

The systems' Approach to Solving Management Problems

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Most of us are aware of the fact that the failures of society and its institutions derive more from their failure to face the right problems than from their failure to solve the problems they face

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Abstract

The subject of management is so complex that it is almost impossible to find a comprehensive universally accepted definition. Decision – making is concerned with a wide range of situations, each of which has a number of unique characteristics. The most basic statement about the content of this paper is that it is about problem solving. The emphasis will be on that class of problems generally termed ‘ Management problems’. The purpose is to present a discussion of the decision situations, to clarify what is meant by the term management problems to demonstrate the failure of management science approach to decision making and the success of the systems approach as a complements; in solving this kind of problems.

ملخص

يعتبر موضوع الإدارة موضوعا معقدا، حيث يستحيل تقريبا إيجاد تعريفا شاملا متفق عليه بالإجماع إن صناعة القرارات معنية بمجموعة متسلسلة من الظواهر ذات أفق واسع لكل منها ميزات خاصة. إن التبرير الأساسي لمحتوى هذه الورقة هو أنها تتعلق بحل المشاكل. وتهتم بذلك النوع من المشاكل الذي يطلق عليه عموما > مشاكل الإدارة». لذلك الهدف هو عرض ومناقشة حالات القرار، لتوضيح ماذا يعني بمصطلح مشاكل الإدارة، والبرهان على قصور العلوم الإدارية في صنع و نجاح مدخل النظم كمكمل في حل هذا النوع من المشاكل.

Introduction:

The subject of management is so complex that it is almost impossible to find a comprehensive universally accepted definition. Management primary function is to make decisions that determine the future course of action for the organization over the short and the long term. Peter Drucker said, 'the end-products of management are decisions and actions'(1)

As every experienced executive knows a major part of a manager's time is occupied in a daily process of making numerous and diverse

decisions. The nature of decisions is multifaced and continually variable. This diversity generally tends to increase with the level of responsibility and becomes particularly pronounced for the top executive of the organization.

Decisions usually involve several identifiable stages. First is the recognition that a problem exists . Second, attempts are made to identify alternatives, evaluate them and select one alternative or more for implementation. A solution of any decision problem in business can be viewed in four steps: (2)

- 1) Perception of decision need or opportunity.
- 2) Formulation of alternative courses of action.
- 3) Evaluation of the alternatives for their respective contributions.
- 4) Choice of one or more alternatives for implementation.

Perception of need is a major issue in the decision-making process. Problems have traditionally been assumed to be given or presented to an actor. Where they come from and why they are worth solving is implicitly assumed to be irrelevant to consideration of how they should be solved or what their solutions are . Management problems continue to be of concern in most organizations . This paper , therefore , looks at the problem of getting managers to contribute effectively to taking decisions and solving management problems . The most basic statement about the content of this article is that, it is about problem solving . however, the emphasis will be on that class of problems generally termed ‘ management problems’ .

Thus , the purpose of this study is :

- 1- to know the categories of decision situations .
- 2- to clarify what is meant by the term ‘ management problems’.
- 3- to demonstrate the failure of management science approach to decision making in solving this kind of problems.
- 4- to know why the systems approach has been used as a complement to the conventional approach .
- 5- to give a description of Soft Systems Methodology (SSM) of the professor Peter Checkland of Lancaster university which has been successful in solving this kind of problems.

Categories of decision situations :

The subject of decision making is concerned with a wide range of situations, each of which has a number of unique characteristics . Brian Wilson in his book states that the activity of problem solving consists

of , first of all, finding out about the situation in which the problem is believed to lie and then through some analysis leading to decisions about what to do , Taking action to alleviate the perceived problems. (3)

There are situations in which a problem can be defined in simple terms like those that are met repetitively and that become routine as a result of many encounters with the same situation (4). The decisions for these kind are programmable because a specific procedure can be worked out by which they can be resolved(5) . This kind of easily defined problem , according to Wilson(1984) represents one extreme of a problem spectrum which extends to the kind of problem facing the managers in the area of production, for example a particular manager may be faced with the problem that production performance could be better . It is difficult to give a solution to that situation which will be recognized as a solution by all concerned . This class of problems which lie towards the latter end of the above spectrum is generally termed 'management problems(6).'

Peter checkland classified the problems types according to the extremes of the spectrum which extends from ' hard' to ' soft' taking into consideration the distinction between questions which are concerned with how an activity should be undertaken as opposed to what the activity is . In this context the well defined problems, those that are met repetitively , referred to previously, are hard problems whereas the situation of that production performance is extremely soft .He defined a hard or structured problem as ' a problem , usually a real –world problem , which can be formulated as the search for an efficient means of achieving a defined end '(7) . Based on this definition the problem can be formulated as the making of choice between alternative means of achieving a known end . It is exclusively concerned with a 'how' type of question . Which means that there is no doubt about what to do , the problem is how to do it . This kind of problems is the domain of the design engineer who seeks effective and economic answer to the how type of question .

A soft or unstructured problem is defined as ' a problem , usually a real-world problem ,which can not be formulated as a search for an efficient means of achieving a defined end , a problem in which ends , goals , purposes are themselves problematic'Checkland(8). It could not necessarily be formulated as hard problems in the sense defined above. A soft problem is one which is typified by being mixtures of

both 'what' and 'how' questions. In the area of production performance that could be better, referred to previously, this kind of problem gives no guide to what the manager should investigate to identify areas for potential improvement, or how he could then introduce change to realize that improvement. At the level of what he needs to do, he could:

- improve raw material to product conversion.
- improve plant maintenance.
- redesign production planning scheduling methods.

Having decided on one or more of the above areas, he has then to determine how to bring about the improvement desired.

The decisions for management problems are not repetitive. They appear to be new and unique to the decision maker in one or more respects when they occur (9). No complete and well established procedure exists for dealing with them, because no direct experience has been obtained from previous encounters with a decision situation of exactly the same sort. In comparison to hard problems decisions, the data available concerning a soft problem decisions is usually incomplete and illdefined. The means of dealing with situations of this nature are not unique nor are they usually agreed upon by all concerned. Different persons may have different perceptions of a particular situation and of the manner in which it should be handled.

Systems Approach :

What a system is ?

A system has been defined in the Oxford English Dictionary as "a set or assemblage of things connected, or interdependent, so as to form a complex unity; a whole composed of parts in orderly arrangement according to some scheme or plan." Harold (10). The Dictionary of English Language adds to this as a definition of system "an ordered and comprehensive assemblage of facts, principles, doctrines or the like, in a particular field of knowledge or thought" (11). This definition indicates that almost all life is a system. The basic notion of a system is simply that it is a set of interrelated parts. Implicit in these concepts as it will be clarified is the degree of 'wholeness' which makes the whole something different from, and more than the individual units considered separately. It contains elements that have some reasons for being taken together rather than some other, but it is more than just a set, it also includes the relationships that exist between the elements of that set.

The concept of ' system ' , therefore involves an understanding of relationships among things that it has so much to offer as a basis for thinking about the problems that face the manager .

Systems Classes :

The particular classification , adopted at Lancaster university by Proffessor Peter Checkland was summarized by Brian Wilson (12) as follow :

- a) Natural systems : they are physical systems which make up the universe in a hirarchy from subatomic systems through the systems of ecology to galactic systems .
- b) Designed systems : These can be both physical (tools, bridges,...), they are designed as a result of human purpose , and abstract (poemes , mathematics , language,...), they represent the ordred conscious product of human mind .
- c) Human activity systems : they are systems generally described by human beings undertaking purposful activity such as industrial activity .
- d) Social and Cultural systems : most of human activity will exist within a social system , where the elements will be human beings and relationships will be interpersonal . examples of social systems would be the family as well as the set of systems formed by groups of human beings getting together to performe some other purposeful activity such as a conference .

A problem situation which can be described as ' hard ' in the context reffered to earlier , may be analysed as a designed system of the fisical variety . Whereas, a soft problem situation can be analysed as a set of interacting human activity systems .

With in the above classification , it is the human activity system type which has proved to be of value in the analysis of management problem situations .

Systems Characteristics :

- 1- A system has two or more parts.It is a whole which has parts . Its parts are subsystems , they are considered to be systems contained with in a larger system . This means that any system may itself be part of a larger system .
- 2- Each part of the system can have an effect on the behavior or properties of the whole .

- 3- The effect that each part can have on the whole depends on the behavior or properties of at least one other part .
- 4- A system is more than the sum of its parts . which means that when its parts are separated it loses some of its essential characteristics (property). water has property of ‘Wetness’ which has no meaning when related to hydrogen and oxygen which are its constituent parts. These properties known as emergent properties enable complexity to be described in terms of a hierarchy of levels of organization in which each level is described in terms of emergent properties . This idea of wholeness is the central concept in the general theory of systems proposed by L.Von Bertalanffy in mid 1940s Wilson(13). Therefore from the functional point of view , a system is an indivisible whole .
- 5- A system can be considered to be either ‘ closed’ or ‘ open ‘ . A closed system is one that has no environment . an open system is one that does .
- 6- The environment of a system is the set of elements , which are not part of the system but a change in any of which can produce a change in the state of the system . Therefore , external elements which can not affect the state of a system are not part of its environment .
- 7- A system can be regarded as a transformation process , which receives some inputs and produces some outputs .

Method of Science and Systems Approach :

Science is a way of acquiring publicly testable knowledge of the world , it is characterised by the application of rational thinking to experience such as is derived from observation and from deliberately designed experiments . The concept of science may be reduced to three R’s : Reductionism , Repeatability and Refutation . ‘We may reduce the complexity of the variety of the real world in experiment , whose results are validated by their repeatability , and we may build knowledge by the refutation of hypotheses’ (14).

The reductionism leads to the concept as ‘ scientific reduction’ namely the explanation of complex phenomena in terms of simpler ones . This is the methodology of science , it is systematic .

The doctrine of emergence identified by L. Bertalanffy enabled a new tradition , Systemic rather than Systematic . This was the prime

source of the thinking which became generalized as ‘ Systems Thinking ‘. Systems thinking can be seen as a response to certain problems within science .

The crucial problem which science faces is its ability to cope with complexity .‘It assumes that the components of the whole are the same when examined singly as when they are playing their part in the whole,or that the principles governing the assembling of the components into the whole are themselves straightforward ’ Checkland(15).

Systems approach is concerned with the paradigm ‘system’ and its use in real world problem solving . It believes that the concept ‘system’ can provide a source of explanations of many different kinds of observed phenomena which are beyond the reach of reductionist science .

Management science Approach to Solving Problems:

Management science is one of the attempts within the paradigm of science to cope with problems which are intrinsically very complex . It provides many techniques for building models to show the effects of logically-related variables on some measure of performance ,frequently financial, selected as relevant to decision-making .

This approach concentrates on rational decisions , the selection from among possible alternatives , of a course of action . “ It assumes that problems can be formulated as the making of choice between alternative means of achieving a known end (16) .’” But when we seek to apply this method to the soft problems of management , whether in private companies or in public administration , it is precisely the unavailability of precise definitions of objectives to be achieved which makes problems problematical.

The failure of the scientific approach to make much progress so far in its application to the process of management , can be usefully be examined by looking briefly at the example of Operational Research, which is the closest management science comes to having a hard scientific core . All definitions of O R emphasize its scientific nature . Operational research is “ the application of scientific method to the study of alternatives in a problem situation, with a view to providing a quantitative basis for arriving at an optimum solution in terms of the goals sought”Harold (17) . The purpose is to develop quantitative data to help managers determine their policy and actions scientifically . what has happened historically is that O R has concentrated most of

its effort on refining its quantitative models and developing them for specific situations . Such models are logical tools which can be used within the human activity system managing .But, they are systematic models , they are not systemic . Thus , the essential characteristics of O R as applied to decision making may be summarized as follows:
(18)

- 1- The emphasis on models – the logical representation of reality or problem .
- 2- The emphasis on goals in a problem area and the development of measures of effectiveness in determining whether a given solution shows promise of attaining the goal.
- 3- The attempt to incorporate in a model the variables in a problem , or at least those which appear to be important to its solution .
- 4- Putting the model with its variables, constraints, and goals in mathematical terms .
- 5- The attempt to quantify the variables in a problem to the extent possible , since only quantifiable data can be inserted into a model to yield a finite result .
- 6- The attempt to supplement quantifiable data with such usable mathematical and statistical devices as the probabilities in a situation .

Quantitative models are claimed to be successful in well-defined problems , those in which objectives are well stated , relationships between variables in the situation can be specified and measures of performance are quantitative . Clearly , the model of problem-solving underlying this field is adequate only if the need to be satisfied can be defined precisely . Soft problems in which objectives are hard to define , decision –taking is uncertain , measures of performance are at best qualitative , human behaviour is irrational, and people with different perceptions and attitudes , it is difficult to see how a mathematically-based language can be appropriate (19).

Management science approach is technique oriented to solving problems . The problem situation is distorted to fit technique , and obviously there is the absence of guidance on how to generate alternatives .

Systems Approach to Solving Management Problems:

Problems have traditionally been assumed to be given or presented to an actor to be solved . They do this despite advice to the contrary given by the eminent American philosopher, William James. He

sought to make us aware of the fact that problems are taken up by , not given to , decision makers .” He argued that problems are extracted from unstructured states of confusion” (20). In management problems , it is more usual to find sets of problems which are highly interactive . It often happens that the people involved in a particular difficulty cannot agree either on what is wrong or what should be done .Therefore, instead of thinking of ‘problems’ and ‘solutions’ we need to think about ‘ messes’ or problem situation ,and proposals for constructive change or improvement in the situation . A mess is defined as “ a system of external conditions that produces dissatisfaction . It can be conceptualized as a system of problems” Ackoff(21) . The solution to a mess is not the simple sum of the solutions to the problems which are or can be extracted from it,treated independently of each other. Management problems are multi-faced and contain so many connections , that we must embrace ‘the whole problem’ in seeking to solve it, because lest improvement in one area produce effects elsewhere which are inimical to the whole . Therefore, decision-makers must cope with systems of problems as systems , as wholes, as an indivisible sets of interdependent elements . What we need then ,is an approach which can cope with these difficulties mentioned above . An appropriate approach whose characteristics welcome the following conditions :

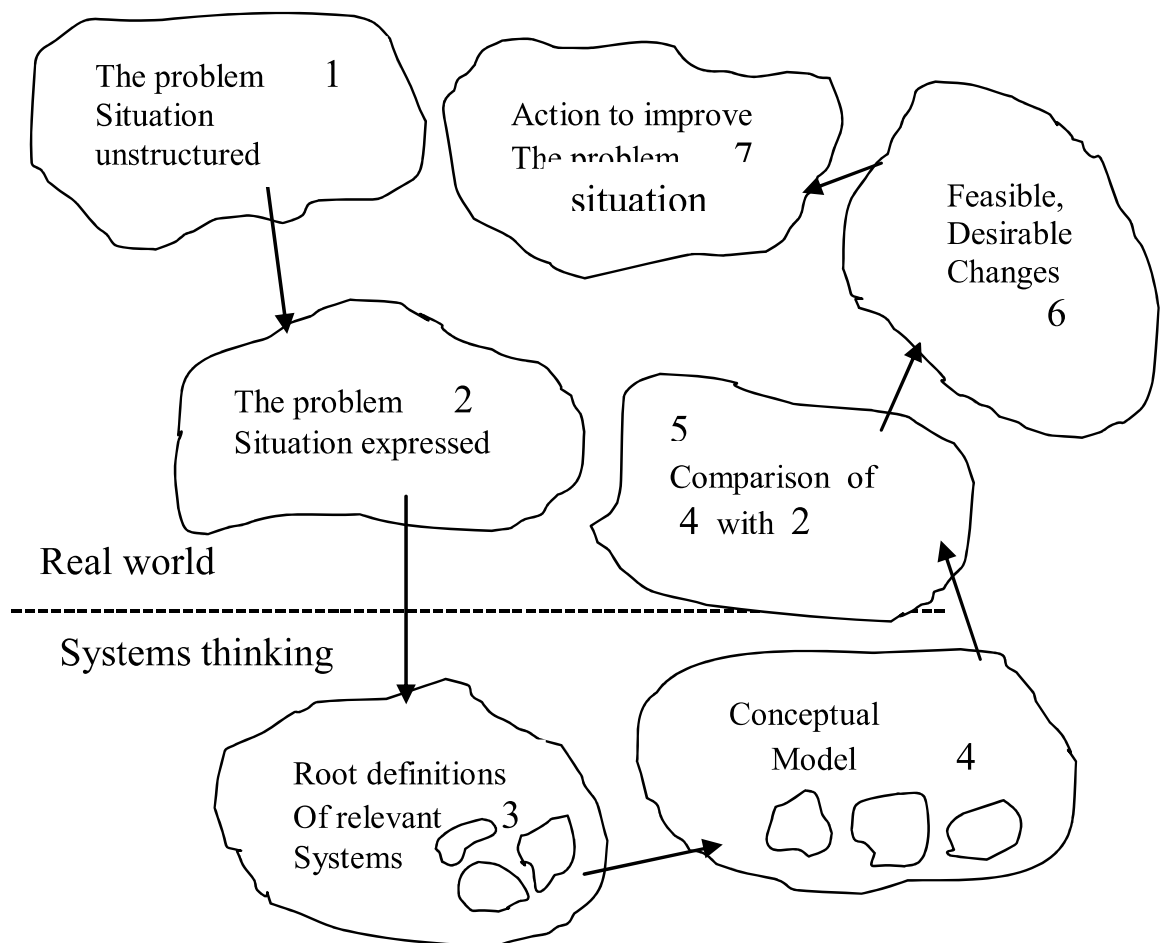
- ill structured problem situation , in which
 - objectives are hard to define.
 - measures of performance are qualitative.
 - allowing different point of views.
 - human behaviour is irrational .
 - the problem situation must be taken into account as a whole ,
- rather than simplifying it , to suit a particular technique .

Soft Systems Methodology of Peter Checkland seems to be based on these conditions . The strength of it comes from the fact that , it is problem situation orientated .

The checkland Soft Systems Methodology : general description

The aim of this description is to give some initial idea of what the basic stages of this methodology are like . The figure bellow is a summary of the methodology in diagrammatic form .” It is a chronological sequence and is to be read from 1 to 7 , a logical sequence which is most suitable for describing it”Checkland (22)

The first thing to note is that the methodology is just a series of different stages ,although recent work provided the possibility to start at any stage . The second thing to note is the broken line which divides the top of the diagram from the bottom .What this means is that ,the methodology contains two kinds of activity . Stages 1,2,5,6 and 7 are done with reference to the real-world situation that you are tackling,they are real world activities.Stages 3 and 4 are systems thinking activities,and are done using only abstract concepts .The third thing to note is that Checkland has invented his own terms ,which are rather daunting at first , but they will become familiar when using them .



The Checkland methodology in summary
(Checkland.P.B,1981,p.163.)

Stage 1 and 2 are simply concerned with getting to grips with exploring the situation , and avoiding jumping to conclusions about ‘what the problem is’ , they are an expression phase during which an

attempt is made to build up the richest picture , not of the problem ,but of the situation in which there is perceived to be a problem , i.e. the problem situations could be expressed in 'rich pictures' which represent the essence of these situations .

Stage 3 involves naming some relevant systems which could be meaningful for the problem situation , and preparing concise definitions of what these systems are . The definitions which are given to these systems are termed 'root definitions'. "Root definitions have the status of hypotheses concerning the eventual improvement of the problem situation by means of implemented changes which seem to both systems analyst and problem owners to be likely to be both 'feasible and desirable'." Checkland(23) . Each definition is based upon a particular point of view, which means that different perceptions are possible . A problem situation can be analysed as a set of interacting human activity systems. A human activity system can be described as an interacting set of activities. Therefore , " a root definition should be a concise description of a human activity system which captures a particular view of it " Checkland(24).

Stage 4, as we saw in systems characteristics a system can be regarded as an entity which receives some inputs and produces some outputs . What should be done in this stage is to make a model of the activity system needed to achieve the transformation described in the definition . " The definition is an account of what the system is ; the conceptual model is an account of the activities which the system must do in order to be the system named in the definition " Checkland(25) . The word activity implies action and hence the language in which human activity systems are modelled is in terms of 'verbs' . Systems models are termed conceptual models. "The model of a human activity system is no different to a differential equation. That is also a model of a particular view of a situation " Wilson(26). In this stage any root definition may be looked at as a description of a set of purposeful human activities conceived as a transformation process, and hence that purpose need to be made clear . It must not be a description of any part of the real world , because , if descriptions of the real world slip into the model then in the comparison stage we will be comparing like with like , and novel possibilities are unlikely to emerge . For a fuller description of this stage and model development, see Wilson B. "Systems: Concepts, Methodologies, and Applications". J. Wiley. 1984.

Stage 5 is simply to compare 'conceptual model' with the real situation again and see if the comparison sparks off any ideas. This comparison stage is so-called because in it parts of the problem situation analysed in stage 2 are examined alongside the conceptual models. "The comparison is the point at which intuitive perceptions of the problem are brought together with the systems constructs which the system thinker asserts provide an epistemology deeper and more general account of the reality beneath surface appearance ; it is the comparison stage which embodies the basic systems hypothesis that systems concepts provide a means of teasing out the complexities of reality" Checkland(27) . It should be done together with concerned participants in the problem situation .The purpose is to generate debate about possible changes which might be made within the perceived problem situation .

Stage 6 is the debate on the ideas brown up .It is a discussion of possible changes (Feasible and Desirable Changes) . the debate about change is carried out in the real world of the problem with concerned actors .

Stage 7 is action to improve the problem situation .

Conclusion:

Management problems are real world problems . They are the most complex of those with which we are faced today. In contrast to the scientist problem in a laboratory which we can define and limit . The key element in management problems situations is the conflict of interests and objectives of many participants , that it is more usual to find sets of problems which are highly interactive , and it has been found to be more useful to examine not a problem , but a problem situation . Many managers have a concept of management which rests on a point of view that has remained unchanged since it was formulated by Henri Fayol, although some new ideas of great importance to management have emerged . The modern manager needs a new approach to his job for the reasons which was discussed above . Systems approach to management promises to help the manager to do his job , being complementary to the reductionist approach embodied in the method of science .

Problem solving is dependent upon problem structuring . Soft Systems Methodology (SSM) of Peter Checkland which we described uses systems ideas to find a structure in apparently unstructured 'soft'

problem , and hence leads to action to solve the problem . The strenght of (SSM) comes from the fact that it is problem situation oriented , rather than those which simplify the problem to some few factors to suit a particular model .

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