Management of Company's Strategic Changes on the Basis of Its System Diagnostics

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Abstract. *The article describes the results of constructive system tools development for managing strategic changes at companies on the basis of their system diagnostics and also presents the results of appraisal of these tools at a domestic mechanical-engineering enterprise.*

Key words - system approach, system diagnostics, parametric identification, strategic changes, cybernetic management.

I. Introduction

Transformation of post-Communist Ukrainian enterprises into modern market and competitive organizational and economic systems (OES) requires strategic system changes and their efficient management. However, absence of corresponding theoretical developments and practical experience of solving this problem made it impossible to obtain positive practical solutions of the problem. Attempts to use theoretical tools and the experience of developed capitalist countries with classic corrective market management conditions for strategic management of domestic enterprises was not successful because of their inadequacy in regard to domestic enterprises and also due to unfavorable operational conditions. Besides, Western theoretical methods and tools were created for managing strategic changes, which are targeted at business processes. At the same time, the condition and interrelation between system elements at Western firms and companies were quite perfect and did not need strategic changes.

Regarding domestic enterprises, their condition and interrelation of system elements were not quite perfect as far back as at the foundation stage as compared to their Western equivalents. That is why their operation, as a result, could not be effective in the management conditions that were transitional on the way to market economy. Therefore, for domestic enterprises, first priority targets of strategic changes should be their system conditions rather than internal processes of transformation of resources into products. However, domestic enterprises had neither theoretical methods and tools for managing strategic changes of system conditions nor practical experience for target transformation, therefore, they had no market economy success in competitive environment.

In the recent years, the Department of Enterprise Economy and Management at Kharkov National University of Economics offered theoretical methods and constructive systems tools on the basis of developed system models and modern diagnostics methods of domestic enterprises system condition. Solutions offered have perspective value for managing strategic changes at domestic enterprises since they are based on the constructive system approach , which, in its turn, is based on complying with system principles and system regularities of developing and arranging artificial systems operation that are known in systems theory [1].

In this connection, the goal of this work is presenting the results of offered solutions development for managing strategic changes at enterprises on the basis of system diagnostics, and also, the results of their appraisal at a domestic mechanical-engineering enterprise.

II. Main part

The cybernetic method of parametric identification of management subject, which, in this case, is OES "enterprise", was made the basis of enterprise system diagnostics. This method consists of informational description of management subject with the help of measurable parameters that characterize its condition or behavior. Quantitative assessment or measured parameter value allow, in cases of complete and adequate set of parameters that characterize the subject, to switch to scientific management since it gives an opportunity to give an expressed reflection of the subject under study both statically and dynamically. Changing in time, parameter values produce a complete and authentic reflection of a subject and, that means that on that basis they allow to make an information system for providing management functions and to implement a cybernetic approach when constructing and arranging operation of enterprises management systems.

To implement this method on the basis of the "white box" model, a system model of an enterprise as an open system was built. It allows to perform an immediate parametric identification of OES "enterprise" condition as a management subject (Fig. 1).

System model adequately reflects the composition and structure of "enterprise - state" system tandem in the capacity of system and supersystem under study. As based on this model, it follows that the condition of OES interaction with supersystem is parametrically identified by the values of generalized system parameters: Y, X, R, I, C, and IE.

It should be noted that OES internal condition in this model is reflected by a functional converter, which consists of four interrelated general system types of activity, which includes the following: management, productive, supporting, and maintenance activities. The composition and the structure of each type of those activities forms a certain set of elements, which can be divided into two groups: passive and active elements. Passive elements include: instruments of labor, subjects of labor, and labor condition elements. Active elements include people who carry out activities.
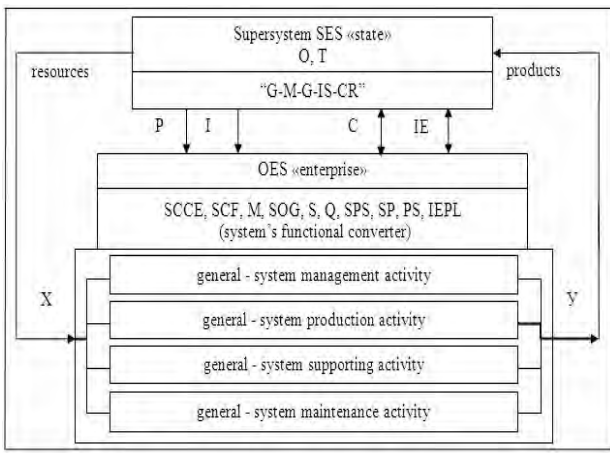
Conventional notation: Y - system's product output; X - flow of resources and services that transforms into system's output; O - opportunities that arise in domestic environment; T - threats that arise in domestic environment; G - M - G - classic exchange formula in market environment (goods - money - goods); IS - information support; CR - correctness of relations; P – procedures; I – impacts; C - communication lines, IE - information exchanges; SCCE – system's competitive capacity of enterprises; SCF – system-constituting factor; M - enterprise mission; SOG - strategic operation goal; S - strategic importance of enterprise management; Q - level of system openness; SPS - structural property of system; SP - system potential; PS - system perfection; IEPL - internal environment profitableness level.

Fig. 1. System model of parametric identification of OES "enterprise" condition as a management subject

As for the following generalized system parameters - values: SCCE, SCF, M, SOG, S, Q, SPS, SP, PS, IEPL, they are part of internal system condition of OES "enterprise". That said, it should be noted that SCCE, SCF, M and SOG characterize the condition level of target strategic guidelines, which are specified in OES "enterprise", and such system parameters-values as S, Q, SPS, SP, PS, IEPL directly reflect the condition level of OES functional converter.

As for supersystem, it is represented by the "state" social and economic system (SES) in this model, which, accordingly, generates certain opportunities and threats in regard to OES "enterprise" operation, and also market exchange in domestic environment is immediately implemented, which is represented by the following formula: "G - M - G + IS + CR".

This way, judging from the model presented and the nature of parameters, it can be seen that OES "enterprise" system condition is fully and adequately described by sixteen main parameters. In this regard, enterprise as a system agrees with the functional of the following type: F_{OES}(Y,X,R,I,C,IE,SCCE,SCF,M,SOG,S,Q,SPS,SP,PS,IEPL) = 0. When functional is equal to zero, it signifies, according to the system theory, interrelation and interdependence of all system parameters, which identify system parametrically [2].

Assessment of values of managed system parameters is carried out with the help of the expert method in the scale of 0÷10 points. In order to measure intermediate values of managed system parameter levels and subject system

condition figures, the following criteria ranges are used: 10-9 points – compliance with global standards, 9-7 points – standards of ex-Soviet states, 7-6 points – standards of domestic market, 6-4 points – industry standards, < 4 points – contractual performance specifications (PS).

That said, for the evaluation of each generalized system parameters – values that reflect the condition level of OES "enterprise" functional converter, system models which were developed earlier is used [3-8].

External or domestic counselors can be engaged as experts, those who are competent in the area of assessment of system parameters - values offered.

It should also be noted that the authors of the work carried out appraisal of these constructive tools at a mechanical-engineering enterprise in Kharkov. System diagnostics was performed at the enterprise, allowing to determine the level of its system condition as equal to 4.6 points, which, based on criteria ranges used for its assessment, characterizes it as complying with industry standards. At the same time, the results of the system diagnostics carried out became the basis for developing the list of subjects for strategic changes at the enterprise. The enterprise's qualified employees acted in the capacity of experts.

For the sake of illustration, we will demonstrate the technology of managing strategic changes at the enterprise on the basis of its system diagnostics using a system parameter, which forms the level of functional converter system condition, system openness (Q).

In order to carry out system diagnostics of OES openness level condition, a hierarchic model of assessing the level of OES "enterprise" system openness condition is used (Fig. 2).
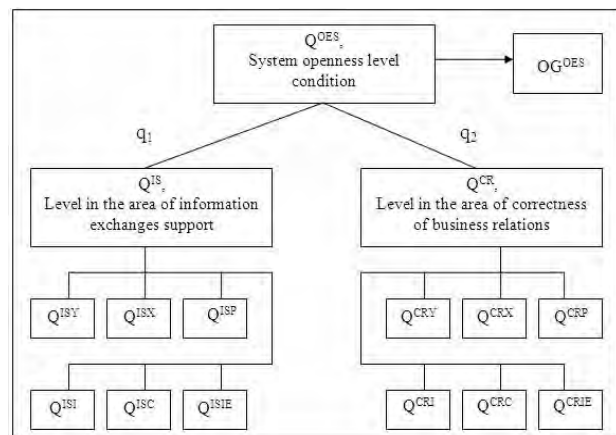
Conventional notation: OG^{OES} - OES operation goal; Q^{OES} - OES system openness level condition value; q - system significance coefficient ($q_1 = q_2 = 0,5$); Q^{IS}, Q^{CR} - generalized values of system openness condition level in the area of information exchanges support and correctness of business relations, respectively; Q$^{IS(Y, X, P, I, C, IE)}$, Q$^{CR(Y, X, P, I, C, IE)}$ - assessment values of OES system openness condition in the area of information support and correctness of business relations, respectively, through interaction channels «Y, X, R, I, C, IE» with external environment according to the "white box" model.

Fig. 2. Hierarchical model of assessing the generalized value of OES "enterprise" system openness condition level [4]

Using model in Fig. 2, system diagnostics of openness condition level of OES "enterprise" under study was carried out. Its results are presented in Table 1.

TABLE 1

RESULTS OF THE SYSTEM DIAGNOSTICS OF OPENNESS CONDITION LEVEL OF OES "ENTERPRISE" UNDER STUDY

Conven-tional notation	Actual assessment, points	Substantiation
1	2	3
Q^{IS}	6	–
Q^{ISY}	9	Individual types of enterprise products have certificates of quality that conform to global requirements (ISO standards, UkrSEPRO certification)
Q^{ISX}	7	Lack of customers' awareness of payment delays
Q^{ISP}	5	Instability of legal basis, contradictory nature of external procedures
Q^{ISI}	6	Low level of supersystem impact warnings
Q^{ISC}	5	Indeterminacy of clear list of accountability information
Q^{ISIE}	4	Withholding of incompleteness and inaccuracy of information
Q^{CR}	5.7	–
Q^{CRY}	8	Occurrences of tardy shipment of products to customers, presence of flawed items in batches
Q^{CRX}	7	Payment delays, unclear requirements regarding delivery terms and quality of raw materials
Q^{CRP}	5	Imperfection of specified procedures
Q^{CRI}	5	Incorrectness of impacts, occurrences of unregulated impacts
Q^{CRC}	4	Occurrences of informal communication
Q^{CRIE}	5	Irrelevancy, incompleteness and inaccuracy of information
Q^{OES}	5.9	–

As based on Table 1, it follows that the condition level of generalized values of system openness condition level in the area of information exchange support and correctness of business relations of OES under study is equal to 6 and 5.7 points, respectively. In its turn, the condition level of system openness generalized value of the given OES is equal to 5.9 points, which is, in correlation with criteria ranges, agrees with the level of industry standards system openness condition.

Graphic profile of system openness condition of the enterprise under study was built according to measured values of assessment figures, including the reflection of the average value of assessment parameters (Fig. 3).
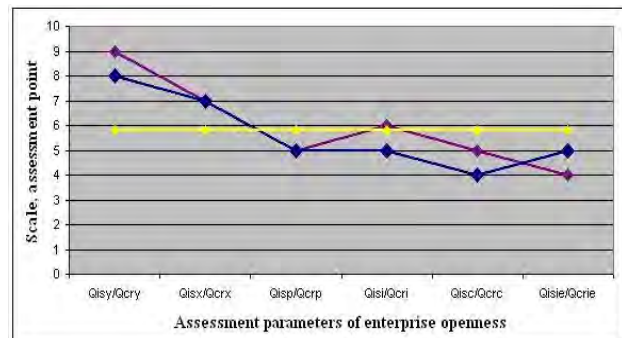
◆—◆ - condition level of enterprise exchange information support;

◆—◆ - condition level of enterprise business relations correctness;

◆—◆ - average condition level of enterprise system openness assessment parameters.

Fig. 3. Graphic profile of system openness condition of the OES "enterprise" under study

Fig. 3 reflects average value of assessment figures equal to the value of generalized figure of system openness condition (5.9 points). This equality takes place because of equal system input of each generated figure into forming a generalized figure.

Besides, the graphic profile reflects critical parameters, whose values are within below average range. The following can be referred to them: Q^{ISP}, Q^{ISC}, Q^{ISIE}, Q^{SRP}, Q^{SRI}, Q^{SRC} and Q^{SRIE}.

The elements and ties between them that are responsible for the values of critical parameters - figures become the subjects of the first priority strategic changes.

In totality, a generalized list of subjects for strategic changes for enterprise system condition was made by the results of the system diagnostics of OES "enterprise" under study.

The first priority actions in the framework of strategic changes management at enterprise by the results of system diagnostics are development and implementation of system activities for increasing the condition level of subjects selected for strategic changes, at the first stage, to average level, which is seen as target level. By the results of planned system activities implementation, assessment of the changed conditions of strategic changes subjects is carried out, a new graphic profile is built and managed parameters for a new stage of strategic system changes are defined. The number of stages for strategic system changes is determined by the value gap between the target and initial levels of assessment parameters system condition. The presented technology of strategic changes process implementation is used for all subjects of strategic changes in the framework of each succession.

This way, solving the problem of scientific (cybernetic) management comes to influencing the condition and ties of system elements that are responsible for low values of system parameter levels. And since there are tools for

measuring quantitative values of system parameters, development of management influence is of objective character and is void of any subjective erroneous influence.

Conclusion

The article describes the results of constructive system tools development for managing strategic changes at companies on the basis of their diagnostics and also presents the results of appraisal of these tools at a domestic mechanical-engineering enterprise in the city of Kharkov.

Modern system and cybernetic approaches, which are based on measurements of quantitative values of managed system parameters make the basis of OES "enterprise" system condition diagnostics and management of its strategic changes. It allows to switch to scientific management by achieving a target system condition at domestic enterprises.

In particular, the following was offered for practical use on the basis of the system approach:

1. an adequate "white box" system model for parametric description of artificially made OES "enterprises" as a management subjects;

2. a scale for assessing differentiated system parameters and a graphic method for reflecting the profile of subject condition that allows to determine first priority critical parameters for increasing system condition level;

3. a technology for managing strategic changes at an enterprise on the basis of system diagnostics of its condition .

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