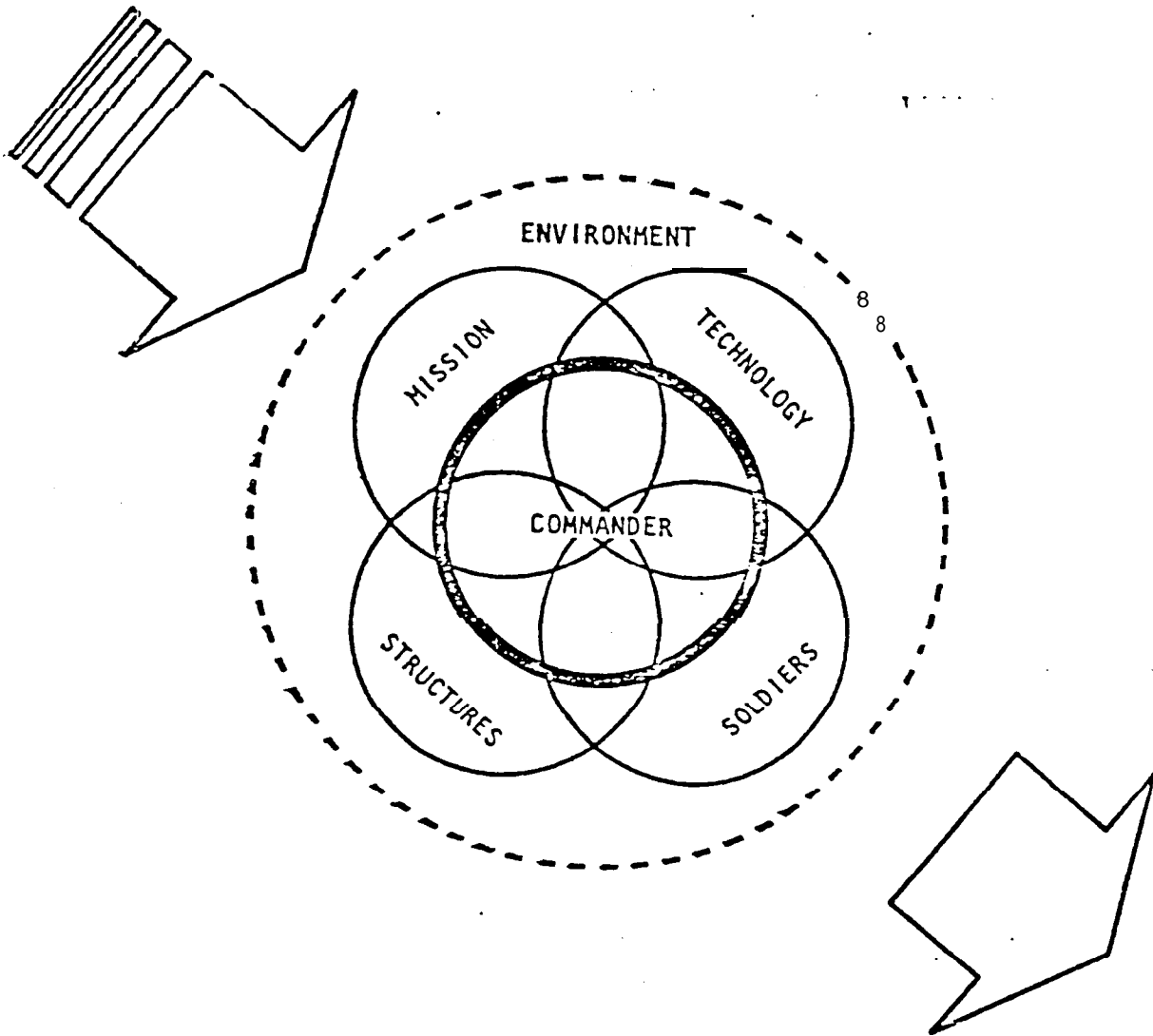


SYSTEMS



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OPEN SYSTEMS - THEORY AND PLANNING

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Introduction

This article explains the meaning of the terms and the concepts and examines some of the implications of adopting the open systems planning approach when developing organizations.

Why systems theory is useful

Open systems theory has been referred to in many "management" magazines as a great new powerful tool - doing for the managers of organizations what slicing did for the loaf. In many ways this is correct, but few articles explain why. I think such explanation is a necessary introduction to an explanation of open systems theory generally and of the mechanism of open systems planning in particular.

The past two decades have given birth to the thought that it is *the thing* for managers to use a large dose of "organization development" in their programs for improving results, and for organization development the words behavioral science are frequently used.

The reasoning for this runs as follows:

Improved results means having an organization change something in some way - making more in the same time, selling the same amount quicker, keeping current performance with fewer people, etc. This change affects the people doing the work to some degree. Organizations have been striving for improved results for many years - but *in* the recent past "managing the way the people are affected" has taken on a new importance. The reasons for this-are broadly:

1. They are *more* able to resist or show their dislike today than they were in, say, the 30's if they disliked the change. The power of the trade unions has made change planning almost a new technology. Also with increasingly complicated jobs - less hewing of wood and drawing of water, more problem identifying and problem solving - bosses depend far more on their subordinates. This means that resistance to and dislike of change can be much less easily accommodated. So this gives rise to the need to work out what subordinates like about what they do at work, what they don't like, what they can do, what they want to do and so on. Then appropriate decisions can be made, action taken and training, coaching and counselling provided. Then the change can be planned and implemented with some chance of success, ready for the next time.

2. "Grinding the faces of the poor" and the "exploitation of labor by the ruling classes" has become an unfashionable business ethic. Businesses are supposed to be more humane, capitalism is supposed not to show an unacceptable face.

No matter which of these two reasons provides the answer, the would-be improvers of organization results find themselves needing to manage the way change

affects their people, and they turn for help to what?.....Well, they turn to whatever they think will help them best - from remedies of the folklore type to good old common sense. But if they are thoughtful types and want to understand why things are turning out the way they are and to plan what they might do to improve the state of affairs rationally they turn to systems theory. Up to the 50's they could not do this: they could have turned to psychology, anthropology or sociology and then looked at their problems from the various schools of thought spawned by these disciplines. They could have looked at their problems from the perspective of "Behaviorist school" to help them understand what happens in small groups; or the "Personality school" which might have been of value in understanding individual personality and temperment; or the "Socio-economic school" to help them understand unrest amongst the "lower classes"; or the "Super-organic school" to help them understand why races display the traits they do. But all of this would have seemed academic and not really on target with their problems as managers of an organization. The "Field theory school" offered more help because it did start to address how the environment affects individual behavior, but the ideas coming out of field theory were almost buried in the rarefied debate that went on between these different schools of thought as each endeavored to gain academic sway over the others. It was not until the 1950's, when several strands of independent work were pulled together in a patterning called "systems theory," that all these various schools could be put into perspective relative to each other - the individual and his/her motivations, traits and what have you could be comprehended as being part of and relating to various groups, which in turn were part of and therefore in relationship to larger groups and so on up to the organizational level and beyond. Hence the acclaim that surrounded systems theory. Seems obvious in hindsight, but then so does "the wheel."

The "book" on all this - so far the most well worked out theory using a systems approach in viewing and thereby trying to understand organizations - is a book published in 1965 by Katz and Kahn "The Social Psychology of Organizations." its title shows the fusion between what had hitherto been considered to be separate and in many ways contradicting schools of thought. This article draws heavily on this basic text.

There are two parts to this paper - the first describes systems theory and the second describes the organization development method that has grown out of that theoretical base.

Part 1

Systems Theory

I should like to start by building up definitions, first of a 'system' and second of an 'open system'

What is a system?

A system is an inter-relation of parts. The word 'inter-relation' conveys the sense of an arrangement of interacting and interdependent parts - which thus form the unified whole which is the system. The word 'system' is in very common use today - we hear of penal systems, legal systems, school systems, plumbing systems and social systems. In each case, system is added to provide a sense of

the integrated nature of a set of penalties, laws, educational goals, copper tubes and people. This sense of integration, blending into a whole, uniting with something else, belonging together, is the first key concept provided by using the systems approach when thinking about organizations.

Types of system - particularly 'open' systems

There are many kinds of systems - closed, open, mechanical, human and so on. While all share this notion of interrelation, each type differs in character and in complexity. J. Boulding in *General Systems Theory "The Skeleton of Science"* (1956 *Management Science*) attempted to list types of systems and identified them by level from most simple to most complex.

I show them here to help put 'open systems' into perspective. Levels 1, 2, and 3 are 'closed,' level 4 onwards are 'open.'

1. **Static structure.** The changeless system - for example the ordering of the planets in the solar system. The simplest form of system is somewhat artificial as most things change, albeit slowly through time.

2. **Simple dynamic system** A mousetrap for example. Most machines are simple dynamic systems. The laws of Newtonian physics are appropriate to closed systems.

3. **Cybernetics system** Cybernetics comes from the Greek word *kybernetes* meaning pilot or governor. A cybernetic system therefore is one which has a control mechanism - for example a thermostat.

4. **Open system** In Boulding's listing, open systems are first mentioned at level 4 and defined as 'self-perpetuating' structures such as the single cell. They are goal seeking - almost 'programmed' to survive. The key difference between levels 1, 2, and 3 (all closed) and 4 onwards (all open) is that open systems are all living; and living systems, whether biological organisms or social organizations are acutely dependent upon their external environment in order to survive. This means that the system boundary must have "openings," must be permeable to permit the vital transactions with the outside world to take place. As complexity increases up to level 9, so too does the system's openness to change and modification from the outside and as the permeability of the boundary increases and so too does the dependency of the system upon its environment.

The use of the word "open" above in 4 (open system) is frequently confused with "open" as in openness and trust. It is important to distinguish between the two meanings. An open system simply has its "boundary doors" open and not shut. An open person reveals and does not conceal his/her thoughts, which is a different matter altogether. This means that you could easily have a closed (people mistrust each other and do not reveal their thoughts) open system (an organization having a permeable boundary).

5. **Genetic-societal system** A plant, having sub-systems. The key point for these systems is that they develop through transacting with their environment. Again goal directed, but this time not just goal seeking but goal choosing - surviving by rejuvenation, reproduction, and evolution.

6. Animal system A dog - having specialized sub-systems for receiving and processing information from the environment or outside world. Also having self-awareness and mobility.

7. Human systems. Man - having the capacity for self-consciousness and the use of symbolism to communicate ideas.

8. Social systems. An organization. People are sub-systems within the larger system - the organization. A by-property of a social system is morphogenesis. A Morphogenetic system is capable of 'growing new' systems and shedding existing ones.

9. Transcendental systems. Unknowables yet to be discovered.

In summary

An open system is therefore a system (a collection of elements that in some way belong together such that altering one element alters the whole) which has the following key properties.

1. It is living.
2. It is goal choosing.
3. It depends upon transactions with its surrounding environment in order to survive - to continue living.
4. It has a permeable boundary.

We have not defined the term boundary yet - simply stated that the notion of a boundary implies that a system as a whole is identifiable as being in certain, if limited, respects independent of related systems.

You may at this stage have a sense of the implications of these definitions - for example how do we know where to "draw a boundary," how do we pick any one system out of other systems - if all living systems have sub-systems and are themselves sub-systems of some larger system - how and by whom are a system's goals decided, and so on. We will return to these points later, but first I want to amplify how using the concept of a system helps when thinking about organizations.

Why use a Systems Approach?

We partly answered this question in the introduction.

The phrase "when developing organizations" in the first paragraph of the introduction to this article pinpoints the first assumption we must make. It is this - at some time *or* other all of us will wish to change some part of our organization. The change may be small or large but it will almost certainly be aimed at improving the work the organization does and therefore can be described as developing the organization

Having made this first assumption, a series of logical steps follow - define what is 'to be improved, plan how to achieve the improvement, put the plan into effect, and produce the improvement. These steps are simple to write down but difficult to put into practice when the organization to be developed contains a people. The systems approach has proved to be a valuable aid to help overcome this difficulty, probably the most valuable set of ideas yet available to the would-be organization improver, because it enables him/her to understand not only what an organization is supposed to be, but also how it works and therefore enables him/her more accurately to identify where to make maximum improvement with minimum expenditure of energy.

At risk of being provocative, most of the people some of the time put their efforts into the wrong things in the cause of development. The phrase, "We need to re-organize" is frequently the signal that such an error is about to be made. Using a systems approach helps avoid this kind of error.

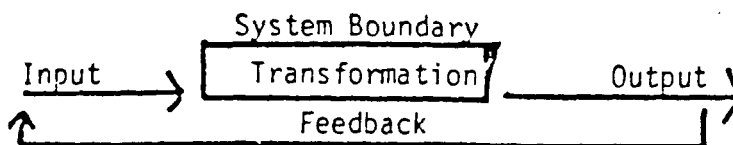
What is an Organization when viewed as a system?

It has been said that the shift in thinking needed to understand systems is as difficult as that needed to switch from three-dimensional to four-dimensional geometry, if you know what that is! Our aim in these notes is to help you understand, enable you to "think systems." The approach we have adopted is to state the principles then to illustrate the meaning by example, by story, by re-statement and so on. If, in spite of our attempts, you are still unclear about systems thinking, make notes of the points and ask the next staff member you see.

Most people could attempt a definition of "organization" and I expect most of us have drawn an organization chart to picture a structure of jobs and hierarchical levels. It is possibly instructive if, before reading on, you write out your own definition. You are unlikely to arrive at the definition that follows because we have a tendency to think of an organization as a static structure - almost capable of being photographed. In contrast adopting a systems approach causes us to think of an organization as "the coordination of different activities of individual contributors to carry out planned transactions with the environment." It is not "a structure of jobs and hierarchy" as is an organization chart, nor is it the "buildings and equipment" - these are just trappings. The purpose of organization is to enable the different elements in the system to be so arranged and to inter-relate in such a way that the whole system "works." For an open system "works" means it survives. Survival means to continue to exist, to last, to endure.

The shared meaning element in these words is "over a period of time." (This sense of "through time" is a key mental shift in dear that the systems approach gives to our thinking as we construct a mental picture of an organization.) We picture an organization as a process - a moving, changing "web" of connections existing through time - a chain of events.

The model we have found most helpful in understanding organizations as systems is this: the "energetic input - output cycle."



It is applicable to all open systems from the individual human being to the total organization. The organization takes input from its environment (the familiar people, money and materials illustrate this) transforms This input in some way so that it is exportable back into its environment (as highly desirable boxes of soap) the environment exchanges energetic input for the output (pays cash for the soap) and the cycle starts up again.

The individual human being is the smallest open system in an organization and organizations consist of the patterned activities of a number of individuals. These patterned activities are complementary or interdependent with respect to some common output or outcome and they are repeated and relatively enduring. If, say, the activity pattern or cycle of events happened just once we would not speak of an organization. The recurrence of the pattern and the idea of a system as a cyclic energy conversion process enables us to define the organization, or the piece of it we want to improve, be it an individual or a section. We follow the energetic chain through its cycle and back to the beginning to find out:

- (a) what are the key inputs and therefore the key boundary transactions?
- (b) what are the key conversion or transformation processes?
- (c) what are the key outputs and therefore the key boundary transactions?
- (d) what is the reactivating feedback?
- (e) what is the apparent goal or purpose of the organization which causes activities to be coordinated into a pattern?

It is fairly easy to understand the above points using a factory as an illustration. In a factory the raw materials and the human labor are the "energetic input"; the patterned activities of production are the "energetic transformation" and the finished product the "energetic output." Maintaining this pattern of activity requires a continued renewal of the inflow of energy. In an organization like ours this is provided by the return from the product or output. We sell the soap and by doing so obtain the means of securing new raw materials, compensating employees and so continuing the cycle again.

Key inputs are raw materials and human labor - key boundary transactions are clear; in fact there are whole departments - Buying and Personnel - set up to handle these key boundary transactions in our organization. The rest of the questions a, b, c, d, e - can be answered easily also. However, the questions get harder to answer as we change focus and look at smaller pieces of the organization, which is appropriate for most if not all of the participants in this course. The reason it is harder is that organization sub-systems exhibit the same characteristics as does the parent system, and some of these characteristics need very careful dovetailing or coordinating if conflict, strife and waste of energy is to be avoided. We will go into more detail later - but first what are these characteristics? The following nine seem to define all open systems:

1. Importation of energy: Inputs

Open systems import some form of energy from the external environment. 'The cell receives oxygen from the blood stream, the body similarly takes in oxygen from the air and food from the external world. The personality is dependent upon the external world for stimulation. Social organizations must also draw renewed supplies of energy from other institutions, or people, or the material environment. No social structure is self-sufficient or self-contained.

2. The through-put: Transformations

Open systems transform the energy available to them. The body converts a starch and sugar into heat and action. The personality converts chemical and electrical forms of stimulation into sensory qualities, and information into thought patterns. The organization creates a new product, or processes materials, or trains people, or provides a service. These activities entail some reorganization of input. Some work gets done in the system.

3. The Output

Open systems export some product into the environment, whether it be the invention of an inquiring mind or a bridge constructed by an engineering firm. Even the biological organism exports physiological products such as carbon dioxide from the lungs which helps to maintain plants in the immediate environment.

4. Systems as cycles of events: The iterative process

As we have said, the pattern of activities of the energy exchange has a cyclic or iterative character: it repeats. The output "exported" into the environment furnishes the sources of energy needed for the repetition of the cycle. These sources of energy can come either from some exchange of the output in the external world (selling boxes of soap for cash) or from the activity itself (a voluntary organization can provide expressive satisfactions to its members so that the energy renewal comes directly from the organizational activity itself) or from both. This repeating cycle is the "structure" of the system. It does not exist in the physical sense and this frequently causes difficulties in understanding. An organization chart is the nearest picture of the structure of a social system that we have - and this is not very near. It is events, not things or jobs, that provide the component parts in a social structure, so such a structure only exists through time. To stretch an analogy - if you used a still camera you could not photograph the structure of a social system; you would need a movie camera to see it. Social structure is a dynamic not static concept. Activities are structured so that they comprise a unity in their completion or closure. The chain of events may involve many people but their various behaviors only form a structure (in system terms) when there is closure in the chain by a return to its point of origin (with the probability that the chain of events will then repeat). The repeating cycle does not have to be identical to the preceding one but the goal or purpose will be the same. (For example, your eye may move in such a way as to have a point of light fall upon the center of the retina. As the light moves the movements of the eye may change from upwards to downwards or sideways, but the purpose of the activities will remain constant - to focus upon the light).

Single cycles of events provide simple structures, combined cycles give more complex structures. An organization typically consists of many circles or chains, which in turn consist of many smaller cycles of circles or chains and each one may make contact with several others. In summary, the basic method for the identification of social structures is to follow the energetic chain of events from the input of energy through its transformation to the point of closure of the cycle.

5. Negative Entropy

To survive, open systems must move to arrest the entropic process. You may have heard of entropy - the universal law of nature which stated that all forms or organizations move towards disorganization and death. Biological organisms run down and perish. Complex physical systems move towards simple random distribution of their elements. The open system is no different unless it imports more energy from its environment than it uses in both keeping itself going and in exporting back to the environment. It can therefore store energy and arrest the entropic process: it achieves so to speak negative entropy. As a general trend open systems build up "fat", thus enabling them to survive in relatively lean times (living on borrowed time is a phrase capturing this idea). Organizations seek to improve their survival position, to make "breathing space" and acquire reserves or comfortable margins around their patterns of operation. Here is a key difference between biological and social organizations. No matter what "reserves" are "stored" the biological organism will eventually die. The social structure is capable of an almost indefinite arresting of the entropic process because it is not anchored in the physical constancies of biological organisms. Yet in 1975 many companies have gone out of existence: in the terms of this model their outputs did not generate sufficient energetic input: an interesting thought for those captains of industry who believe that they know better than their customers.

This leads us into another thought - inputs for organizations are of two kinds - energetic: to be used in the transformation process, and informative: to enable the organization to correct its deviations from course.

6. Information input: negative feedback: the coding process

Miller (of whom you have now heard!) emphasizes the critical nature of this second kind of feedback: the cybernetic type. He calls it negative feedback which in essence is concerned with deviations from course and he says:

When a system's negative feedback discontinues, its steady state vanishes, and at the same time its boundary disappears and the system terminates."

Visualize an airplane flying without any navigatory information and you get a sense of the critical nature of negative feedback. If there is no corrective device to get the system back on its course, it will expend too much energy *or* it will ingest too much energetic input and no longer continue as a system. Hence our emphasis on this course on feedback of many kinds - staff to participants; participants to staff; teams to themselves; teams to other teams; individuals to individuals and so on. There is always data available about "how a system is doing" relative to its planned course and goals: the key skill required is for the system to select the critical elements about which to seek feedback. if a system, say a course team, sets itself a goal and then does not elicit feedback about progress towards this goal its continued success is in some doubt. Hence our insistence upon goal clarification: if goals are not clear, feedback cannot be obtained, and the system will perish.

The reception of inputs is selective: systems can react only to those information signals to which they are attuned. This is coding - the "blooming, buzzing confusion" of the world is simplified into a few meaningful categories for a given system. The nature of the functions performed by the system

determines its coding mechanisms, which in turn perpetuate this type of functioning. An intriguing thought for those concerned with "telling a person or piece of organization that it must change!"

7. Steady state and dynamic homeostasis (homeostatic: thing kept the same)

Imparting energy to resist the entropic process results in the transformation process taking place with some constancy: a so-called steady state develops and is then maintained through time. This steady state is not motionless or a time equilibrium. There is a continuing inflow of energy from the external environment and a continuous export to it of the products of the system, but the character of the system, the ratio of the energy exchanges, and the arrangement and relations between parts remains the same (not identical, but very similar). This steady state idea is illustrated by body temperature. No matter what the temperature of the external environment, the body's homeostatic processes work to maintain body temperature at 98.6 F. However, the homeostatic process in biology is not exactly the same as the steady state trend in a social system - hence the use of "dynamic" in the heading. With a social system the "steady state" or "dynamic homeostatic" processes cause it to grow and expand. An initial disturbance in an organism results in mobilization of energy to restore the balance, and recurrent upsets lead to actions to anticipate the disturbance: we eat before we experience intense hunger pangs. The basic principle in an organization is the preservation of the character of the system. To ensure survival systems operate to acquire some margin of safety beyond that immediately needed for existence. The body will store fat, a social organization will store up reserves, the society will increase its technological and cultural base. In adapting to their environment, systems attempt to cope with external forces by ingesting them or acquiring control over them. The physical limitations on human beings and other organisms do not apply to organizations and they move towards incorporating within their boundaries the external resources essential to their survival. The result is expansion or growth of the original system as the system strives to achieve a steady state (not to do so would result in failure in the basic cycle) and thereby preserve its character.

This characteristic of social systems shows why it is so hard to change the way in which a particular organization unit functions: the unit will work towards maintaining its own character which could well defeat the intended change.

In summary, the steady state, which with the simple system is one of homeostasis over time, with more complex systems becomes dynamic with the goal of preserving the basic character of the system through growth and expansion.

One might suspect that growth and expansion in itself would change the basic character - but this is not the trend. The most common type of growth is multiplication of the same type of cycles or sub-systems - a change in quantity not quality. However, eventually multiplication must cause a change in quality also: a 100 people organization which takes over three other 80 people organizations cannot still function in the old way. This leads to the last two points on the characteristics of open systems.

8. Differentiation

As systems grow they become more elaborate and form *new* functions - specialized sub-systems to cope with these elaborations and so restore steady

state: though at a different plateau of functioning. The armed services provide an illustration of this: specialist bureaucratic functions now exist in the Navy, for example, that were undreamed of in the 1900's (although there are fewer sailors and ships now!) The European Common Market Division has departments and divisions newly established to cope with so-called "higher order" functioning made necessary by the increasing complexity of the business. There are many examples of this point. The problem facing organization improvers is to sort "the wood from the trees." The tendency to resist changes that look like affecting the character of the system exists in these specialized sub-systems also. The risk is that in coping with increasing complexity the specialized sub-systems become divorced from their prime function (which is to protect the primary transformation process from disruptive environmental forces) and work to preserve themselves as systems in their own right: which explains the difficulties frequently encountered in changing the character of specialized "higher order" sub-systems.

9. Equifinality

Finally, the last characteristic of open systems is the property of equifinality: otherwise stated, a system can reach the same final state from differing initial conditions and by a variety of paths. In organization terms this is frequently called "adaptive capacity" or "flexibility." The key point here is that the adaptive capacity of an organization tends to decrease as regulating mechanisms, such as specialized sub-systems, spring into being and start working in a way which serves to preserve the character of the sub-systems. The total system risks stagnation - it loses adaptive capacity as "red-tape" or procedures strangle it.

10. Boundaries

The consequences of viewing an organization as an Open System

All the preceding theory probably makes sense to you - once you have gotten over the initial hurdle of the new words (one point about the words - they are needed as they have precise meanings. If there was another way we would have used it!) Our guess is that it will be much less clear to you what the consequences for management become when organizations are treated as open social systems.

1. Most managers some of the time (and some all of the time!) make the error of viewing open systems as closed. They therefore apply machine theory thinking (level 2 on page 3) to a social organization (level 8 on page 4) which is futile. If by so doing a would-be organization improver actually changes something for the better, it will be by accident, not design! This illustration helps explain the point.

We will start with how organizations "happen" in the first place and the typical pattern of developments from then on.

We tend to assume that organizations have purposes. They don't, of course - people have purposes. Organization purpose is just a quick way of saying "the reason which is causing various people to make various contributions in a coordinated way." Organizations spring into being when one person decides to unite efforts with another one or more persons, the better to cope with their environment, be it killing sabre-toothed tigers or trading in soap.

One common misconception is to assume that organizations are possessed' of built-in goals. This is readily assumed and typical reasons found to explain it are: the founding fathers implanted them, or the current organization leader decreed them, or by some mysterious process they have emerged from the fabric of the organization itself (whatever that is). However, consider this quotation from Katz and Kahn: "The stated purposes of an organization as given by its by-laws or in the reports of its leaders can be misleading. Such statements of objectives may idealize, rationalize, distort, omit, or even conceal some essential aspects of the functioning of the organization. Nor is there always agreement about the mission of the organization among its leaders and members."

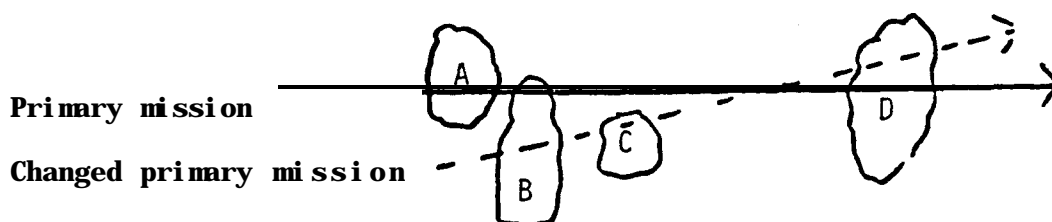
The university president may describe the purpose of his/her institution as one of turning out national leaders; the academic dean sees it as imparting the cultural heritage of the past, the academic vice-president as enabling students to move toward self-actualization and development, the graduate dean as creating new knowledge, the dean of men as training youngsters in technical and professional skills which will enable them to earn their living, and the editor of the student newspaper as inculcating the conservative values which will preserve the status quo of an outmoded capitalistic society.

"THE FALLACY HERE IS ONE OF EQUATING THE PURPOSES OR GOALS OF ORGANIZATIONS WITH THE PURPOSES AND GOALS OF INDIVIDUAL MEMBERS. THE ORGANIZATION AS A SYSTEM HAS AN OUTPUT, A PRODUCT OR AN OUTCOME, BUT THIS IS NOT NECESSARILY IDENTICAL WITH THE INDIVIDUAL PURPOSES OF GROUP MEMBERS."

The key point is that, although the purposes or goals of organizations, often called the "primary mission", can be discerned from examining what an organization does, these purposes or goals will only represent a few strands in a complicated weave or cloth.

ANY ORGANIZATION MUST BE VIEWED AS A DEVICE FOR ACHIEVING NOT ONLY THE PRIMARY MISSION BUT ALSO FOR MEETING THE PERSONAL GOALS OF INDIVIDUAL, HUMAN CONTRIBUTORS AND THE GOALS THAT HAVE BECOME CHARACTERISTIC OF EACH SOCIAL SUB-SYSTEM

Viewing the organization solely as a device for primary mission achievement is applying machine theory thinking - level 2 - to a social organization - level 3. When through so doing, the would-be organization developer conceives of a "good idea" if it results in organization improvement, it will be entirely by chance. A picture should help clarify what I mean by the primary mission and other goals:



Each bubble represents an individual and his/her pattern of needs, aspirations, hopes, and desires. The flow of the primary mission arrow is from left to right through time. Say the mission is shoeing horses. 'A' is the stable keeper - he/

.loves animals and is quite happy looking after the horses needing shoeing. He/she would be 'happier' - more satisfied with life at work - were he/she on a farm - but it doesn't pay as well as the stable. Person 'B' is the forge expert, he/she looks after the fuel, the fire, the ashes, lights it and keeps it right for the work during the day, puts it out in the evening. (He/she would be 'happier' to be in the Fire Brigade and is only doing this as an interim job until old enough to apply.) 'C' is the blacksmith. He/she loves every minute of the work day. 'D' is the shop manager. He/she thinks they have a slick operation but is always looking to put in new work to generate more money. He/she hits upon the idea of making wrought iron tables in spare moments. They do it a few times, the tables sell like hotcakes - but he/she finds A, B and C have joined the Farriers Union and say they want to "negotiate terms and conditions of work". You are all no doubt ahead of me by now. Not only has D failed to take into account what the shift in primary mission does to the possibilities for goal achievement and hence job satisfaction of A, B and C, but he/she may be misled with the "terms and conditions" smokescreen as well. A and C have become friends - they like working together. B just fits in but A and C know he/she is likely to be off soon so he/she does not really count. But A and C are resisting iron tables because this means that they will cease to work together for A will certainly leave if his/her contact with horses (animals) is discontinued. The four-person group therefore can be drawn as at least six separate systems:

the primary mission system	:	All 4 together
each individual system		4 separately
the social sub-system		A and C together

There are many other sub-systems as well - selling, procuring the fuel, the iron, the horses and so on, but these six illustrate the point.

To understand how the organization functions as it does (performing reasonably the primary mission) as a start to improving its performance, D needs to take all these six systems into account, understand the nature of the separate goals and how and to what degree the primary mission enables them to be met before thinking of changing anything. He/she needs to stop conceiving of the organization as a machine for efficiently carrying out the purpose of its designer. A social system characteristically includes more and less than is indicated by its design basis and D needs to find out what the sub-system goals are as well as be clear about the primary mission. Then he/she can start to alter the arrangement of the system, flex or change the linkages and connection, and change the inputs to effect his/her desired improvements.

2. Another result of "closed" thinking about open systems is the typical failure to recognize fully that the organization is continually dependent upon inputs from the environment and that the flow of inputs is not a constant. The built-in protective devices to maintain stability (for example, a warehouse in the making - selling primary mission chain) often delude one about the reality of the interaction with the external environment. This leads to a concentration upon internal functioning when the external environment is changing: moves are made toward tighter integration and coordination to ensure stability where flexibility may be the more important requirement. Moreover, the risk is that coordination and control become ends in themselves rather than means to an end. They are not seen as adjusting the system to its environment, but as desirable goals within a closed system

3. Another typical error is the failure to recognize the equifinality of an organization: namely, that there are more ways than one of producing a given outcome. We insist that there is one best way of assembling a gun for all recruits, of swinging the club, of running a job, and we standardize and teach these "best" methods. It is true that under certain conditions there probably is a "best" way - but the conditions must be established first. The general principle for all open systems is that there does not have to be a single method for achieving an objective: a point well worth using in your team working.

4. Another typical painful error is that of treating irregularities ("hiccoughs") in the functioning of a system as errors when they have been caused by environmental forces. The strong tendency is to pretend they are not real or should not have happened, or will or ought to go away or something. The captain on his/her bridge shouting "this ship is unsinkable" as it slips below the waves illustrates this kind of mistake. King Canute provided another illustration! A more topical illustration is provided by this quote from Leonard Japp, Jr., President of Jays Food, Inc., who produce among other things, Jays potato-chips, "Hit back hard with advertising. I told the public Pringles are not the real, fresh thing, like Jays" - since 1968 Pringles has captured 13% of the potato-chip market.

Rather the focus should be upon this external force, identifying it, understanding it and then making appropriate organizational response. We cannot understand a system without a constant study of the forces that impinge upon it.

This rhyme gives a sense of the shift in system thinking:

"A system is a little black box,
Of which we can't unlock the locks,
But find out what it's all about
By what goes in and what comes out."

One can, of course, examine the internal workings of an organization or a section of it and in so doing "unlock the locks" - however, the message in the rhyme is that a frequently more valuable, less time and energy consuming approach is to examine the environment for input and output transactions, examine the quality of the transactions, identify the apparent goals or purposes the organization seems to be serving and then identify changes you want to make and make them as new or revised inputs. The system is then likely to produce the desired output without your further intervention.

(One further point - one cannot of course "unlock all the locks" of social sub-systems: the individual human being cannot be "unlocked" - he/she can only be treated as an open system. In spite of this, we all know of attempts that have been made to treat him/her as a machine!)

Thinking of the organization as a closed system, moreover, results in failure to develop the mechanism which provides "negative feedback" - the information the system needs to stay on course. We all have illustrations of this point in practice. How many people have not had performance review sessions as frequently as they would like? How many people, when provided with cues and clues about their performance, refuse to acknowledge them?

Implications of Open Systems Theory for Managers

We have just examined some of the typical "errors" that organization improvers do not realize they are making. However, if we understand and want to apply systems thinking to our managing - what do we do?

Well, we use the organization development method known as Open Systems Planning: Part 2 of this article explains this. However, we want to end Part 1 with some "managerial guidelines" that seem to follow from the theory.

1. The primary task of a manager is to manage the boundary conditions of his/her enterprise. If a manager has to coordinate or otherwise resolve internal "disturbance" he/she is distracted from his/her task.

2. The goals or purpose of his/her enterprise can be understood only in the context of the environment. The goals are just special forms of linkage with the environment: they show the interdependence of the enterprise and the environment and aim to maximize energetic input.

3. An enterprise can only achieve the steady state it needs:

a. When there is some constancy of outputs or outcomes; i.e., the enterprise stays pointing the same way or in the same direction for a period.

b. When it maintains a rate of progress in that direction.

Progress means more boxes for the same effort, or the same number for less effort, etc. An enterprise cannot hope to achieve steady state (except accidentally) unless it sets a mission for itself in terms of outcomes that are achievable and ahead of present performance so that this "rate of progress" can be maintained.

4. It follows from points 2 and 3 that the manager's task is to match constantly the actual (now) and potential (what could be achieved in future) capacities of the enterprise with the actual and potential requirements of the environment. Only then can he/she define a mission that will permit a "steady state" to be achieved. Of course, just defining the mission is not the end of the job - but it is the crucial start point.

5. Steady state cannot be achieved by combinations of regulatory devices or mechanisms, however much a manager might wish it! in a human organization the two requirements for steady state and constancy of outcomes can only be achieved in a changing environment by leadership and commitment because the basic regulatory mechanism has got to be self-regulation of the individual human being. The manager needs to lead his/her people to:

a. understand the mission and consequent transformations and inputs.

b. agree the mission - then they are able to respond for themselves to wide-ranging changes in their arrangements and relations: self-regulation is produced.

Regulatory mechanisms such as cost controls make an effective contribution to this framework when they do not run counter to the production of this self-regulatory capacity. Remember that regulatory mechanisms appropriate in one phase of a system's existence may, with revision or change in the mission, become inappropriate.

6. The human members of an organization are open systems and can relate to each other and to organizations only in open system ways. This means each needs sufficient autonomy to exercise choice: then they stand a chance of committing; themselves to the mission (or to the revised mission). The point in 5 - steady state and self-regulation means that complete autonomy and independence is not possible: membership of an organization requires autonomy and choice in the context of selective interdependence. You cannot just "do your own thing" regardless of the results - you depend on others and therefore "do your own thing" within tolerable limits: and the limits start with the identification of the mission.

Conceptual Basis of Systems Theory as a strategy for developing organizations

We have previously mentioned the "switch" in thinking that systems theory contains in comparison to traditional theories of organization. This switch, this difference in focus, is central to the understanding of systems theory. This difference can be summed up as follows:

1. Systems theory focuses upon the relationships between and the arrangements of the sub-systems and units which make up the whole; focuses upon the interactions, transactions, and flows - rather than on the internal efficiency of each sub-system or unit. Once you "see" organizations in this way the importance of individual needs and the social processes going on becomes much greater. The central task mission is seen as one of several important needs of the organization, rather than the only one.

2. Systems theory is descriptive rather than prescriptive. A key result of using systems theory is that you collect descriptive data about inputs, transformations, and outputs, about feedback, about individual, social and task processes. Then the people who make up the system use this to improve the way these processes work together in an organic, flexible way. The approach doesn't prescribe actions or value changes which will lead to "better effectiveness," the approach just unlocks data which is typically not available when other strategies are used, which in turn permits the people who make up the system to make changes if that is what they want.

Whereas the scientific management approach accepts the technological imperative (the technology dictates the structure of everything else) and strives for greater efficiency in working and excludes other considerations, the systems approach highlights the interdependence and the dynamic interaction between task, individual and social and environmental goals and sparks analysis of the arrangements and relationships between them all.

Whereas machine theory views achievement of the "primary mission" or task as all important, systems theory views the primary mission as central but the blending the fusion, of mission with individual, social and environmental goals as vital to survival. Change is traditionally aimed at individuals. Traditionally, the only way people appeared to know how to hold organizations together was to establish rules, a set of norms, and a culture into which people had to fit. They changed, the culture did not.

Change from a systems perspective is aimed at the culture and at the norms: at increasing the level of knowledge and awareness of what's going on in this

'culture so that each individual can make choices about which way it is best for them to change or not to change. Change is aimed at what people do, their outputs to the culture and not at them by prescribing ways they should "be better."

"This sense of through.....organization."

You should try to complete the above sentence yourself; if you cannot, go back to page 5.

Next, have a go at writing down what you think are the key points of systems theory. If you have trouble with this, go back to page 1 and read through again.

OPEN SYSTEMS PLANNING (seen as a Strategic Model for developing organizations)

Building on a background of some understanding of "systems theory" we move on to handle the question "How do we use it... if we want to develop organizations?" The model developed by Clark and Krone called O.S.P. has 4 main steps:

1. COMMUNICATION: The individual in his small group

The step concentrates on interpersonal communication skills. Training activities in this area are activities such as:

- 'T' groups
- Blake Phase I grids
- Group dynamic workshops
- The Developing Organization Course

Here the individual is put in a situation where through practical experience and helped by feedback he or she can adapt or change to become a more skillful communicator. This is often described as "increasing sensitivity," becoming more aware of the effect a person has on others and how they are reacting to others; i.e., sensitive to the effect they are having on them

The key change here is that people communicate, show, reveal, open up more of themselves to others and typically the way this is done is through the expression of feelings. The individual adapts and grows as an open system by accepting more and different inputs and changing his/her outputs.

2. APPRECIATION: The individual and his world

Here the individual begins to relate and apply these enhanced communication skills to more people than his/her small group. He/she is seeing "reality" w/new eyes and developing increased understanding of the process involved in relating to other people. This has been called the change of the "appreciative system" - seeing more of the environmental realities and valuing them differently. This normally takes time after skill building in Step 1.

3. OPEN SYSTEMS PLANNING: The organization and its future

This step in the model is seen as being so crucial that the name of the whole strategy uses the title of this one step. "Open systems planning" is a set of procedures where groups can:

a. Identify and map out the dynamic realities of their links with the environment.

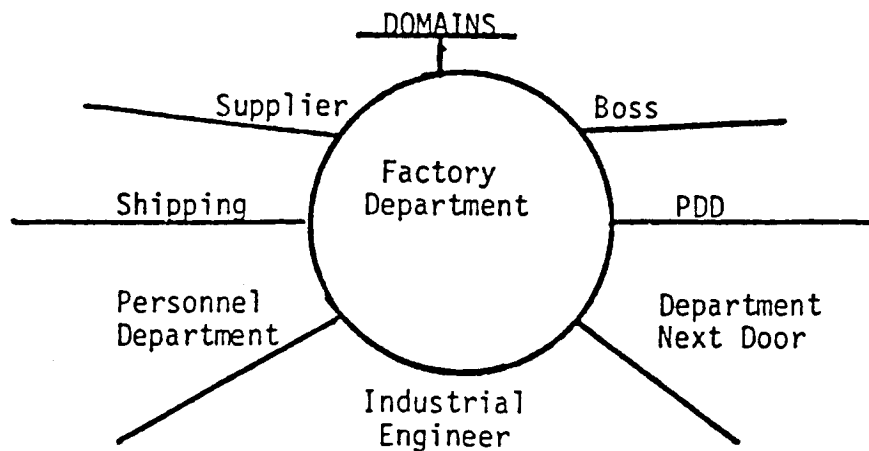
b. Map out how the group presently acts towards and hence finds itself valuing those realities.

c. Map out how the group wants to engage with those realities in the future (i.e., set revised value goals).

d. Make plans to restructure the "architecture" of the organization. This means changing the pattern by which the group relates to the various parts of the environment (the environmental forces or domains) in the valued direction.

A practical example of Open Systems Planning might be for a factory management team to do the following:

(1) Map out environmental realities. (Called producing a domain map. By domain we mean a relevant part of the environment with which we do or should' transact.)



(2) Map out how the group acts toward and therefore sees itself valuing these realities when working with the domains. We would ask questions such as:

- What do we expect of them?
- What do we get from them?
- What do they expect of us?
- What do we give them?

(3) Map out how we would like these transactions to be in the future. Here the group would ask itself - from Step 2 - this is what it's like now; how would we like it to be?

(4) Make plans to restructure the "architecture" of the organization. By architecture we mean the fabric of the organization - its shape and form. At this state a range of changes is possible such as:

- Job design
- Organization structure changes
- New tasks created
- Old tasks eliminated
- Training needs identified
- Change the managerial role, etc., etc.

The assumption is that appropriate architectural change is necessary if new patterns of relating are to evolve.

The KEY difference with "Open Systems Planning": compared with other technologies is that OSP doesn't focus inside the system, but looks at the transactions with the environment. Remember: "A system is a little black box..."(look it up!) To "proact with the environment" is one of the underpinning values we see a healthy system incorporating.

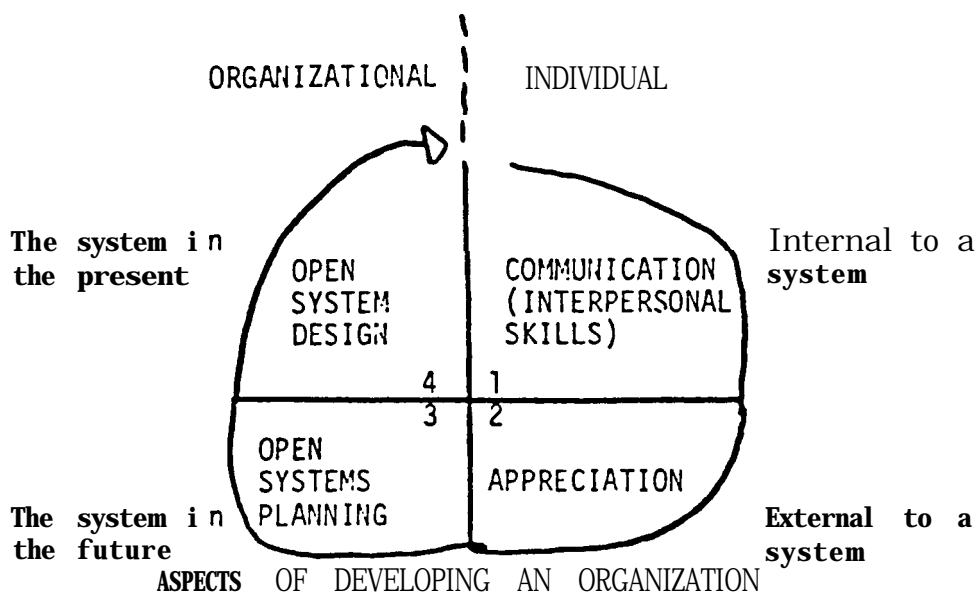
4. OPEN SYSTEMS DESIGN: The organization and its present in a turbulent environment

This is deliberately challenging the culture, the norms and the assumptions that are in the present organization design. e.g., What is management's role? Why is it this way, how is it this way?

In Step 3 we were identifying responses and interactions with the environment. In Step 4 we look inside the system to identify those changes that are needed in the capacity of the "work force" to handle the process involved in Steps 1, 2, and 3 for themselves. To do this typically managers ask questions such as: "Does the system have enough information about the environment?" "Does the system have enough skills, technology or capacity to deal with the information?" "Do we need other organizational forms?"

The managerial role in an "open system" is very different to that of the "boss" in the traditional hierarchical organization. This is one of the most important things for us to learn.

The four steps described so far can be illustrated like this:



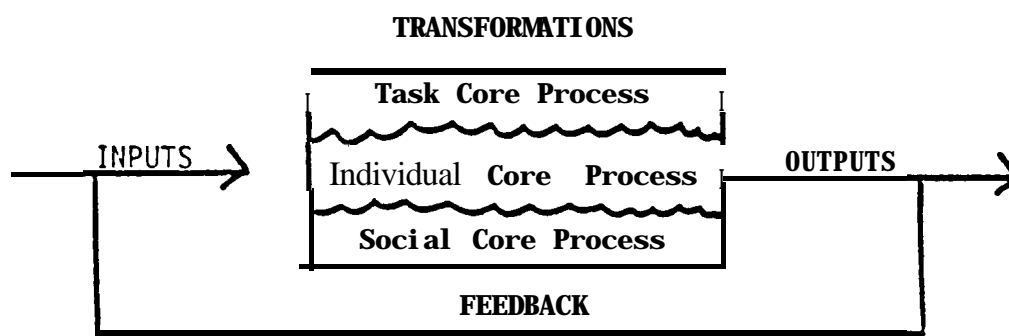
The assumptions in this model are that:

The four steps are linked iteratively • we need to keep going round and round until the organization spontaneously and continuously generates activities in all boxes. Then the goal of self-regulation is being realized.

It is probably best to start at 1, but not essential • but wherever we start we need to move clockwise.

The Transformation Processes

To support a 4-step model just described and to add to our ability to describe and understand organizations, we see an organization (system) as having three centers or CORE processes (when transforming inputs into outputs): represented by the wavy lines in the model below.



Task Core Process

This can be defined as the course of transformations which is essential to mission achievement. These can be described for a system assuming we are clear about:

- its mission or reason for existence
- its outputs
- its inputs
- the system boundary

For one of our factories some energetic inputs are chemicals and packing materials that arrive on lorries. We might describe a first transformation in the Task Core Process as "unload cartons with a fork-life truck." This would be wrong as the transformation is UNLOADING using the participle to describe it (remember this sense of through time!). The fork-lift truck is a piece of machinery we may decide to *use* or continue to use but in itself is not essential. We could do it with cranes and pack mules. To overlook this point can restrict the choices we see being available to us when we are concerned with organization design or re-design.

Individual Core Process

This can be defined as the course of personal transformations which is essential to individual fulfillment. By fulfillment we assume an individual prefers creativity

'to monotony, interest to boredom, to feel worthwhile rather than redundant and so on. Which means that confirmation from an individual which indicates his/her state of fulfillment can be simply classified: is he/she turned on/exhilarated or turned off/bored?

Social Core Process

This can be defined as the kinds of interactions and relationships between people necessary to blend individual fulfillment process with task core process to achieve the mission. Some indications of the social core process are:

- Organization's norms
- Type of relationships
- Managerial style
- Type and style of decision making
- Goal clarity
- Conflict handling
- Hierarchical "presence" and so on.

One key assumption is that a healthy social core process results in the individual core process and the task core process being in mesh, fitting, being in tune. This then liberates ENERGY in the individuals so that the quality of mission achievement is considerably enhanced. One way to illustrate this is to picture someone (maybe you) who is bored and tired at 10:00 a.m. after the usual number of hours sleep - why is this? Conversely it is well known that people at times in their work or play (such as factory start-ups or parties) work and stay awake for prolonged periods.

This liberation of energy is hopefully something you will all experience on this course. When you find yourself "bubbling and full of energy" your pattern, of activities will be very "close to" your individual core process.

An important conclusion from this is that developing an organization is a COST exercise for an organization because of the improvement in mission achievement by the liberation and redirection of energy. The consequences for the manager are also fundamental as he/she becomes what we have come to call the Social Process Engineer.

*Note (From page 17):

This assumes that a Factory organization or department has been selected as the focus and that a "boundary" has been visualized.

A boundary is any set of forces or factors which differentiate parts of a system and define the start and finish of a transformation process. A boundary can be physical - on a different floor; social - Protestant or Catholic; or temporal - days or nights.

It is our interest that helps us construct the boundary; i.e., decide where to draw it so that activities or processes taking place on one side can be differentiated from activities or processes taking place on the other side and the transfer from one to the other - the link so to speak, can be identified. We need to identify the boundary so that we can identify the points

of linkage. This is another aspect of the systems approach - the way to identify what to change is not first to examine what is inside one system or the other, but to examine the state of fit or mesh between them. Only then are we equipped to decide what is not happening that should be, and only then can we work back to change the component parts of the appropriate system. Boundary definition is, therefore, a very important stage in the analysis of how an organization works.