mutually facilitating the achievement of a jointly recognized aim. The purpose of this type of organization is typically to find ways of going beyond the established given. As an organization it provides the maximum autonomy of individual members consistent with, and under some conditions optimally suitable for, the achievement of a joint aim.

There are several reasons why organizations of this type tend to remain relatively unrecognized for long periods. Taking the case of a network of scientists as an example,

Communications may be in the available literature but their significance may initially only be visible to, and actively responded to by, relatively few others.

The aim may be only vaguely specifiable at first, and possible means of implementation may be quite tentative and unclear to the network members

themselves. The joint task and commitment of network members becomes that of working toward the clarification of both the aim and the means of implementation.

A web of directive correlation is scarcely ever visible to the outsider and may also become recognizable to the participants only in retrospect. It is not simply a matter of information flowing more easily within the network.

The type of process which occurs is that the contribution of member A may be recognized as an innovative step by member B, who may be able to take this further in his own work. This again may help A to see further implications. In this way a cumulative process within the network may lead to a new approach to a problem which is a joint product of the group. At the same time, approaches which show themselves to be inadequate can be rapidly modified or abandoned. The absence of status striving by individual members is a critical factor in being able to abandon or modify unproductive approaches. In this way the primary function of a network is the development and maintenance of a joint learning process, and its productivity depends on the actual or evolving complementary skills of its members. In the nature of its task, its mode of organization and its process of functioning, a network is possibly as far removed from a bureaucratic hierarchical organization as it is possible to get.

Although network groups may maintain their existence over some decades, they are in principle temporary systems. As such, members will normally maintain their role in more conventional institutional settings. In this case the linkage between different institutions may

become a correlated function, which at the next stage points in the direction of a network organization in which the nodes are institutions. A network group, as its task becomes completed, that is as its approach becomes converted into a new established given, may become institutionalized as some kind of professional society or the members may disband and move toward new fields.

Each of the types of organization discussed has existed for some time; however, they have generally been either unrecognized or exceptional. Known actual cases at this time, whether discovered as naturally evolved forms or achieved by design implementation, are on a small scale. A study of cases of this type was essential to developing, gradually, an understanding of both the basic design principle and the mode of functioning of organizations of this type. Table 1 gives a tentative overview of the characteristics of nonhierarchical organizations at the group size level. One of the basic differences between bureaucratic hierarchical and nonhierarchical forms of organization will be seen to lie in the fact that bureaucratic hierarchical organizations are based on the principle of a single rigid structure, while each nonhierarchical form of organization has the capacity for multistructured functioning.

The problem at present is that of investigating the relevance and feasibility of the design principles for larger social units. There are at least two ways of proceeding:

- If a change of scale occurs due to growth then, just as it is possible to develop larger bureaucratic hierarchical organizations with organizations of the same type as components, so it may be possible to develop a network of networks.

- The constituents of a matrix or network, instead of being individuals, may be organizational units of different types.

There is insufficient experience so far with the utilization of autonomous groups as building blocks for larger units. There appear to be two possible problems:

- The requirement that members be capable of carrying out all or most tasks restricts the size of individual units.
- Autonomous type groups have, for the most part, been implemented within the structure of existing hierarchical type organizations, specifically in bottom-up change strategies, and thus have been built at least temporarily into a partially inconsistent context.

The approach which has been found specifically appropriate for large-scale units is the network organization. This type of approach was, in fact, utilized from the beginning in the Norwegian Work Democratization Project (Emery and Thorsrud, Vol. II, "The Norskhydro Fertilizer Plant"). To see its significance what is needed is a figure/ground reversal.

Organizational networks may, in much the same way as project groups, be utilized to implement changes somewhere else. In this case they function as adaptations of a fundamentally bureaucratic structure. Their mode of functioning as nonhierarchical organizations is quite different.

An example is the type of enterprise that has evolved in a project concerned with working toward a new form or organization on merchant ships, which initially was concerned with developing an autonomous type group for the subordinate crew and more recently with developing a matrix group of officers (Herbst, Vol. II, "A Learning Organization in Practice: M/S Balao). As it proceeded, the project required a change in headquarters organization, a change in maritime schools that involved the Ministry of Education, changes in certification and regulation, changes in trade union structure and functioning, changes in the process and direction of technological and architectural design and changes also in the role of the researchers involved.

The implementation process that involves changes in the mode of functioning of each of the constituent organizations and also changes in their relationships to one another is almost precisely the same as that described previously for the little network group. The project is to go beyond the established given system. The aim to be achieved finally cannot initially be specified in detail. The initial time horizon may be 10 to 15 years. The project is such that no organization by itself can go ahead very far since it is linked to the other organizations involved by interdependence and complementarity relationships, which become manifest in the change process. The major difference as compared to the informal network group is that, while interdependence relationships of the latter are a result of selective interdependence, the initial structure of interdependence relationships is given by the nature and scope of the change process.

In the present case, given a joint commitment of the organizations concerned for initial exploratory steps in the accepted direction of change, a representative committee was formed, which then constituted the formal core of an evolving network group. Taking exploratory steps for changing the organization on board project ships, provisional facilities for

additional education of officers for a matrix organization were required. With the agreement to go further, a new structure for maritime education has been established which affects both career paths and certification requirements. What becomes visible now is that while previously the captain had to be recruited via the deck department, he can now be recruited from any part of the matrix group. To implement an extension of the new form of organization what needed to be explored at the next stage were requisite changes in the organization at head office and the development of new types of relationship between head office and ships. At the same time, ship personnel have been involved in the design of new living quarters, providing lounges and restaurants for the total crew and an equalization of cabin facilities, thus removing one of the traditional supports of the earlier segmented, hierarchical status structure. The extension of the number of project ships has at the same time led to a diffusion network between different shipping companies. At a later stage, a need for the change of trade unions, which are at present based on the traditional work roles, may become recognized.

What is meant by a figure/ground reversal in the present case is that the initial object of change becomes at the next stage a means for the transformation of the larger social system. Within this process, each of the participant organizations is able to change itself adaptively in relationship to other participant organizations. Within the organizational network, the process of change moves along the lines of a gradually evolving fabric of directive correlations. Each implementation step becomes subject to evaluation, and after each step new steps forward may become visible and subject to exploration. In this way a continuous learning process is developed and maintained within which theories and guiding hypotheses become evolved and modified in a constant confrontation with the empirical results obtained. What is

found here is a possible alternative to traditional ways of achieving social change which, whatever the ostensible and often idealistic aims, may by their mode of implementation maintain the established given and at worst add momentum to the extension and preservation of bureaucratic or authoritarian social orders.

An extension of a matrix structure to the next higher level becomes possible if we have a set of organizations each with a specialist task but with some overlapping competence, which can link smaller and shifting subsets in carrying out their tasks. It would appear that within a matrix organization autonomous type groups will have a more appropriate context, given that they are able at this stage to take an active participant role within a larger organizational context.

Table 1
Types of Group Organizations

	<i>Bureaucratic hierarchical</i>	<i>Composite autonomous</i>	<i>Matrix</i>	<i>Network</i>
<i>Task structure</i>	Product (P) procedures (π) and input state (I) are given by specification $\pi(I) \rightarrow P$ or assumed to be reducible to this form in terms of given norms and rules.	Product is specified. Input states are specifiable but procedures are not, or a requisite choice exists, $\exists(I) \dots \rightarrow P$	There may be a variety of products. $\exists(I) \rightarrow P'$ or $\exists(?) - P$. Procedures and possibly input requirements are not specified.	Neither initial nor outcome state are specified in operational terms $\exists(?) \rightarrow P$. The task is to achieve a more specifiable task structure.
<i>Task competence range of members</i>	One person/one specialized task.	Each person/all tasks.	Each person has a specialized task together with overlapping competence with other members.	Overlapping competence range of members.
<i>Organizational Structure</i>	A single specified structure of relationships.	Can adopt any type of temporary structure depending on recognized task requirements.	A basic structure is given by the pattern of overlapping competencies but within this a variety of structures may be adopted.	Sets of members may, and generally do, engage in joint project work for shorter or longer periods. The structure is given by the web of directive correlations.
<i>Basic principle of organization</i>	Parallel and independent activity of contiguous members. Regulated by specified activity programs and normative rules.	Mutual facilitation of contiguous members in direct interaction with one another. Joined and shared responsibility. Short-term directive correlation when members work in smaller subsets.	Intermediate between composite group and network. Members work predominantly in smaller subsets and the pattern of all working together on a task is less frequently adopted.	Long-term directive correlation of dispersed members. Selective interdependence.
<i>Feasible size</i>	No apparent limitation to the subordination of parts.	Sets of autonomous groups linked by rotation of members are possible. The use of this type of organization for larger scale units needs to be further investigated.	In principle there is no limit to the size of a matrix. However, the problem of viability has not yet been investigated. At the next level a matrix in which organizational units are components appears to be possible.	Network groups are limited in size. A network of networks appears to be possible. The main utilization of this type of organization lies in the development and maintenance of directive correlations of organizations involved in a long-term change process.
<i>Environmental suitability</i>	The assumption is that the environment, including human beings, both can and should be converted to and maintained in a highly predictable form.	While means/ends relationships may remain basically predictable, operational conditions may be subject to marked variations. At the same time autonomous groups have a capacity for both technical and organizational learning.	The conditions may be such that a number of aims need to be achieved in a coordinated way. At the same time a shift of aims can lie within, or not too far beyond, the adaptability range without requiring basic change of the organizational form. The matrix organization provides this case a balance between structural constraints and flexibility.	In their original form network groups were established to tackle problems outside the established given. At present their relevance lies in respect to mildly turbulent environments. Their stabilizing structure lies in the fabric of directive correlations. Matrix organizations are appropriate for production tasks. Network organizations are appropriate when a number of different organizations become involved in a relatively continuous and long-term change process. Their basic characteristic is that the research function becomes incorporated and dispersed within the organization. It is at this stage that the traditional role of academic and research institutes with exclusive property rights to the research function is no longer appropriate.

References

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