
System Diagnosis & Evaluation and Study of
Management Techniques & Methods Application in
Corporations

Qifan Wang
Zheng Shaolian
Fu Xinhua

School of Management, Fudan University
Shanghai, 200433, China

ABSTRACT

It is important to apply modern management methods and means to raise the productivity in modern era. But there isn't powerful and systematic tool, we developed a tool and a series model which based on S.D theory to diagnose the corporation structure and evaluate the effect of management methods application in corporation.

I. The Problem and Purpose

Modern corporations, with an increasing complexity of large-scale social production, depend for their success on effective and well-organized management. The traditional styles of corporate management in Chinese industries is no longer fit to the planned commodity economy which results from the policy of opening and reform. The study of how to create and apply effective means of management which fit both the inner mechanism and outside environment of a corporation for the purpose of raising productivity and profit has become a work of great economic value. In order to explore the problem and approach the purpose, we created a tool which includes a series of S.D models on the basis of the system thinking and the theory of management science. The tool combined both qualitative and quantitative analyses and can be used to diagnose and evaluate the effectiveness of the systemic organizational structure and the results of the application of multi-methods applied simutaneously.

II. The Functions of the Tool

The tool has the following functions : (1) diagnosis of the completeness of the constituent substructures of a corporation for its purpose and analysis of the coordination among the substructural functions; (2)



evaluation of the effectiveness of overall dynamic structure of a corporation; (3) factor analysis of the problems in a corporation for tracing their causes; and (4) evaluation of the results the applications of multi-management methods as a whole.

The tool has been operated in the following steps: (1) design a typical S.D. model for the corporation systems; (2) revise the typical model for a particular corporation system and validate its effectiveness with respect to the purpose of study; (3) qualitatively analyze the completeness and coordination of the system structures; (4) find problems in the behavior of the model and trace their causes; (4) identify solutions to the problems in that part of the structure where the causes of the problems lie by use of corresponding management methods; and (5) evaluate the applicability of the methods according to the extent to which they solve the problems.

III. The Features of the Tool

The core of the tool is constituted by a set of S.D. models, typical model and specific corporation models. It generalizes in an abstract and quantitative analysis the characteristics of a corporation in production process, organization and management. It can describe the behavior and dynamic mechanism of a corporation, and aid decision-making.

The creation of this set of models aims at a more accurate and convenient study of the characteristics of a corporate structure and function, the characteristics of its production techniques, the coordination of the structure and function of its organization and management, and the solutions the management methods can offer to the practical problems. The tool can be applied to simulate the effects brought about by various management decisions so that it can play the role of evaluating the effectiveness of the chosen project to aid decision-making. It is therefore both an evaluative model for organizational structure and the application of management methods and an effective decision aid system. The basic structure of the main model is shown in Figure 1 .

IV. Analyses of the Effectiveness and Structure Function of the Model



1. Effectiveness of the Model

For a corporation model designed on the basic of the typical model, it must be validated by many tests before being put to use. These tests include the extreme condition test, parameter test, etc. The requirements we put on the present set of models specify that its behavior modes should be consistent with reality, and that the relative error between its major technical specifications, economic and actual statistical data should not exceed 5% to 10%. By doing so, the effectiveness of the model can be guaranteed.

2. Analysis of Structure Function

After the effectiveness test, the corporation model is assumed to be consistent in structure with the actual one. Therefore, it can be used as a basis for making various analyses and tests of the latter.

The first step in analyzing a corporation is to make an analysis of its structural function. It is known the behavior of a corporate results from the effects of its inner structure and therefore the analysis of a corporate's structure is helpful for evaluating the effectiveness of the corporation.

The analysis of structure function mainly includes:

(i) Structural completeness

By structural completeness, it is meant whether there is inadequacy in certain parts of a business's structure according to the theory of modern business organization and management. For example, research and development are the functions which any business must process, but if a business does not have these functions, it is then said to be structurally inadequate and this will sooner or later exert harmful or even vital influence on future development of the corporation.

Some corporations neglect the overall investigation of market. As a result, they may plan their production according to past performance plus some blind increases in production. However, they may someday discover that they are deprived of their market by competitor, but it may be already too late to catch up. This is another example of the weakness in structure function or structural inadequacy.

(ii) Degree of the coordination among substructural-functions



There is a close association between the various substructure-functions of corporate. When these substructures are appropriately combined, they form the whole corporate structure. The extent to which these subfunctions can match with one another directly affects the total behavior of a corporation.

In the overall structure, by linking of information from various components of the system constitute feed back loops in which the substructures influence one another. However, under certain conditions, some loops may become so important that they can dominate and even determine behavior modes. We call these loops the leading parts of the system. The coordination between the leading and non-leading parts indicates whether the various substructure-functions can operate effectively and match well with one another.

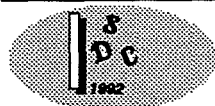
V. Problem, Loop Analysis and Self-adaptation of the Dynamic Structure

1. Loop Analysis for the Causes of a Problem

As mentioned previously, the goal can be reached by analyzing the problems which effect productivity and studying the application of methods and means of modern management.

Productivity is a synthetic index which can be interpreted in different ways. But one thing is certain about it : it is a indicator of the management level of a corporate and utilization efficiency of its production factors. Therefore, the degree in coordination among subsystems can lead to the increase or decrease of productivity of a corporate. Because of nonlinearity and counter-intuitive behaviour of a complex system, it is not easy to identify the causes of a particular problem from its surface phenomena. It is therefore necessary to trace the causes of the problem by studying the different influences on the problem from leading and non-leading parts, identifying the factors which bring forth the problem, measuring the effects of the factors, and picking up the main factors and their influence-loops so that we can move in the right direction to solve the problem.

However, the nature of the influential factor, in particular the main factor, of a problem is vital to the solution of that problem. Generally speaking, it is



3. The Application and Selection of Management Methods

To use a new management means to change the relationship between the form and match of the existing structure so that there will be significant changes in its behaviour towards the goal of raising productivity. In order to tackle with the system, we must correspondingly apply appropriate methods. Different methods adapt themselves differently to the solutions of problems. Through simulation of the effects a method may have on the behaviour of a corporate system, we can screen out the most effective and adaptive methods and at the same time avoid blindness in selection of method.

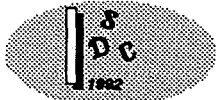
It often occurs that several problems coexist or the same problem is involved in a number of substructures. In such a case, there will not be much effect produced if a method is used non-systematically. This is because the effect of the method may be offset by an unimproved structure in the system where all the substructures are associated in close interaction. Therefore, it is important to use methods systematically with a view of the entire system.

There are other factors that should be considered in choosing a method, such as the knowledge level and skill of management personnel, the operability, cost and possible risk of the method, and so on. Besides, a method may have some preconditions for its adaptive due to changes in structure and condition. It is therefore necessary to constantly apply the model in studying a business for the purpose of effective use of the selection management methods and the combination of a set of methods which can best fit the corporation.

VI. A case in application

SWF, a watch manufacturer, is a large-scale industrial business in Shanghai. Its production output per year exceed 6,000,000 watches and its achieves more than 100 million yuan of profits before tax. Since the corporation started, it has made great contribution to the country.

However, this leading corporation in the profession of watch production suffered from many setbacks in recent years: its products sales decreases; the period was lengthened for retrieving receivable for goods; and its profits before tax decreased dormastically. Although it



was forced to put down the price of its products for several times, there did not appear any curb in this declining tendency. In regard to this situation, people in the manufacturer differed widely in their views. One view was that debt-chain was the main cause for the delay of retrieving receivable for goods which resulted in a shortage of circulating fund and a decrease in efficiency, and that declining sale of products was mainly due to the slack market. Another view was that watches imported from abroad occupied market, so it is necessary to limit watch importation to protect our national industry. A third view attributed the declining sales to the poor quality of the products. These views each had its own reasons, but the key question is : where lies the key cause ? or how can it be solved ? In collaboration with the management personnel of the manufacturer, we started with the previously described method in working out a model and analysis for the corporation.

We found that the main cause of profits before tax decrease and poor sale of products was the poor quality of the products. On the one hand, this caused a large amount of waste product which in turn led to an increase in production cost. On the other hand, the problem in product quality is directly reflected in a high ratio of sold products which were returned to the manufacturer for repair. This, in contrast to the quality of imported watches which are seldom returned for repair, seriously affected the order of goods, resulting in an increase in the stock of finished products. The analysis of these two dimensions of the problem conformed with the actual situation of the corporation. But which of them constituted the principal part of the negative influence on the business ? The analysis, provided by the model showed that the amount of wast product which was previously thought to be the key problem actually made up only a little more than 10% of the decrease of efficiency. However, insufficient order of goods constituted 90% of the negative influence. Figure 2 gives a comparison of effects in the application of the methods.

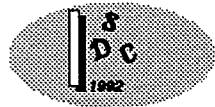
On the surface, the basic structure of the corporation seems to be adequate. But a close examination of the quality control system reveals an inconsistency between the actual structure and the planned structure. In other words, the function of quality control system is subject to serious limitations. Because of relatively complete



implementation of the contrast system policy in the assembling procedure, its quality gets guaranteed. In contrast, the work of quality control is poorly done in the purchase of raw materials and the production of spare parts, and this tends to weaker the function of the structure. QC and TQC whose function is to strengthen control quality of product are largely ineffective, despite their long years of application. It is also discovered through the model that the decrease in the enthusiasm of workers and the aged equipment are vital to the quality of parts. It is therefore suggested that the following test be made: adequate incentive system should be set up to enhance the working enthusiasm of the workers and staff; a comprehensive equipment management method should be worked out to deal with the factor of aged equipment; extensive and deep-going market predictions should be made to improve the image of the corporation on the market. When combined effectively, these methods will help the manufacturer to gain more marketplace and achieve the goal of raising its productivity.

REFERENCES:

1. Peter, M. Senge. 1989. Organization Learning: A New Challenge for System Dynamics. Computer-Based Management of Complex system. Springer-Verlag, P229-236
2. Wang, Qifan. 1988. System Dynamics. Qin Hua University press, Beijing



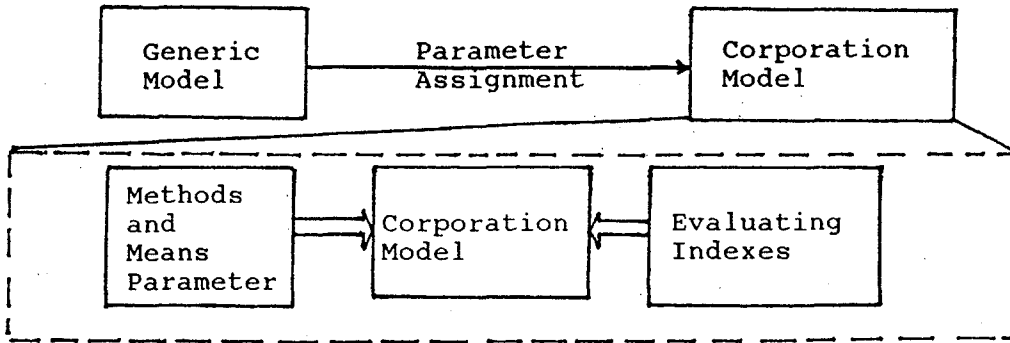


Figure 1 Basic structure

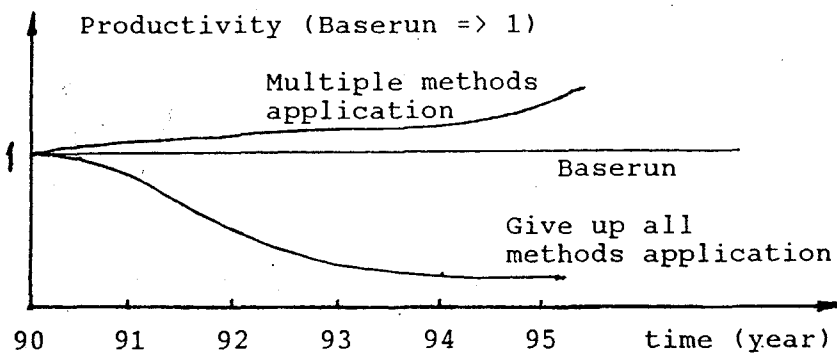


Figure 2 Method application comparison

