

# ANALYSIS OF THE INFLUENCE OF INSTITUTIONAL EXPOSURE MEASURES ON THE EFFICIENCY OF THE WORK OF THE ORGANIZATION

## АНАЛИЗ ВЛИЯНИЯ ИНСТИТУЦИОНАЛЬНЫХ МЕР ВОЗДЕЙСТВИЯ НА ЭФФЕКТИВНОСТЬ РАБОТЫ ОРГАНИЗАЦИИ

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**Annotation.** The problem of the dependence of the effectiveness of organizations on the intensity of staffing requirements is considered. It is noted that the decrease in the efficiency of organizations is due to the initial uncertainty in the behavior of human resources, as well as due to lack of loyalty of employees to management measures. A technique has been proposed that allows selecting the “threshold” level of institutional measures for influencing personnel, the excess of which negatively affects the work efficiency. The methodology is based on a non-strict ranking method for determining the types of activities requiring regulation, and calculating the average level of employee loyalty to the measures introduced.

**Key words:** institutional measures, personnel management, loyalty, Fishburne weights, regulation.

**Аннотация.** Рассматривается проблема зависимости эффективности работы организаций от интенсивности требований к персоналу. Отмечается, что снижение эффективности работы организаций возникает вследствие изначальной неопределенности в поведении кадровых ресурсов, а также из-за отсутствия лояльности сотрудников к управленческим мерам. Предложена методика, позволяющая подбирать «пороговый» уровень институциональных мер воздействия на персонал, превышение которого негативно влияет на эффективность работы. В основе методики – метод нестрогого ранжирования для определения видов деятельности, требующей регламентации, и расчет среднего уровня лояльности сотрудников по отношению к вводимым мерам.

**Ключевые слова:** институциональные меры, управление персоналом, лояльность, веса Фишберна, регламентированность.

**Introduction.** Proper management of the social subsystem (personnel) of any organization is undoubtedly of great importance: the activities of personnel can both strengthen and completely reduce the results of the efforts of management to improve the efficiency of the enterprise. Thus, the problem of finding and applying methods and mechanisms aimed at changing the state of the social subsystem of an organization in the direction necessary for a decision maker (DM), in particular, to achieve and maintain a certain level of loyalty, is a very urgent task [6, 16].

**General characteristics of the subject area.** Figure 1 shows a diagram of the social subsystem of the organization as an object of management

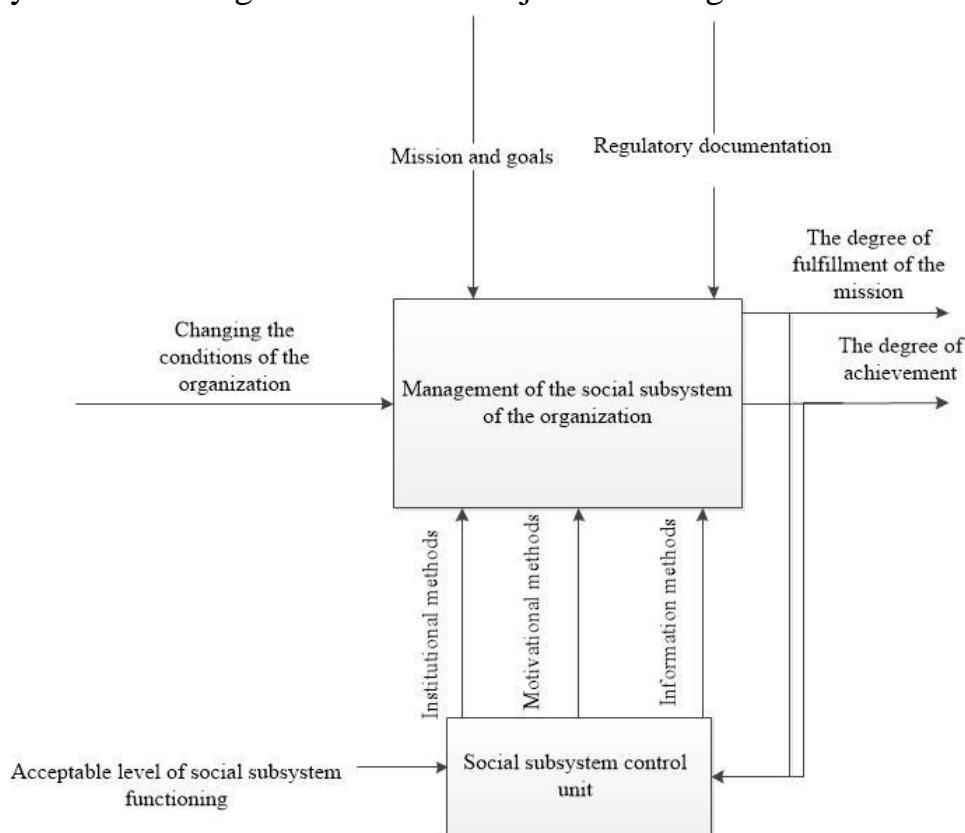


Fig. 1. The social subsystem of the organization as an object of management

It should be noted that the problem of personnel management is complex because it contains many different methods of working with the staff of the organization. This problem is quite fully covered in the works of Russian and foreign scientists [5, 14]. However, the specificity of human resources is that people's behavior is initially characterized by uncertainty. Therefore, "the modeling of processes occurring in systems with anthropogenic elements turns into a weakly formalizable problem" [12, p.179]. At the same time, despite the considerable number of works devoted to the

study of human behavior and how to manage it, there are virtually no formalized methods for finding the best management decisions in this area.

The effectiveness of the work of the employee as a whole and his compliance with the regulations adopted in the organization is determined, in particular, by the degree of his loyalty. In this context, we will call loyalty of an employee to comply with prescribed regulations, job descriptions and norms of behavior.

Employee loyalty is formed on the basis of his emotional attachment, positive attitude, influencing the processes of making “working” decisions. In turn, the meaning of these concepts depends on the intensity of application of control actions, which, according to [10-11], are divided into measures related to managing the structure of the social subsystem, as well as measures of motivational, institutional and informational impact.

#### Material and methods of research

Institutional impact involves streamlining work in general by regulating the subject's behavior through the establishment of norms, the introduction of rules and restrictions (various internal rules, instructions, security policy provisions, etc.). Institutional management methods are aimed at reducing the overall uncertainty in the system, they make the interaction between employees of the organization more accurate, correct and predictable. However, in the overwhelming majority of cases, excessive regulation leads to a significant reduction in the loyalty of individual entities of the organization’s staff, and this, in turn, is fraught with a sharp increase in the risk of violations of rules and regulations. As a result, there is a general decline in the efficiency of the organization due to the actions of the human factor in the overall normal functioning of software, hardware, technical and other components.

Also, a negative impact is that employees of the organization are physically unable to remember all the clauses of the requirements governing their activities. A frequent reference to the texts of instructions and prescriptions significantly increases the time spent on operations and, accordingly, negatively affects the overall performance.

The dependence of staff loyalty and degree of orderliness of activity on the intensity of regulation in [2] was proposed to be described by the following formulas:

$$U = f_U(R; a_U; b_L; \bar{U}) = \bar{U} / (\bar{U} + e^{-a_U(R-b_L)}); \quad (1)$$

$$L = f_L(R; a_L; b_L; \bar{L}) = \bar{L} - \bar{L} / (\bar{L} + e^{-a_L(R-b_L)}), \quad (2)$$

where R is the intensity of regulation (measures of institutional impact); - the degree of orderliness of the staff at the maximum (full) regulation of activities;  $\bar{U}$  - the level of staff loyalty in the absence of institutional measures;  $a_U$  and  $a_L$  are the numerical parameters of the functions of orderliness and loyalty, affecting the

"steepness" of increasing the orderliness and decreasing loyalty, respectively. The coefficient  $b_U$  reflects the degree of self-organization of the anthropogenic subsystem and corresponds to such an intensity of institutional measures of influence, at which half of the maximum value of order is reached;  $b_L$  reflects the intensity of the decrease in the loyalty of the organization's personnel and corresponds to the intensity of the institutional measures of influence, at which the loyalty of the personnel is reduced doubly from the initial level.

The final impact of the institutional impact measures is described by the product U on L:

$$E_R = U \cdot L = f_U \cdot f_L \quad (3)$$

To take into account the priority of the implementation of a particular type of work regulated by the relevant instruction, it is necessary to enter into the consideration of weight (determined by expert). It should be noted that qualitative ("soft") measurements: comparison, assignment to a class, ordering are much more reliable than assigning quantitative assessments of the importance of criteria, subjective probabilities, "weights" of utilities, etc. [4, 8].

In cases of difficulties in obtaining unambiguous numerical evaluations by an expert, it is preferable to apply rank methods, in the use of which it is only necessary to order the concepts according to the degree of their influence. One of the most effective is the method of non-strict ranking: the expert produces a sequential numbering of the concepts by increasing their influence, the ranked numbers of the concepts are assigned to their "weights".

When in doubt about determining the degree of importance of certain concepts in the ranking process, the expert places them in one position in an arbitrary order. If there are several equally equivalent concepts in one position, their weight is usually taken equal to the arithmetic average numbers. In [3], it was proposed to modify this method, taking as the weight of each of the equivalent concepts the number of the group that they form as one object participating in the ordering.

For example, let the concepts  $K_i$  ( $i = 1, \dots, 5$ ) be ordered by an expert by the degree of their influence on  $K$  as follows:

$$K_3; (K_1, K_4); K_5; K_2. \quad (4)$$

Since concepts 1 and 4 are equivalent in degree of influence, they both occupy the second position. The sum of all numbers is:  $1 + 2 + 2 + 3 + 4 = 12$ . Therefore, the weight of the concept  $K_3$  is  $1/12$ , the concepts of  $K_1$  and  $K_4$  are  $2/12$ , the concept of  $K_5$  is  $3/12$ , and  $K_2$  is  $4/12$ . The sum of the weights is one.

The considered method of assessing the weights of influence is a generalization of the procedure for calculating

Fishburn weights [15] for the case when, together with preferences, the system includes

and a relationship of indifference. Fishburn weights at the same time reflect the fact that “the system of increasing preference for alternatives is best answered by the system of weights that increase according to the rule of arithmetic progression” [13, p.51].

After finding the weights, the total (total) contribution to the ordering (and, consequently, to the quality of performance) of the work of various regulations can be found as an additive convolution:

$$U = \sum_i^N S_i R_i, \quad (5)$$

where M is the number of regulations governing the activities;  $L_j$  is the average employee loyalty to the j-th instruction.

The value of  $L_j$ , in turn, is defined as

$$L_j = \frac{1}{K} \sum_{k=1}^K L_{kj}, \quad (6)$$

where K is the number of employees whose activities are regulated by the j-th instruction;  $L_{kj}$  - the loyalty of the k-th employee in relation to the j-th instruction. The level  $L_{kj}$  is estimated verbally, by values from a term set {High negative (B-); Above average negative (BC-); Average negative (C-); Below average negative (NC-); Neutral (low) (H); Below average positive (NA +); Medium positive (C +); Above average positive (Sun +); High positive (B +)}.

The resulting verbal estimates are assigned numerical values according to the Harrington scale: “H” - 0; “HC ±” - ± 0,29; “C ±” - ± 0.51; “BC ±” - ± 0.72; “B ±” - ± 1.

**Discussion of the results.** Thus, the following methodology is proposed for selecting the optimal level of institutional measures for influencing personnel in order to improve the efficiency of the organization:

1. Select the whole range of activities that affect the efficiency of work and require regulation.
2. For selected types of activities, obtain values of  $S_i$  weights (for example, using a non-strict ranking method).
3. Find the set  $\{R_i\}$  and, thus, establish the degree of ordering of each of the regulations of the relevant activity.
4. According to the formula (4) to determine the cumulative ordering of the social subsystem of the organization U.
5. Determine the attitude of the staff to the measures of institutional impact:
  - 5.1. Get verbal evaluations of employees.

- 5.2. Assign numerical values to the obtained estimates (using the Harrington scale).
- 5.3. Calculate the average level of staff loyalty  $L$  by the formulas (5), (6).
6. Assess the potential effectiveness of  $E_R$  introduced institutional measures  $\{R_i\}$ .
7. If the decision maker is satisfied with the result obtained in paragraph 6, implement the proposed measures  $\{R_i\}$ , otherwise it is necessary to take measures to improve the degree of orderliness of the activity provided for (the degree) by the totality  $\{R_i\}$  and / or increase staff loyalty proposed institutional measures.

Since, in practice, it is often impossible to further improve the degree of ordering of activities ( $\forall i: R_i = 1$ ), the only way to achieve the required level of work efficiency is to increase employee loyalty.

**Conclusion.** The nature of the relationship between the regulation of activities and the effectiveness of the functioning of employees leads to the conclusion that there is some critical value, which, if achieved, strengthen institutional measures not only cease to be effective, but also lead to a decrease in performance due to threats that are the source .

A forced increase in the level of regulation above a critical value leads to a sharp decrease in employee loyalty and, as a consequence, an increase in the likelihood of potential threats of targeted and / or unintentional negative personnel impact on the system - the so-called “insider” threats. The method proposed in the work allows determining the indicated critical value of institutional measures for influencing employees by the decision maker.

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