

# SYNERGY AND SYNERGY PARAMETER

**Vasilij Novikov**

The Belarusian State University, Belarus

**Nikolaj Busnjuk**

The Belarusian State Technological University, Belarus

## Annotation

*Synergies in collective systems and its dependence on parameter of synergies are considered. As synergistic effect is only the result of collective self-organization system, there are proposed does not take into account the effects not related to collective self-organization under the synergistic effect calculation. This are proposed to define synergistic effect as a function of self-organizing measure of a collective system.*

**Key words:** synergy, synergy parameter, self-organization, cyber corporation, open system, GAP-analysis.

The integration into the world economic community, competitive requirements capable of effective development at all levels of Government have led to the creation of corporate systems. Unlike a conventional system the corporate system to a much greater extent provides synchronization of efforts of each element of the system. This synchronization to a very large extent is accomplished by advanced information technologies using. The emergence of enterprise systems and cyber corporation significantly changed economic and political culture of our society. Problems of interaction of the elements and sub-systems of the corporate system in terms of education, synergy are now very topical and are not well understood [1].

For the first time the term "Synergetics" Haken was proposed as the concentrated expression of self-organization in the open system and its arrangements with competing environment [2]. Synergetics is a logical continuation of the cybernetic approach to collective system. An integral part of the Cyber-system is the dominance of negative feedback on the positive. It is the dominance of negative feedback ensures stabilization processes in the system. This does not mean the total absence of positive feedback that the system needed to ensure complacency results action system. In the presence of intense positive feedback to stabilize the system, you must maintain and the dominant negative feedback. It is hard to occupy a leading position on the competing market but even harder to hold on to positions of leadership. To stabilize the system leader is not possible to be guided by the examples of competing environment and system has had to spend large sums of money to identify gaps in its activities on the basis of only their interactions with potential consumers. So to maintain the required level of negative feedback producers of goods and services spend a lot of money on intensification of positive and negative reviews from customers. Some firms even injected material reward consumers for the most significant comments about their products and services.

Synergy based on system performance as the open revealed the formation of backward linkages. Open system generates their feedbacks on the basis of their interaction with competing environment. Only intensive contacts with the competing environment allow you to form a dominant negative feedback. As an open system view commits to undertake active in the collection and analysis of information related to the results of its activities. Open system does not mean the disclosure of its confidential information and technological secrets, but obliges us to receive information about competing surrounded by all legitimate means.

It is undisputed now restructuring the system with functional business process principle [3]. Business process structuring is possible and effective only within the system operating according to the principles of open systems. Business process structuring system provides, first of all, synchronization of open system elements both inside the business process and in the interaction of business processes. Such structured contacts can reduce the number of system elements, which should not exceed seven [4]. Business process approach provides a more transparent mechanism of interaction as elements within the system and contact systems with consumer and competitors. Active transition from functional business structuring process is hampered, to a large extent, the habit and the conservatism of the leaders, on the one hand, and the reluctance of some elements of the system to make its activities more transparent to the environment, on the other hand.

Rules of business-process approach are limited in the standard series ISO 9000. In accordance with this standard requires the Organization have to provide accountability for each business process. This reporting allows you to present the Organization's activities in a transparent and standardized functional uniform. The structuring reporting system according to

the standard ISO 9000 is not only fictitious but is a brake in the development of the system itself. The latter is connected with the fact that the activity of such a system is not transparent, and more confusing.

Business process approach is the basis for the transition from work in a group to group work in the system organization. The group work involves not only saving regulated action of each element of the system but also bottom-up. Bottom-up approach allows you to provide dynamic development of corporate system in the face of stiff competition from the external environment. Under group work collective self-organization system is supported by the transparency for all elements of the system as a whole and each element separately. Only teamwork ensures self-organization system to the peaks of intuitive decision-making by qualified members of the system.

Despite the undeniable advances in understanding mechanisms of functioning corporate system there are intractable problems [5]. These include [6]:

1. formation of self-organizing behavior of complex multidimensional objects;
2. using modern technologies and management techniques, dealing with management capabilities (synergism) of the elements of the system;
3. enabling the integration mechanisms that allow you to take advantage of specialization;
4. formalized description of mechanisms of functioning and decision-making.

The concept of synergy systems is a key activity in the corporate system. This notion can be defined by two items:

5. from the standpoint of comparative mapping system with other non-corporate systems;
6. from a position of self-sufficient operation of the corporate system.

From the perspective of the first approach a comparative quantitative analysis of corporate system and similar systems for assigning smaller level is carried out. In the article [6] it is offered to assess synergy by factor  $S_0$ :

$$S_0 = \frac{F(x_a + x_b)}{F(x_a) + F(x_b)} \quad (1)$$

where:  $F$  - the function of system performance  
 $x$  - the capacity of the system.

According to (1) for the systems A and B alone and as part of the overall corporate merger value  $S_0 > 1$  means positive synergism, value  $S_0 < 1$  indicates the ineffectiveness of such a merger. However the value of  $S_0$  does not reflect the fact that exploitation systems. Each element of the system is subject to varying degrees of exploitation, i.e. unreasonably reduced remuneration for maintaining synergy system. This value can be defined as  $\Phi(x)$ . Then the synergies system efficiency when merging A and B can be expressed by analogy with [5] coefficient  $S_1$ :

$$S_1 = \frac{F(x_a + x_b) - \Phi(x_a + x_b)}{F(x_a) - \Phi(x_a) + F(x_b) - \Phi(x_b)} \quad (2)$$

It is obvious that  $F() > \Phi()$  and  $S_1 > 0$ . The value of  $S_1 = 1$  means the synergistic effect of merge completely is absent in the joint system. The value of  $S_1 > 1$  signifies that the synergetic effect of the joint system is higher than that of the systems A and B. The value of  $S_1 < 1$  indicates not the prospect of merging A and B.

As at merging the two systems into a larger system the introduction of innovative technologies leads to reduction of expenses of rather separate element of system, most often the scale effect leads to increase in synergetic effect.

In terms of the synergetic effect the system integration process is also beneficial because an additional image associated with the scale effect. On the other hand, excessive monopolization in the system activity has an adverse effect on quality of activity results. It is connected with impossibility of adequate verification of qualitative indicators of a monopoly system activity due to lack of other examples on the market for such activities. An excessive monopolization also leads to uncontrollability of the exploitation process of each system element, including the unreasonably low remuneration for the maintenance of the system activity. In most cases monopolization is beneficial to the system itself but not beneficial to consumers and society as a whole. In many countries, in accordance with the legislation the proven monopolization fact allows you to enter an artificial division into smaller systems.

From the perspective of self-sufficiency any corporate system can be considered in a simplified form as a physical system with the target and not the target interaction of the system elements [7]. In such a system each element performs its work with a certain efficiency. If in the collective system each element actions are independent, the result of such a system you can define by the average of their efficiency. For example, many farmers who perform their work

independently of each other are the example of such an interaction. The synergy option (b) such a system is equal to zero. If the collective system synchronizes its actions, then ceteris paribus its synergy parameter can be determined factor from 0 to 100%. The parameter value synergy of 100% indicates full synchronization of the system element actions, when any item regulated system. For example, in physics, laser radiation, where oscillations of particles are tightly synchronized, is the example of 100% synergy parameter.

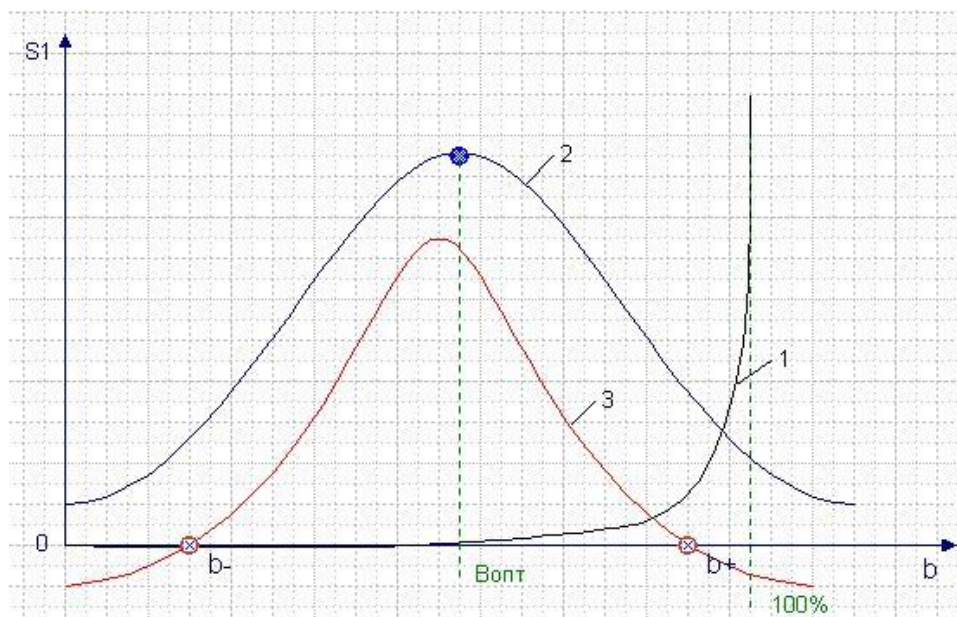


Fig.1. Typical synergy curves *from the synergy parameter*

Synergistic effect of corporate system is defined as a function from the synergy parameter. For a physical system the synergy effect is a monotonically increasing function from the synergy parameter with the achievement of its maximum when  $b = 100\%$ , which is shown in Fig. 1 (the curve 1). In the economic system in contrast to physical the synergy effect is not a monotonically increasing function from the synergy parameter and has the appearance of the curve 2 (Fig. 1). This is due to the fact that when 100% synergy parameter the creative initiative of the system elements is completely suppressed, which requires additional time and money in addition to the duties regulated by the system. In the particular case depending on the system purpose can be maximum this curve and at 100% but it is only in the enterprises with a complete lack of creativity. However, even in systems with rigid process can be considered

suspicious  $B_{onm} > 90\%$  because even here must be a reserve upgrade processes. The value

$B_{onm}$  depends on the nature of the system: this is the smallest value in the scientific field and

the largest in the area with a rigid standard tracking technology. Value  $B_{onm}$  is a compromise value defined as a result of the GAP-analysis. On the one hand, the company's manager in their

official duties is trying to increase  $B_{onm}$  to achieve, in his view, the highest manageability of

the system. On the other hand, the company marketer can track the greatest deviation  $B_{onm}$  relative to 100%. In the GAP-analysis process the manager and the marketer in particular and

determine  $B_{onm}$ . Maintenance of  $B_{onm}$  is provided by the business processes structure of the organization and by the system of marketing channels with the customer. The creative initiative reserve in the system must be supported by both the material and moral levels. So when implementing advanced technologies, management should guarantee performers a fee

for maintenance of  $B_{onm}$  and after the introduction of these technologies, which can be reflected in the relevant contract.

In general, the synergies efficiency curve would be as the curve 3 (fig. 1). When  $b = 0\%$  and  $b = 100\%$  the negative synergistic effect is the peculiarity of this curve.

The value of the parameter  $b$  can be considered as the minimum threshold of regularization in the system. In corporate systems, of course,  $b_- > 0\%$  as the activity of such a system requires at least a minimum coordination of the system elements actions. In the absence of minimum regularization in enterprise system it can be considered impossible to introduce any information technology.

The implementation of a corporate package in the system allows the system to move from a learning organization to a qualitatively new learning organization. In the latter case the system learning process is the norm with settled relations between learners and trainees. Learners benefit by getting additional knowledges and trainees favorably to transfer new knowledges because their remuneration and the system efficiency as a whole depends on it.

The value of the  $b_+$  is the threshold of the system regulation. The famous case of work "on instructions" in Japan was an example of such a regulation. The system regimentation is dangerous because it is not always possible to determine the deviation of the actual state of the system and formal indicators in accordance with statutory reporting.

Unlike the model curve of 3 (Fig. 1) the super strong nonlinear dependence effect can real take in an enterprise system by analogy with the bifurcation point in physical systems. If there is the bifurcation point in the system, the stepwise change of the synergistic effect is possible.

This effect cannot be considered only theoretically possible in the corporate systems where information technology is being intensively used. In this regard, it should be a very responsible approach to the selection of the software product, because the wrong decision in this choice may lead to a sharp decrease in future synergies. This decrease cannot be practically eliminated as it is required to replace the corporate information system with a more perfect one. With the database already created, you will have to completely update the huge corporate database when changing the package. In this regard, it is necessary tracking tool for implementing the package and its ability to quickly adapt the system interface when purchasing a corporate package. We should be suspicious of any packages implemented without using of object-oriented programming due to the limited capabilities of such systems in upgrading the interface part.

The introduction of modern corporate packages allows for more transparent interaction of the system and the competing environment in connection with the standardization of all accounts. This applies to the regulation of reporting positions and report forms for each position.

When the system functions, the question of identifying parameters that make the system closed is of particular importance. To identify such parameters it is necessary to use the full potential of the system. But it is not enough to reveal such parameters, it is important to know how to make the system open by one or another parameter.

It should be borne in mind that the mode of revaluation of its capabilities by each element of the system depends on the time in which the system was closed by the parameter. To ensure the adequacy of system behavior and its elements there is an optimal time of regularization before opening system for this parameter. If this time is less than optimal the system synergy will not be ensured by more dynamic destructive forces. If this time is greater than the optimum the standby mode turns the constructive forces in the destructive ones. The optimal time of the regularization is more significant in the implementation of the norms of legislation regulating the economic sphere of activity in a competing business environment. The most optimal one can be considered the linear closed system modernization mode in the open system with a modernization time of equal to a regularization time. Such a regime should provide for a gradual introduction of new regulated standards in the system activities, including the introduction of techniques for rating staff assessments from the standpoint of their influence on the self-organization of systems [8].

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