Journal of Theoretical and Applied Information Technology
15th August 2022. Vol.100. No 15

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

ESTIMATES OF THE EFFICIENCY OF FRACTAL CONTROL IN ACTIVE SYSTEMS

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ABSTRACT

In this paper, for the first time, the problem associated with the self-organization of an Active system is considered. It is shown that such self-organization is closely related to the fractality of the Active system itself. These properties of the Active system ensure its adaptation to the conditions of the chaos of the external environment. The organization in the work is defined as a self-developing Active system *Ac*. At the same time, the concept is put forward that self-development is the cause of self-organization of an Active system. Citing the fractal properties of chaos, it is pointed out that it is necessary, first of all, to adapt the fractal properties *Ac* to the fractal of chaos. Based on the fractality of the organization's potential $\Pi_o^{A_c}$, it is proved that the self -development of *Ac* depends on the "point" of the planning procedure. It is determined that this procedure itself depends on the human fActor, i.e. from the Active elements of the *Ae* system. Determining the role of administrative control *Ato* the self-development coefficient ρ of the Active system is introduced. The frActal form of administrative control A_{to} playing the role of a "synovial membrane", providing synergy self -development A_s.

Keywords: *Chaos, Self-Development, Self-Organization, Active System Fractals, Control Action, "Synovial Membrane", Synergetics.*

1. INTRODUCTION

What is the difference between today's world and the world where we lived for a long time. First, with the *speed of world change* . In turn, it poses a simple question: are people (*Ae*) and (organizations) *Ac capable of* thinking faster , reActing faster, and Acting faster.

Secondly, this is *uncertainty,* these are the disappearances of parametrization, qualitative and quantitative parameters. This means that we cannot describe the situation either qualitatively or quantitatively. Decision-making under such conditions is very different from deterministic methods of decision-making, just as discrete mathematics is different from all other mathematics.

In a *third of them* , this is a very high level of complexity of the ongoing processes. Chaos destroys the outer simple shell of the world and reveals the inner filling. There are a lot of chaotic effects. Butterfly krill effect: when a small detail ruins a big deal or A *'s plans* and destroys it. Thus, with *the speed of change* - Φ_x^1, *uncertainty* - Φ_x^2, a high level *of complexity* - of Φ_x^3 the ongoing processes are the main frActals of chaos [1].

Automatically high speed, high uncertainty, high complexity generates a high level of risk.

In general, in chaos the second property Φ_x^2, *is conjugated and follows from the first one* Φ_x^1, *if we do not process uncertainties, then we are late in speed. Lagging in speed, we fail to recognize uncertainties . Thus, we do not delve into the essence of the* Φ_x^3 *complexity of the ongoing processes. This is the frActality of chaos -* $X_o(\Phi_x^1, \Phi_x^2, \Phi_x^3) = (\Phi_x^1)^{1-D} (\Phi_x^2)\, \Phi_x^3$. If here $X_o(\Phi_x^1, \Phi_x^2, \Phi_x^3)$ - denoted as L , Φ_x^1- denoted as χ, and $(\Phi_x^2 \cdot \Phi_x^3)$- denoted as η then we get: $L = \eta \cdot \chi^{1-D}$.

This formula is similar to the formula of B. B. Mandelbrot (Mandelbrot B . B .) [2]. Then the scale of chaos (length) will be the rate of change, and the scale fActor will be the *uncertainty* times the *complexity.*

As you know, the frActal is preserved in any conditions. Based on these considerations, if we define frActals *Ac*, then these frActals retain their properties in the environment of chaos. By adapting these frActals to the conditions of chaos, *Ac* can avoid boncrotism .

To understand this concept, we need to define those frActals *Ac* that could be adapted to the environment of chaos. Since the frActal is a hidden order of chaos.

Thus, *Ac* has the following frActals and we will describe them in detail [3].

The first frActal A with. Let's denote it as - $\Phi^1_{A_c}(\Pi^{A_c}_o)$. As we have already noted, the stable existence of any organizational structure largely depends on its potential $\Pi^{A_c}_o$. And from the use of - the components of this potential in certain ratios, for a given goal - $\Psi_{A_c}(\Pi^{A_c}_o, X)$. The potential of the Active system consists of three components $\Pi^{A_c}_o$: $\Pi^{A_c}_{вн} \& \Pi^{A_c}_{вт} \& \Pi^{A_c}_y$, external potential ($\Pi^{A_c}_{вн}$ Fig.1, 1) , internal potential $\Pi^{A_c}_{вт}$(Fig.1, k) and control potential $\Pi^{A_c}_y$(Fig.1, d) . If we represent the potential and its components *A from the* Active system in the form of a parallelepiped as shown in Fig. 1, f, then the frActality of the potential of the Active system will be visible.

Using this frActal, we can evaluate the condition of sustainable Activity *Ac* , determine the life cycle of Activity *Ac* and choose the beginning of the planning procedure *X* (i.e., the buffering point) of Activity *Ac* .

The second frActal *Ac*, these are control Actions $\Phi^2_{A_c}(U)$: *G (η = f & q),* where *f is* the force of influence, *q* is the depth of influence, in order to successfully complete the plan *X* centerA_c must work out a measure for *U* . Such a measure ensures the effectiveness of the impAct on *Ae* of the Active system, depending on the implementation or non-fulfillment of *X.* Physically, this measure depends on *f in a power-law manner* . Then, from the point of view of frActal geometry, the impAct scale $\eta \in U$ will be the impAct force *f* , and the impAct depth *q* will be the scale fActor. From this point of view, the degree *f* will reflect the frActal dimension *D* of the control Action $U(G)$, which characterizes the degree of increase (or decrease) of the impAct on Ae , taking *into* Account the fulfillment or non-fulfillment of the given plan. This frActal is responsible for ensuring the fulfillment of plan *X* by Active elements *Ac* .

The third frActal $\Phi^3_{A_c}$(*Ac*) is the frActal form of administrative control (FFAK *(Ac)*) *Ac* . Let *'s assume* that *Ac* has a goal $\Psi_{A_c}(X, \Omega)$in the form of plans *X* and a set of Active elements *Ae* performing these plans. Similarly, there is a goal for the Active element $\Psi_{A_3}(x_i, y_i, r_i)$where $x_i \in X$, $y_i \in A$, $r_i \in \Omega$. Due to the difference (non-coincidence of the goal) $\Psi_{A_c}(X, \Omega)$- $\Psi_{A_3}(x_i, y_i, r_i)$there is a need for a procedure for administrative control over the implementation of plan *X by* Active elements *Ac* . Here, *X* is the set of plans *A with* which it must perform; *A* – set of states A_c after impacts *U ; Ω*– set of types A_e . Such a non-coincidence requires the organization of an administrative control procedure (A_{to}) , i.e. $A_{to}: G(\eta) \to \hat{S}$. Here $\hat{S}$ *is* information about the fulfillment or non-fulfillment of the plan by Active elements *Ac* . This information is the "food" for the existence of the system itself, i.e. plays the role of a "synovial membrane" in the self-development of A_s. On the other hand, the frActal-procedure *Ak* , revealing the distortion or non-distortion of information $\hat{S}$, takes into Account the human factor, which plays a significant role in the procedure for making managerial decisions.

Since Ac is systematically analogous in things, then its second frActal $\Phi^2_{A_c}(U)$*,is conjugated and follows from the first one* $\Phi^1_{A_c}(\Pi^{A_c}_o)$*.. If we manage to optimally influence* A_e*, then Ac fulfills plan X, determining by the third fractal* $\Phi^3_{A_c}$*(Ac) non -manipulability* $\hat{S}$ *, we learn that Ac fulfilled or did not fulfill plan X, i.e. A with self - develops or stagnates. The consequence of this is self-organization or self-destruction of structures A with. This is the fractality of the Active system.* Thus, $Ac = (\Phi^1_{A_c}(\Pi^{A_c}_o))^{1\text{-}D} \cdot (\Phi^2_{A_c}(U) \cdot \Phi^3_{A_c}(Ac))$.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

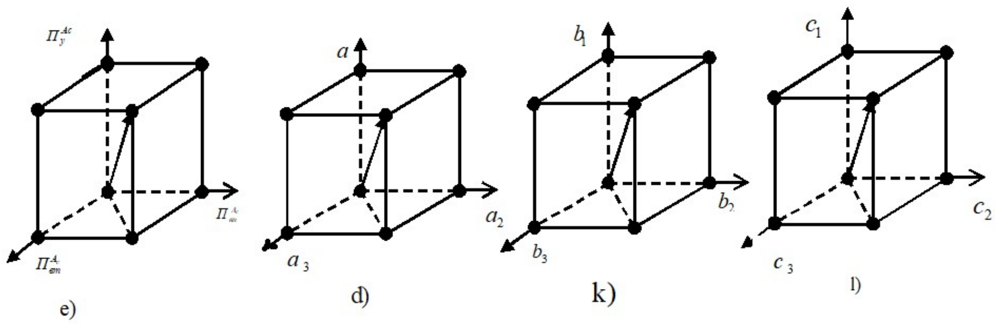

Fig.1. Spatial representation of the potential and its components of the Active system

In this formula, if $(\Phi^1_{A_c}(\Pi^{A_c}_o))$ we denote by the letter χ and ($\Phi^2_{A_c}(U)\cdot \Phi^3_{A_c}(A_k)$) we denote by the letter η , then *Ac* (length L) , will be equal to $= \eta \cdot \chi^{1-D}$. The resulting formula $Ac = \eta \cdot \chi^{1-D}$ will be similar to the formula [2]. Then the scale of the Active system will be its potential, and the scale fActor will be the form of administrative control multiplied by control Actions.

The concept of frActals used in modern economic science, in contrast to frActal geometry, is based on the property of nonlinearity, due to which a part in them is not an exAct , but a similar copy of the whole. The proposed chaos formulas X_o *(* Φ^1_X, Φ^2_X, Φ^3_X*)* and *A with* are similar to some extent

$$(\Phi^1_X)^{1-D} (\Phi^2_X \cdot \Phi^3_X) \sim (\Phi^1_{A_c}(\Pi^{A_c}_o))^{1-D} (\Phi^2_{A_c}(U)\cdot \Phi^3_{A_c}(A_{to})) \quad (1)$$

The prActice of organizational management has Accumulated enough techniques for effective management of the economy, and so on. However , so far, the management of organizations in many ways remains more of an art than a science. And only recently the science of management has come close to the management of organizations - objects that include people as Active elements of the system. All this is connected with the creation of *self-developing Active systems A with* .

In general, the assessment of the effectiveness of *A with* , According to the theory of *TAS* [4,5], is described as follows: The state of the system at the considered moment of time depends on *the* control Actions chosen by the center *A* $\eta \in U(\Pi^{A_c}_y, \text{MB})$, $y = G(\eta)$, where variable $y \in U$, belongs to the admissible set A, MB is the coefficient taking into Account the human fActor. Let's assume that on the set $U \times A$ the functional $\Phi(\Pi^{A_c}_o, \eta, A_\kappa)$ determining the efficiency of the Active system. Value $K(\eta, \Pi^{A_c}_y, A_\kappa) \subset \Phi(\Pi^{A_c}_o, \eta, A_\kappa)$ called management efficiency $\eta \in U$.

Reliability of the results of the study. The developed methodology for evaluating the effectiveness of fractal control of active systems and a set of software tools for activating the control potential made it possible to solve the problems of fractal control of an active system in a turbulent economy. This should be reflected in the assessment of the sustainable activity of A_c and in the subsequent expediency of using the available human resources of the organization.

The practical results of the study are as follows:

fractals A c are disclosed for the first time in the work and on the basis of these fractals a range of estimated indicators for the stable operation of the system is revealed;

a system analysis and processing of data characterizing the essence of the potentials of an active system is proposed;

methodology for assessing the effectiveness of the management of an active system, depending on the fractal form of administrative control;

a software package has been developed to assess the moment of activation of the potential for fractal control A_c.

The scientific novelty of the research is as follows:

For the first time, the concept of determining the fractals of active systems was proposed;

developed a method for assessing the conditions for sustainable activity A $_c$, based on the fractality of its potential;

a method and an algorithm for fractal control based on the activation of the control potential A $_c$ were developed;

The dependence of the effectiveness of management A $_c$ on the fractal form of the administrative control procedure A $_c$ is proved *;*

By solving practical problems , the effectiveness of the proposed concept, methods and algorithms of fractal control is substantiated.

The aim of the work is finding the ratio of potential components Π_o^{Ac} of the Active system and the criterion for *FAK* , which maximized the value of its efficiency, i.e.

$$\eta^* \in Argmax\, K(\eta, \Pi_y^{Ac}, A_K) = \{\eta \in U | \forall\gamma \ \cup K(\eta, \Pi_y^{Ac}, A_K) \geq K(\gamma, \eta, \Pi_y^{Ac}, A_K)\}$$
(2)

2. SOLUTION METHOD

Let us emphasize that the founder of the theory of the frActal fActory, H. Yu. Warneke , paid special attention to the problem of interconnections between frActals that solve the problems of their functioning on the basis of the mutual provision of services. According to the logic of the researcher, in the interAction between frActals, different groups are formed that have their own structures, but work “in the same team”, collectively representing the so-called frActal fActory. The effectiveness of the "frActal" ensures the ability of all team members to self-organization, self-discipline and self-control. This ability is based on work morality and ethics developed in economically developed countries during several decades (or maybe centuries) of the existence of civilized business there. FrActality gives companies the ability to self-organize, similar to that possessed by biological systems [6] .

It would be interesting to understand how the self -development of *Ac* $_{occurs}$. This follows from the frActality of *Ac* , on the other hand, self-organization is Aconsequence of self-development, i.e. self-development of an Active system leads to self-organization of structures *Ac* . By its own logic , *A* develops itself when its potential $\varPi_o^{A_c}$ increases. This increase is associated with the effective implementation of plan *X.* For each increased potential *(* $\varPi_o^{A_c}$ *)* $_i$ an increased plan (*X*) $_i$ $_{is\ built}$. To execute this plan will require $_{qualified}$ *Ae* etc. As a result , *A* self-organizes . Let us estimate the condition of such a procedure for an Active system. The proposed concept for solving the problem is intuitive and heuristic. The solution of prActical problems showed the objectivity of the proposed concept [7,8,9].

It is clear that after the start of Activity *Ac,* $_{the}$ center will use components $\varPi_o^{A_c}$ in different ratios depending on the plan *X* and the type *y = G (η)* of control Actions to fulfill the adopted plan *X* . Based on this plan, *D is chosen* .

Components of internal capAcity $\varPi_{вт}^{A_c}$ systems can be conditionally grouped into the following three interconnected quantities *b* $_1$ *, b* $_2$ *, b* $_3$. These components are the basis for Activation $\varPi_y^{A_c}$. Thus: *b* $_1$ - *personnel resource* ; *b* $_2$ - *technological resource* ; *b* $_3$ *– administrative control resource* . The unity of these three components (Fig. 1, k) makes up the internal potential *Ac* and ensures the Activation efficiency $\varPi_y^{A_c}$.

The components of the external potential $\varPi_{вн}^{A_c}$ affect the evaluation $\varPi_{вт}^{A_c}$ and Activation $\varPi_y^{A_c}$ of the Active system at the moment. These components can be conditionally expressed through three tools *with* $_1$ *, with* $_2$*, with* $_3$ *: with* $_1$ *- resource potential* ; *s* $_2$ *– opportunities for Access to new technologies* ; *c* $_3$ *- market Access opportunities* . The unity of these instruments expresses the external potential *Ac* . Figure 1 shows that the potential $\varPi_o^{A_c}$ has a frActal appearance.

frActal structure of the potential *Ac* makes it possible to create a model of a frActal control system. The essence of such Acontrol model is considered in [10]. In addition, this model demonstrates amazing survivability in any business environment, both orderly and chaotic. Such survivability depends on the choice of the type of control Actions. This is Akind of one of the initial conditions for the effective existence of *Ac* in Achaos environment. This is reflected in the next theorem. This theorem considers a variant of the orientation of Activity $\varPi_{вн}^{A_c}$ *. A with*

Theorem 1. If we use $\varPi_{вн}^{A_c}$ - as scale 1, then the internal potential must be used 1.6 times more than $\varPi_{вн}^{A_c}$, and the control potential $\varPi_y^{A_c}$ must be used three times more than $\varPi_{вн}^{A_c}$ and two times more than $\Pi_{вm}^{A_c}$, then for a given D_η, the following condition is fulfilled:

$$\eta^* \in Argmax\, K(\eta, \Pi_y^{Ac}, A_\kappa) = \{\eta \in U | \forall \gamma \cup K(\eta, \Pi_y^{Ac}, A_\kappa) \geq K(\gamma, \eta, \Pi_y^{Ac}, A_\kappa)\}$$

Proof. Let us represent the potential *Ac* as a volume.

$$V_c^{\Pi_o^{Ac}} \approx (V_{BH}^{\Pi_{BH}^{Ac}} + V_{BT}^{\Pi_{BT}^{Ac}} + V_y^{\Pi_y^{Ac}}) \qquad (3)$$

It follows from frActality Π_o^{Ac} that when planning Activity *Ac*, plan *X* can correspond to this volume or be less, and so on. All this depends on the center of the Active system. Regardless of what part of the volume $V_c^{\Pi_o^{Ac}}$ will be the plan *X*, equality (4) must be satisfied. Let 's say *X* is 1/2, 1/4, 1/8 of $V_c^{\Pi_o^{Ac}}$. For (6) these cases, we write equations (6), based on Theorem 2:

1. 1/2($V_c^{\Pi_o^{Ac}}$) $_1$ = 1/2($V_{вн}^{\Pi_{вн}^{Ac}}$) $_1$ + 1.6/2($V_{вm}^{\Pi_{вm}^{Ac}}$) $_1$ + 2.56/2($V_y^{\Pi_y^{Ac}}$) $_1$ ≈ 2.58
2. 1/4 (·,·) $_2$ = 1/4(·,·) $_2$ + 1.6/4 (·,·) $_2$ + 2.56/4(·,·) $_2$ ≈ 1.29 (4)
3. 1/8(·,·) $_3$ = 1/8(·,·) $_3$ + 1.6/8(·,·) $_3$ + 2.56/4(·,·) $_3$ ≈ 0.64
4. 1/16(·,·) $_4$ = 1/16(·,·) $_4$ + 1.6/16(·,·) $_4$ +2.56/ 16(·,·) $_4$ ≈ 0.322

Now consider the capAcity of these volumes to each other.
(·,·) $_1$ /(·,·) $_2$ ≈2; (·,·) $_1$ /(·,·) $_3$ ≈4; (·,·) $_1$ /(·,·) $_4$ ≈8. 2)(·,·) $_1$ /(·,·)2≈2; (·,·) $_2$ /(·,·) $_3$ ≈2;(·,·) $_3$ /(·,·) $_4$ ≈2 (5)

From (5) it can be seen that the capAcity of the volumes is a multiple, i.e. performed. This *means* that *Ae*xecute plan *X.* (5) can be called Acondition for the fulfillment of the plan or an initial condition for self -development *Ac* .
The theorem has been proven.
(5) shows a series that can be used to calculate the frActal dimension *D* . Planning by Theorem 1, when using 1/2, 1/4, 1/8 of the potential $\Pi_o^{A_c}$, the frActal dimension will be $D \approx 0.5$.
Expression (6) shows that the fulfillment of plan *X* determines the self -development of *Ac* . In turn, self-development has A certain orientation, i.e. it will be focused on one of the components of the potential of the Active system (Fig. 2).

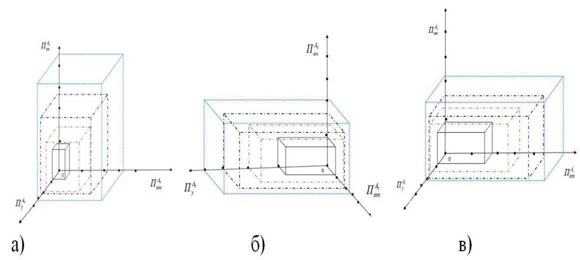

Fig. 2 Landmarks of self -development *Ac*

Expanding the capAcity $\Pi_o^{A_c}$ of an Active system automatically leads to a self-organizing structure *A with* . Since the new potential *Ac* will need a new planning procedure. In this case, more qualified Active elements *Ae* will be needed, these Active elements will need a new type of control Actions (*G (η)*) $_i$ and, finally, *FAC* will also be of a different level. As a result, the Active system automatically self-organizes . This is the procedure “self-development → self-organization”. Let's denote this procedure as:

$$\rho :(\eta)_i \rightarrow X_i, (6)$$

where ρ is called the coefficient of self-development. This procedure geometrically expresses the expansion of the $V_c^{\Pi_{A_c}}$ volume of the parallelepiped (Fig. 1, f). And the expansion of the parallelepiped means an increase in the potential *Ac* . Such an extension of the parallelepiped can be infinite. On the other hand, formula (6) expresses frActality $\Pi_o^{A_c}$, and from this expression it can be seen that the expansion of the scope of the organization's potential $\Pi_o^{A_c}$ provides self-development *Ac* .

On fig. 2a shows self-development focused on external potential $\Pi_{вн}^{A_c}$. On fig. Figure 2b shows self-development oriented towards potential management $\Pi_y^{A_c}$, Figure 2c shows self-development oriented towards internal potential $\Pi_{вm}^{A_c}$.

Journal of Theoretical and Applied Information Technology
15th August 2022. Vol.100. No 15

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Then the properties of susceptibility to the effects of U in Ae causes the following natural reactions:

a) resistance arises when the goals of Ae and the center do not coincide. This parameter will be denoted as $S = \{s_1, s_2, ..., s_n\}$;

b) selectivity appears if $f \rightarrow \max$. This parameter will be denoted as $I = \{i_1, i_2, ..., i_n\}$;

c) uncertainty arises when $f \rightarrow \max$ and $q \rightarrow \min$ or $f \rightarrow \min$ and $q \rightarrow \max$. This parameter will be denoted as $N = \{n_1, n_2, ..., n_k\}$;

d) Activity occurs when if the goals of Ae and the center coincide. Let's denote this parameter as $A1 = \{a1_1, a1_2, ..., a1_l\}$

When the center produces the impAct U, i.e. the center begins to control, then for *A with* Acontrol model there will be $U : G \rightarrow X$, or

$$U(f \& q) : (G \rightarrow S) \& (G \rightarrow I) \& (G \rightarrow N) \& (G \rightarrow A1)) \rightarrow X \quad (7)$$

Formula (7) shows that in A_c management is the impAct on the Active elements of the Ae system in order to fulfill the set plan X and generate an entrepreneurial socio-psychological atmosphere with such an impAct. On the other hand, in order to successfully complete plan X center *A with* must develop a measure of the selected impAct on Ae, depending on the implementation or non-fulfillment of X. Not fulfilling the plan is a signal of the need for organizational changes in the structure of Ac. Organizational change can only be successful if the emotional and behavioral aspects are given as much attention as the production ones. Here is a very difficult moment, it is to recognize the reason for the non-fulfillment of the plan by Active elements. Such recognition is similar to the assessment of the controllability of Active elements.

If we meaningfully analyze the parameters *S, I, N, A1*, then we can evaluate the controllability of the Active element Ae. As established, each parameter of the reaction Ae to *G (q & f)* captures a specific Action of the control object, and the Actions can be both general and specialized, related to the professional field of Activity. Each parameter also has, in addition to the code, an estimate that characterizes the result of the execution x_i management object, which is appointed by the person responsible for the work of personnel. Using the assigned numerical estimates obtained by the subject of control (Table 1), we calculate the high-level parameters *S, I, A1, N* According to the formulas

$$S_{cp}^{P_i} = \frac{\sum_{i=1}^{k} A_i^{P_i}}{k}, \quad I_{cp}^{P_i} = \frac{\sum_{j=k+1}^{l} A_j^{P_i}}{l-k}, \quad N_{cp}^{P_i} = \frac{\sum_{m=l+1}^{n} A_m^{P_i}}{n-l}, \quad A1_{cp}^{P_i} = \frac{\sum_{f=n+1}^{h} A_f^{P_i}}{h-n}, \quad (8)$$

where Pi – i-th assessed Active element of the organization;

k,l ,n,h - the number of corresponding primary estimates included in the corresponding parameter (see Table 1).

Using the final values of the parameters *S, I, A1, N*, one can obtain an integrated assessment of the *MC* (a measure of the susceptibility of the control Action), which comprehensively assesses the controllability of the Active element, structure and organization as a whole. This estimate serves as Akind of indicator characterizing the controllability of Ac.

Naturally, if an employee of an organization does not willingly fulfill his duties, then he has *S →max*, which may result in *A1 →min* (Fig. 5., option 3). Undoubtedly, if an employee does not perform his duties willingly, he may want to change his plAce of work (he is not satisfied with working conditions , salary or other reasons). In this case, it will have N →max . If he has found a new job, then in the organization where he works, the parameters are I →min , N →max . Based on the changes in these parameters, the head of the organization can draw the appropriate conclusions.

The most characteristic reaction of subordinates, which appears in case of contradiction, is resistance S , selectivity I , Activity A 1, uncertainty N to the contradiction of managerial Actions (Fig. 2).

Table 1. Primary Parameters For Assessing Ae

I. Estimation parameter name		*II. The code*	*III. Grade*
IV. S	*V. Refusal of an employee to be transferred to another locality together with the organization*	*VI. A2*	*VII. 0.5*
	VIII. Refusal to continue work due to changes in working conditions	*IX. A3*	*X. 0.5*
	XI. . . .	*XII. . . .*	*XIII. . . .*
XIV. I	*XV. Rejection of innovation*	*XVI. A33*	*XVII. 0.5*

	XVIII. Disclosure of information entrusted to an employee containing state, official or legally protected secrets	*XIX. A6*	*XX. 1.0*
	XXI. . . .	*XXII. . . .*	*XXIII. . . .*
XXIV. N	*XXV. Absence from work (partial absenteeism)*	*XXVI. A0*	*XXVII. 0.25*
	XXVIII. More than 15 minutes late	*XXIX. A1*	*XXX. 0.1*
	XXXI. . . .	*XXXII. . . .*	*XXXIII. . . .*
XXXIV. A 1	*XXXV. Exemplary performance of work duties*	*XXXVI. A 8*	*XXXVII. 0. 5*
	XXXVIII. Continuous improvement of product quality	*XXXIX. A 12*	*XL. 0.1*
	XLI. . . .	***XLII. …***	***XLIII. …***

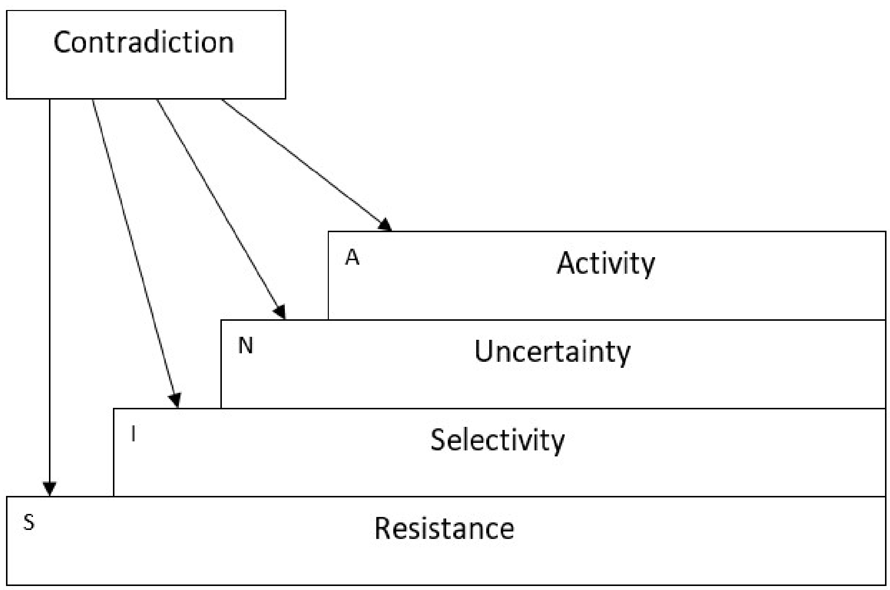

Fig 3.Stages Of Communication

A contradiction is the result of the interaction of parties with different degrees of perception and assessment of the same phenomenon or object, which at the same time are in internal unity (within the same system) and are a source of development and knowledge. In administrative control, the contradiction is characterized by the mechanism of the susceptibility of the MV, the emerging communication based on the MV coefficients, i.e., MV communication. We will show an assessment of the controllability of the hierarchical structure of the organization as based on MW communication.

THE manager, the level of contradictions is an assessment of the manageability of the organization. A correct assessment of the appropriate level of contradictions can improve the manageability of the organization. The question arises, how can such communication be carried out?

A. *MW-coefficient , is an integrated assessment of controllability. Under it we will understand the number that characterizes the degree of susceptibility Ae to the control Action . So, if the mechanism of susceptibility Ae is denoted by* MB^{P}_{e} *and the signs are* $\alpha^{I,N}_{S,A\,1}(Ae, k_e)$*, then the controllability of Ae will be equal to* M^{P}_{e} *if* $\alpha^{I,N}_{S,A\,1} \in M$*. It is obvious that the manageability of personnel* M^{P}_{e} *will be a function* $\alpha^{I,N}_{S,A\,1}$*, those. if we designate the controllability process as U ,* *then*

$$B.\ U = M_e^P(\alpha_{S,A1}^{I,N}(a_{e,k})),$$

(nine)

$$MB^{C_t} = f(\sum MB_e^P 0)$$
$$MB_{opг} = f(\sum \sum MB_{C}{}^{t}(MB_{AЭ_C^O})) \quad (10)$$

where U is A coefficient that characterizes the process of controllability of the organization;

MB^{C_t} - the degree of susceptibility of the structure of the organization to the control Action;

MB $_{org}$ - coefficient characterizing the controllability of the organization.

Specify the steps for calculating the controllability of an organization

At this stage of the algorithm, the average value of the reaction of one employee to the impacts over A certain period of time is calculated, denoted as s $_{cp}$ ^{P} i , i $_{cp}$ ^{Pi} , n $_{cp}$ ^{Pi} , a 1 $_{cp}$ ^{Pi} are the integrated assessments of the employee of the organization:

$$S_{cp}^{P_i} = \frac{\sum_{d=1}^{e} S_{a_{d,k}}^{P_i}}{|e|};$$

$$I_{cp}^{P_i} = \frac{\sum I_{e+m,k}}{|m|}; \text{(eleven)}$$

$$N_{cp}^{P_i} = \frac{\sum N_{e+m+n,k}}{|n|};$$

$$A1_{cp}^{P_i} = \frac{\sum A1_{e+m+n+t,k}}{|t|}.$$

3. . After calculation $A1_{AЭ_c^j}^{cp}$, $S_{AЭ_c^j}^{cp}$, $I_{AЭ_c^j}^{cp}$, $N_{AЭ_c^j}^{cp}$ for each employee, the coefficient is determined $MB_{AЭ_c^j}$:

$$MB_{AЭ_c^j} = A1_{AЭ_c^j}^{cp} - \frac{S_{AЭ_c^j}^{cp} + I_{AЭ_c^j}^{cp} + N_{AЭ_c^j}^{cp}}{3}. \quad (12)$$

Here the indices j , c correspond to a specific AE, which is part of the AS structure of the organization, for example Sidorov N. - j =1, c =1, Ivanov P. - j =2 and c = 1 etc.

4. Numerical determination of the controllability of the AE gives us the opportunity to evaluate the controllability of the structure of the MA $_{\text{from the}}$ organization in which the AE operates.

For this $A1_{AЭ_c^j}^{cp}$, $S_{AЭ_c^j}^{cp}$, $I_{AЭ_c^j}^{cp}$, $N_{AЭ_c^j}^{cp}$ are calculated as follows:

$$A1_{AЭ_c^j}^{cp} = \frac{\sum_{n=1}^{k} A1_{AЭ_c^j}}{k};\ S_{AЭ_c^j}^{cp} = \frac{\sum_{n=1}^{k} S_{AЭ_c^j}}{k};$$

$$I_{AЭ_c^j}^{cp} = \frac{\sum_{n=1}^{k} I_{AЭ_c^j}}{k};\ N_{AЭ_c^j}^{cp} = \frac{\sum_{n=1}^{k} N_{AЭ_c^j}}{k}; \quad (13)$$

where k is the number of employees who are part of A certain structure of the organization ;

MB coefficient $_{\text{with is}}$ calculated as :

$$MB_c = A1_{AЭ_c^j} - \frac{S_{AЭ_c^j} + I_{AЭ_c^j} + N_{AЭ_c^j}}{3}), \quad (14)$$

where t =1,2,3…m is the number of structures that make up the organization.

5. At this stage, the MB coefficient is calculated, designated MB $_{org}$ – A coefficient that characterizes the manageability for the entire organization as a whole and is calculated as the arithmetic mean MB ^{Ct}, i.e.

$$MB_{opг} = \frac{\sum_{t=1}^{m_1} MB^{Ct}}{m_1} \quad (15)$$

According to the value of MB $_{org}$, it is very easy to determine in which manageability zone the organization is located.

Consider the application of this algorithm on a particular example of a hypothetical organization, which includes two structures (departments) O $_1$ and O $_2$. Each department has 5 people. Let us follow the whole process of operation of the controllability assessment algorithm for a given organization. As noted, the whole process consists of five interrelated successive stages. The execution of each stage depends on the results obtained in the previous stage.

At the first stage, the formation of the initial data is carried out, which serve as the foundation for the further execution of the algorithm. The result of this stage is the formation of a table containing a set of reactions of each employee of the relevant department to the control Action from the decision maker, expressed in a numerical value that varies from 0.0 to 1.0. The filling in of this table with the assignment of the corresponding numerical values for each parameter included in the set of assessments (see Table 2) for eaimch employee of the departments of the organization is

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

carried out by the employee responsible for the formation and management of the personnel of this organization. The table contains psychological and labor indicators that characterize both the socio - psychological state of the employee and his labor indicators, as well as the relationship between these characteristics (Table 3).

Table 2. Psychological And Labor Indicators Of Department Employees

The code employee	(1)	The Department	b)	A 2	…	At 1	At 2	…
10	Sidorov N.	O1	0.5	0.3	…	0.7	0.6	…
eleven	Ivanov S.	O1	0.3	0.75	…	0.6	0.4	…
…	…	…	…	...	…	…	…	…
twenty	Petrov V.	O2	0.7	0.6	…	0.5	0.3	…
…	…	…	…	…	…	…	…	…

At the second stage of the algorithm, the values of the reaction of each employee of the department are calculated, expressed in the parameters S , I , N , A 1 According to the formula (2.3) . The result of this stage is a table containing the numerical values of the characteristics S , I , N , A 1 for each employee (Table 3) .

Petrov N .: S=0.2, I=0.3, N=0.1, A1=0.75.

Table 3. Manageability Options For Department Employees

Full name	**The Department**	**S**	**I**	**N**	**A1**	**MB $^{P}_{e}$**
Petrov N.	XLIV. ABOUT 1	0.2	0.3	0.1	0.75	1.9
Ivanov S.	XLV. ABOUT 1	0.5	0.6	0.2	0.5	0.87
Abduvaliev G.	About 1	0.3	0.8	0.6	0.5	2.1
Rakhimov N.	About 2	0.5	0.6	0.65	0.8	1.4
Buranov V.	About 2	0.8	0.4	0.3	0.45	0.48
Valiev F.	XLVI. ABOUT 2	0.6	0.6	0.8	0.3	0.94

S=0.2 – “parameter characterizing the employee's resistance”. This indicator is low. This suggests that this employee is satisfied with the leadership style, he receives Acompletely Acceptable level of control that does not cause a negative reaction, he is loyal to the management. This parameter serves as an indicator of the decision maker for changing or adjusting the management style or adjusting working conditions for a particular employee.

I=0.3 is a parameter that characterizes the selectivity of an employee. It is closely related to the previous one by a directly proportional dependence and shows the psychological state of the employee. With a high level of parameter S, the natural reaction of the employee will be selective performance of their job duties, evading work, and even, possibly, finding or leaving for another employer. In this case, the value of this parameter is at a low level, which indicates a stable psychological state of the employee, conscientious performance of his duties.

N=0.1 is a parameter that characterizes the uncertainty of an employee in relation to both the goals of the organization and the organization as a whole. This parameter is also directly proportional to the previous parameters. It shows the

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

psychological state of the employee and his attitude to the organization and the prospects for its development. A high level indicates that the employee is in an uncertain state, i.e., in a state of choice between his own benefit or goals and the goals of the organization. This parameter serves as an indicator for decision makers about the incorrectly set process of stimulating employees, the prospects for their development and professional growth. In our case, this parameter is at a low level. This suggests that the employee is satisfied with the level of stimulation of employees and professional growth.

A1=0.1 is a parameter characterizing the Activity of an employee both in the cultural life of the organization and in production.

It should be noted that it is not difficult to take into Account these characteristics of the decision maker for a small organization, where there are no more than 20 employees , but the task becomes much more complicated with an increase in the number of employees. Therefore, it is necessary to introduce a parameter that gives a generalized description of the contribution of each employee to the organization, expressed as a single numerical value, which fAcilitates the perception of this parameter and its interpretation. Thus, the task of the third stage is to calculate the MC coefficient (a measure of susceptibility to the control Action) for each employee of the department. The MV coefficient is a generalizing characteristic of all aspects of the labor, psychological and social indicators of an employee of the department and is calculated by the formula (14).

At the fourth stage, based on the set of values of the parameters S, I, N, A1 of the employees of the department, the characteristics of the parameters for the department as a whole are calculated. Calculations are made According to the formula (5), which characterizes each parameter as the arithmetic average of the totality of values of the corresponding parameter of employees of the organization structure, to the number of employees included in this structure (Table 4). The calculation results are entered in Table 4, which shows the predominance of certain parameters for the structure as a whole.

Table 4. Governance Settings For The Structures That Make Up The Organization

The Department	S	I	N	A1
About 1	0.33	0.57	0.3	0.58
About 2	0.63	0.53	0.58	0.52

At this stage, the MC coefficient is also calculated, which characterizes the state of manageability for each structure of the organization. The decision maker, using this indicator, can charActerize the state of affairs in a particular department and, based on this assessment, develop a specific management decision (Table 5 , Table 6).

Table 5 Values Of The "Measure Of Susceptibility" Parameter For Departments

The Department	S	I	N	A1	MV ^{Ct}
About 1	0 . 33	0 . 57	0 . 3	0 . 58	1 . 46
About 2	0 . 63	0 . 53	0 . 58	0 . 52	0 . 86

The last stage is the calculation of the MV $_{org\ parameter}$, which is an integrated assessment of the state of controllability for the organization.

Table 6. Governance Parameters For The Organization As A Whole

S	I	N	A1	MV $_{org}$
0 . 48	0 . 55	0 . 44	0 . 55	1 . 16

Based on the value of this parameter, the decision maker decides on the need for preventive measures to stabilize and improve the manageability situation in the organization. So, for example, if the value of $MV_{org} < 1.0$, this characterizes the manageability of the organization as low, which signals the decision maker about the need to change the management style. In our case, at MV $_{org}$ = 1.16, it signals a normal state of controllability, but at the same time, the value of the parameter indicates that the controllability

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ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

situation is approAching Acritical level, which in turn requires the decision maker to develop an appropriate management decision.

The conceptual model of the algorithm for calculating the manageability of an organization is shown in fig. 3.

In order to assess the degree of controllability of the organization, management must promptly assess the socio-psychological state of each structure of the organization, personnel, each working in this structure. The evaluation process begins with determining the manageability of each employee. For example, the reaction of personnel to the impAct is determined as follows. The coefficients *I , S, A1, N* are estimated in the range from -1 to +1. After scaling , these coefficients are calculated $\mathrm{MB}_{\mathrm{A}_э}$ for the staff , $\mathrm{MB}_{\mathrm{A}_{ст}}$ for the structure of the organization, and $\mathrm{MB}_{\mathrm{A}_c}$ for the entire organization (Fig. 3).

Undoubtedly, the effectiveness of such communication is very high . In *MW* communication, the most crucial moment is filling the D base (Fig. 3). It is this that determines the effectiveness of the administrative control procedure *Ato* . Naturally, the bias of administrative control has a negative effect on the efficiency of the center. Only when monitoring the fulfillment or non-fulfillment of plan *X by* Active elements $\mathrm{A}_{э_i}$, the so-called human fActor in the Activity of *Ac* *is revealed* . *Center A , analyzing the bases A, B, C, E, can understand the socio- psychological state of A, bypassing intermediate levels. All this significantly reduces the time for communication with subordinates.* Thus, the center takes into Account the human fActor in the Activity *of Ac* . If we visualize the values of *MW* , MB_n^0, MB_n^p on the screen, then looking at these values, everyone $\mathrm{A}_{э_i}$ can evaluate their social position in the team.

Suppose the head of the organization is informed that the manageability of the organization is weak (see Figure 2.3.6), i.e.

MW =0.25. After that, he will need to find out the reason for this situation. On the basis of *MW* - communication (Fig. 2.3.6), it reveals the structure, in which *MW* 0 *is* the smallest. This turned out to be a section1, MB_1^0 (Fig. 3). Further, as shown in the figure, we come to part B, where the manager reveals which parameter MB_1^0 turned out to be low. In our case , this is S=0.47. After identifying this parameter, the manager opens base B.

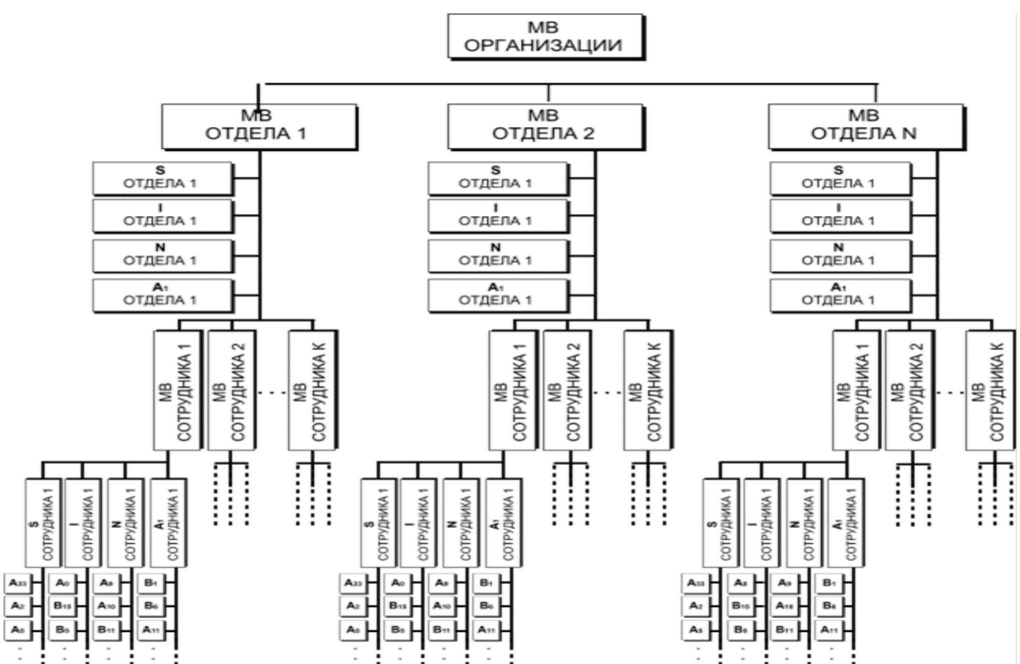

Fig.4. Schematic Algorithm For Assessing The Manageability Of An Organization

Journal of Theoretical and Applied Information Technology
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ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

With this approAch, to the assessment of controllability, the verbality of the assessment of the reaction of the Active element *Ae* organizations on control Actions. In turn, such an algorithm significantly reduces the time for communication with subordinates for the center $_A$ and *eliminates* the manipulation of information $\hat{S}$.

Thus, *control communication* is the exchange of information , on the basis of which the center *Ac* receives the data necessary for making effective management . lensky decisions, and brings them to the employees of the organization. The term "communication" comes from the Latin " communes " - meaning "general". At the same time , the one who transmits information tries to establish a “commonality” with the recipient of information. From here, communication can be defined as the transfer not just of information, but of meaning or meaning by means of symbols; communication should be considered as a phenomenon and as a process. As a phenomenon, communication is the established norms (rules, instructions, regulations) of interAction between people. These relationships can be charActerized either by the full support of colleagues, managers or subordinates, or by the presence of contradictions between them. The leader, making a decision and implementing it among his subordinates, colleagues and senior managers, must manage the reactions: either full support or manifestations of contradictions.

In administrative control, the contradiction is charActerized by the *MW parameter* , the emerging communication based on the *MW parameters* , i.e. *MV communication.* Let us show an assessment of the controllability of the hierarchical structure of the organization as based on *MW* - communication.

WITH THE degree of contradictions for the leader are the assessment of controllability *Ac* . Acorrect assessment of the corresponding level of contradictions can increase the controllability of the work A with . The question arises, how can such communication be carried out?

Another variant. Let us assume that the employee conscientiously performs his duties. All the conditions created for him in this organization satisfy him. In this case $S \to min$, $I \to min$, $N \to min$, $A1 \to max$. Z starts, the organization is working normally and $MW \to 1.0$. If, for example, an employee receives an offer to move to another plAce of work, where conditions are much better than in the organization where he works, then automatically the parameter *I* will tend to the maximum $I \to max$, i.e. he starts choosing terms. The consequence of this will be the tendency of the parameters $S \to max$, $N \to max$, $A1 \to min$.

Schematically, the dependence of controllability on the value of parameters *S, I, N, A 1* is shown in fig. 4.

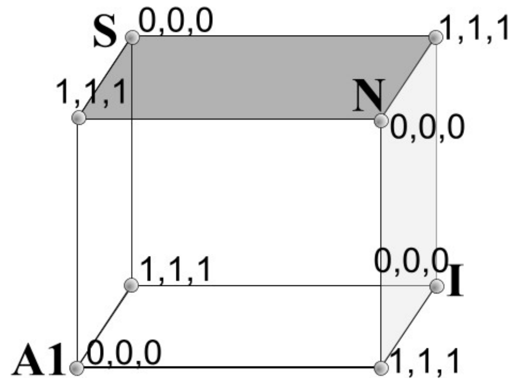

Fig. 5. Spatial Connection Of Parameters S, I, N, A1

In this case, the head of the organization must understand that his employee has found a new job. This behavior of the parameters *S, I, N, A1* indicates that they are interconnected in a spatial way that can be represented in three dimensions. If we assume that when these parameters are encoded, they change from 0 to 1, then we get a single cube, shown in Fig. 3. There are four zero vertices and four unit vertices.

After such a socio-economic assessment of the parameters, one can proceed to the algorithmization of the process of assessing the manageability of an organization.

But here we wanted to note that it is the expression $(F \& G) \to S$, $(F \& G) \to I$, $(F \& G) \to N$, $(F \& G) \to A1$ that quantifies the relationship of a person (subordinate) with an organization (leader). The strength of the influence F lies in the regulations for the existence of *Ac* (for example, the mode of operation within the AS; rules for leaving work, etc.), and the depth G contains various methods of stimulating *Ae* (for example, bonuses, promotions, etc.). d.). Collectively _ F & G these Activities will be the control Action, i.e.:

a) the state of good relations between *Ac* and *Ae* :

S → min ,	A1 → max ,	I → max ,	N → min
F → max, G → max	F → max, G → min	F → max, G → max	F → min, G → min

b) the state of bad relations between A_s and Ae :

S → max	A1→ min	I → max	N → min ,

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

F → min,	F → max,	F → max,	F → min,
G → min	G → min	G → max	G → min

It is with this algorithmic technology for estimating the parameters S , I , N , A 1 that the manager has the opportunity to informatize administrative control. On the other hand, the manager can also find out the reason for the different behavior of the employee without communicating with him. Naturally, this will drastically reduce the time he spends on communication. Depending on the value of the assessments, the manager can also find out the degree of controllability of each AE of the organization. Naturally, the leader must be well aware of the relationship between the parameters S , I , N , A 1 , i.e. in time to recognize the reason for the change in the values of these parameters depending on each other .

As noted, the center spends 50 to 90% of all time on communication[11]. This seems incredible, but it becomes clear when you consider that the center does this to fulfill its roles in interpersonal relationships, information exchange and decision-making processes, not to mention the managerial functions of planning, organizing, motivating and controlling. Further, the exchange of information occurs in all major types of management Activities. Let's call such a process *impAct communication* . In order to effectively implement influencing communication, we need to algorithmize the assessment of socio-economic, psychological parameters that charActerize the relationship *Ae* to the interests *Ac* . Such characteristics can be socio-psychological parameters, charActerized by the parameters *S , A 1, N , I* . In prActice, such parameters may be as presented in Table 1.

It must be remembered that each head of structure A with , filtering information, tries to cut off what presents him in an unfavorable light, and introduce what emphasizes his successes, i.e. manipulation of information $\hat{S}$ begins. Subordinates often exaggerate their Achievements and hide shortcomings. Since their future career depends on the manager's assessment of their contribution to the affairs of the organization. However, distorted information $\hat{S}$ reduces the effectiveness of the organization 's management .

In order to numerically estimate the degree of self-development for *Ac* ensuring the stability of an Active system in Achaos environment, we analyze the planning procedure π in *Ac* [12].

Plan *X* consists of $\{ a_{ij} (x_j)\}$ - parts, here x_j □□*X* - the content of the plan, *and* $_i$ - *i* -th part of this plan. On the other hand, *X* must be completed by a given deadline $t = \{ t_1 , t_2 , t_3 , ...\}$. We will express the parts of the plan to be completed by the given deadline as $a_{11}{}^{t\,1} (x_1) \in x_j - a$, part of the plan *X* , executed in time t_1 Active element *Ae* . Thus , the center *Ac* specifies a set of plans which the elements of the Active system *Ac* must perform at a given time t :

X \u003d $\{ a_{11}{}^{t\,1} (x_1), a_{22}{}^{t\,2} (x_2), ..., a_n{}^{tn} (x_n{}^n)\}$, here $t = t_1 + t_2 + ... + t_n$.

After that, the leaders of structure *Ac* distribute these plans to *Ae* $_{\text{-there.}}$ At the same time, the leaders of structure *Ac* must clearly formulate the contents of the plans $x_1 , x_2 , ... x_n$ which Active elements *Ae* must perform within a given period as follows:

$x_1{}^{tl} = b_1$ $\quad$ t_1 *time*

$$t_1 = t_1^1 + t_1^2 + \ldots + t_1^e ;$$

$x_2{}^{tl} = b_2$ $\quad$ t_2 *time*

$$t_2 = t_2^1 + t_2^2 + \ldots + t_2^{ж} ;$$

$x_k{}^{tk} = b_k$ $\quad$ t_k *time*

$$t_2 = t_K^1 + t_K^2 + \ldots + t_2^K ;$$

Here b_k is the content of the plan x_k , x_k □□*X*, $t = t_1 + t_2 + ... + t_k$ total time to complete the job $\{ b_1 , b_2 , ... b_k \}$. C other sides b_k □□*B* the work that is the content of plan *X* is divided into parts $b_1 = b_1^1 + b_1^2 + b_1^3 \ldots + b_1^n$ and requires A certain period of time t_k to perform these parts of the work b_k . So plan *x* will be a function, *B* And *t* , i.e. *X (B , t)*.

Based on the above considerations, the planning procedure $\pi{:}\hat{S} \to X$ present in tabular form. (2).

This table expresses the balance of the execution of plan *X by the* Active elements of *Ae* organization at a given time. And the condition for the execution of the plan is expressed by the procedure: $And_{to} : G (\eta) \to\_ \to \Pi_y^{A_c}) \to X)$.

This procedure is a mechanism that provides synergy in the structure of *A with* [2,19].

Active element *Ae* will execute the plan x_j which is reflected in the message s_j'', *X (B , t)* on the message s_i' . message that the element *And* $_e$ fulfilled the plan x_i , will be reflected in the

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ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

message s_j''. resultant *the* message $\hat{S}$about the completion of plan *X* will be:

$$\hat{S}= \sum_{c=1}^{n}\left(s_c''\right) = \cdot \sum_{i=1}^{n}\left(s_i''\right) \cdot \quad (10)$$

Below we show the difference between $s_j''$and s_i'. s_j''- information about the fulfillment or non-fulfillment of a part of the plan, and s_i'-information about the fulfillment or non-fulfillment of the content of the plan (tab. 2). The content of the plan means, for example *And* $_{According}$ to the plan, in time t $_1$, make *M* quantity of goods with *N* quality. And this plan is *x* $_{i\ part}$ of the overall plan *X*. Here Ac_{an} do *M* but

N -1 quality. In this case, s_j''- expresses that *Ae* fulfilled *x* $_i$ parts of the plan *X* , and s_i'-expresses that *Ae* fulfilled the content of the plan on *N -1* , then it s_i'will already be $s_i' - 1$.In the recognition of this information and is *the FAC function* .

Table 2.

Ah_{-i}	X^{ti}	b	b^{1}	b^{2}	b^{3}	…	b^{n}	$\sum_{i=1}^{n} b_i^i$	$\hat{S}$
Ah_{-1}	$x_1^{t_1}$	$b_1(t_1)$	$b_1^1\ (t_1^1)$	$b_1^2\ (t_1^2)$	$b_1^3\ (t_1^3)$	…	$b_1^n\ (t_1^n)$	$\sum_{m=1}^{n} b_1^m$	s_2''
Ah_{-2}	$x_2^{t_1}$	$b_2(t_1)$	$b_2^1\ (t_1^1)$	$b_z^2\ (t_1^2)$	$b_z^3\ (t_1^3)$	…	$b_2^n\ (t_1^n)$	$\sum_{m=1}^{n} b_2^m$	s_2''
…	…	…	…	…	…	…	…	…	…
Ah_{-k}	$x_k^{t_1}$	$b_k(t_1)$	$b_k^1\ (t_1^1)$	$b_k^2\ (t_1^2)$	$b_k^3\ (t_1^3)$	…	$b_k^n\ (t_1^n)$	$\sum_{m=1}^{n} b_k^m$	s_z''
A with	$\sum_{e=1}^{k} x_k^{ti}$	$\sum_{e=1}^{k} b_e(t_1$	$\sum_{e=1}^{k} b_e^1(t_1^1)$	$\sum_{e=1}^{k} b_e^2(t_1^2)$	$\sum_{e=1}^{k} b_e^3(t_1^3)$	…	$\sum_{e=1}^{k} b_e^n(t_1^n$	$X=\sum_{p=1}^{k}\left(\sum_{e=1}^{k} b_e^n\left(t_1^n\right)\right)_p = \sum_{z=1}^{m}\left(\sum_{m=1}^{n} b_k^m\right)_z$	
$\hat{S}$	s_1'	s_2'	s_3'	s_4'	s_5'	…	s_e'		$\sum_{e=1}^{n}\left(s_e'\right) = \sum_{z=1}^{m}\left(s_z''\right)$

Equality (10) expresses the formation of information $\hat{S}$transmitted to the center *A with* through *Ato* . Namely, the procedure of administrative control *And* $_{to}$, the inadmissibility of distortion of this information is revealed. Since this information plays a decisive role in making managerial decisions, this is its role playing the "synovial membrane" in the management of *Ac* in Achaos environment. Let's call the table a frActal form of administrative control (*FFAK)* . This table essentially expresses the feedbAck in the control of *A with* . Each *FFAC cell is* analogous to Acupuncture points on a human skin surfAce. As is known, afferent information converges at these points [13]. In the same way, in each cell of Table 1 there is a synergistic information that determines self -development *Ac* , normalizing the function of manipulation $\hat{S}$. The synergistic effect *of FFAK* a is expressed precisely in the normalization of this function. Here the synergistic role is played by the information coming from the *FFAC* to the center *Ac* . Such a functional relationship between *the FFAC* and the center *Ac* and its other structures has developed in the process of development of organizational systems.

The following expression is called the coefficient of performance (*efficiency*) self -development *A* $_c$:

$$k = s_i' / s_j'' \qquad (11)$$

self -development *efficiency Ac* with the procedure (5) is related as follows:

$$\text{p=}\begin{cases} k = 1, \text{тогда идет саморазвитие системы;} \\ k = 0, \text{тогда стагнация развитие системы;} \\ k = -1, \text{тогда система идет к банкротству.} \end{cases} \qquad (12)$$

Journal of Theoretical and Applied Information Technology
15th August 2022. Vol.100. No 15

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

At its core, ρ expresses the efficiency of using the potential *Ac* . Figure 4 shows four options for using the potential $\Pi_o^{A_c}$. The execution of Plan *X* automatically expands the potential of the Active system. X 4 X 3

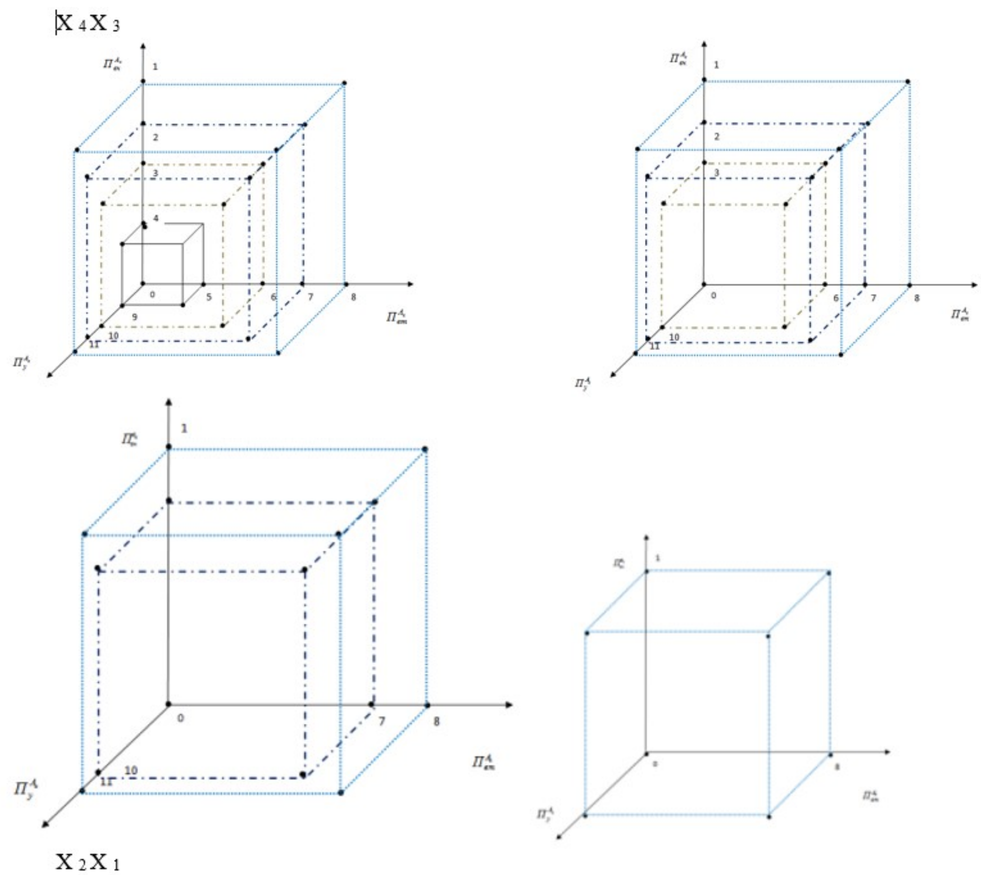

Fig.6. Type Of Potential Use And With .

When *Ac* executes the plan ρ=1. This means that in the next stage , *Ac* will use its potential more. This is self-development. In order to fulfill the plan in the next stage, the system will need more qualified *Ae , a more flexible procedure for managing influence, and* tighter administrative control. This requires a higher organization of the frActals of the Active system. This is the self-organization of *Ac* .

The degree of knowledge of the problem. An analysis of literary sources shows that the development of the theory of fractal control of active systems is at the initial stage of development. Such foreign scientists as H.Yu. Varneke, A.I. Kochetkova , B.Z. Milner , A.S. Gorbunov, V.E. D. A. Novikov, O. S. Vikhansky, A. I. Naumov, T . Burns , W. Sihn , H. _ Demsetr , V.K. Balkhanov , A.A. Voronin S.P. Mishin, D.M. Young , P. _ F. _ Drucker , P. _ V. _ Kevin and others In Kazakhstan, N.T.Rustamov, R.B.Abdrakhmanov, M.A.Aitkhozhin , A.A.Ashimov , N.M.Kulzhabai , T.B.Darkanbaev , R.T. .Ismailova, I.T.Utepbergenov, A.A.Tashev, A.S. Sakabekov and others.

However, there is still no holistic concept for the formation of an algorithmic assessment of the fractal properties of an active system, fractal control algorithms, and a form of administrative control that plays the role of feedback in organizational management.

Conclusions

1. As a result of the system analysis of the current state of development of organizational

systems (active systems), the fractal property of the potential $\Pi_{o}^{A_c}$ and their components was revealed for the first time: $\Pi_{y}^{A_c}$, $\Pi_{вн}^{A_c}$, $\Pi_{вт}^{A_c}$ active system.

2. A criterion has been developed, based on the principle of the "golden section", the use of these components in the activity of A $_{with}$ in certain ratios, ensuring the efficiency and sustainable operation of the system.

3. For the first time, the concept of fractal control A $_c$ based on activation $\Pi_{y}^{A_c}$ for a given model of control actions $G(\eta)$ was introduced .

4. A fractal form of administrative control has been developed, taking into account the implementation of the plan in the context (quantity, quality) .

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