Data Analysis Approach for Personnel Hidden Conflicts Management

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Abstract— **The business processes of high technology companies, like aviation industry are very sensitive to business-process retardation. The reason of such problems can be a controversy on personnel level. The conflict management is a prerequisite for efficiency of the process. Actual methods allow to identify existing conflicts. The disadvantage of such methods is the already accomplished impact of the conflict on the production cycle. Consequently, the deteriorated economic indicators. We propose an approach that allows to identify hidden conflicts between the subjects of the business process at an early stage. It based on information research data. This approach is able to implement conflict management tools for minimization of economic losses due to conflict situations.**

Keywords— **Survey data analysis, personnel conflict management, hidden conflict.**

I. INTRODUCTION

Modern enterprises are organizations with a high concentration of human intellectual personnel. The entire business process depends on the well-coordinated employees in the company. Identifying and minimizing conflicts among business process is particularly relevant [1]. The paper presents a new approach for identifying conflict situations. We refer to a conflict situation not only as a clear manifestation of disagreements, a contradiction of desires, opinions and interests, but also as any deviation from what was originally envisaged in the business process. Whether the employee's work exceeds his official authority, colleagues consider it to be in every possible way successful in the position. Their behavior may be different from everyone else. We understand the term "conflict interest" is an unpredictable and difficult to define phenomenon, when a staff relationship leads to an employee acting against the company. It can be pushing the manager to accept the wrong decisions or makes them independently. The employee pursues selfish goals, wants to extract personal benefit, does not take into account the aspirations and plans of the other party. The disadvantage of traditional methods is the already accomplished impact of the conflict on the production cycle [2, 3]. Consequently, the deteriorated economic indicators.

II. AN APPROACH FOR IDENTIFYING "HIDDEN CONFLICTS" BETWEEN SUBJECTS

Russian companies' management has a very important task of creating effective methods for evaluating management decisions. The effective management decisions development and implementation are important for ensuring the corporate competitiveness in the market. The choice of an effectively appropriate management decision is the result of an economic, psychological, and mathematical aspects comprehensive implementation. The management decision organizational content is that the personnel should be involved in this process [4]. Knowledge and application of various decision-making methods play a significant role in improving the company's personnel efficiency.

In actual economic situation in Russia, there is a need to ensure high-quality management of social processes. The main element of the management process is the management decisions development and adoption. Management decisions require up-to-date data on the business process situation in the HR-segment. There are many psychological research methods classifications. However, the most popular method is the employee survey. The employee survey method peculiarity is that the data source is the knowledge and personal experience of tested employees. The survey results analysis should ensure at least the exclusion of nonobjective data. Moreover, it is proposed to conduct a detailed analysis of mutual employee evaluations. This approach allows us

to determine the maximal and minimal indicators in the estimates that have an exclusively subjective or emotional basis. The method of comparing mutual assessments allows us to identify hidden personnel conflicts. The accurately formulated questions, analytical processing of respondents' answers during survey activities is a basis of objective result. This result can identify unreliable (motivated) answers, hidden conflicts between employees, incompetence of employees and internal dissatisfaction.

In this way, hidden conflicts between employees can be identified and eliminated in a timely manner at an early stage, which is certainly important not only for the normal functioning companies, but also for establishing communications among employees.

We propose an approach that allows to identify «hidden conflicts» between the subjects of the business process at an early stage. This approach is able to minimize economic

losses due to conflict situations. The definition of «hidden conflict» is the situation that the conflict situation exists, but so far didn't show up and the economic damage is minimal. In case of «hidden conflict» identification the financial losses can be minimized. In case of conflict growing the financial losses will be significantly higher. Presented approach allows to identify the «hidden conflict».

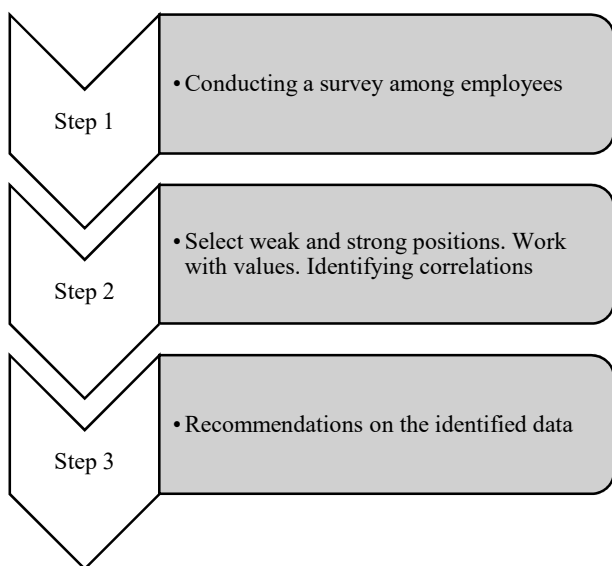As an example, we present the methodology for identifying conflict pairs. See Figure 1.

Figure 1. Algorithm for personnel conflict pairs identifying.

III. CONFLICT-MANAGEMENT PREVENTION MODEL

A. The description of data analysis approach

The data analysis approach is based on cross-score fluctuation. Score reflects the valuation of all counterparties from each of them. Cross-score is a mutual evaluation of all pairs of counterparties. The conflict participants cross-score differs significantly from average one.

B. The conflict-management prevention model

The sample of conflict-management prevention model presented in Tab. 1.

Suggested method for practical implementation consists of:

a) input data: division names, survey values;

b) scale formalization and score calculation from A, B, C, D, E, F, G where A is the min value, G is the max value;

c) cross-score calculation;

d) the values localization in certain interval by feature, that is, ranking by the frequency of intervals;

e) consider a type of distribution;

f) identify the crucial values in maximal and minimal ranges, which reflect a conflict of interest.

Table 1. The prevention model of the conflict-management

Grades (from A to F)	1. Legal Department	2. IT Department	3. Economic Department	4. Supply Department
1. Legal Department		A	B	C
2. IT Department	A		D	E
3. Economic Department	B	D		F
4. Supply Department	C	E	F	

The approach allows you to identify the conflict situation between specific counterparties-participants without waiting for the growth of conflict tension, involvement of other participants in the conflict and its open stage with economic losses. Since the implementation of a hidden conflict situation requires at least two participants, this fact is used in the proposed approach. The matrix is a survey result. In the summary matrix there are different scores - from A-the maximum value up to C-the minimum value. For score model either index or numerical values can be used.

IV. RESULTS

A sample of cross-score Gaussian distribution between the intervals and the frequencies of the values is demonstrated in Tab. 2. Authors use the Tab. 2 for managing the average interval and the mode.

Table 2. Cross-score gaussian distribution

№	Intervals	Number of answers
1	<A	0
2	A-B	3
3	C-D	5
4	D-E	22
5	E-F	12
6	F-G	3
7	>G	0

To improve the level of employee-efficiency we suggest to take into account the max and the min definition.

As you can see from the graph (Fig. 2), there are evaluated pairs with a significantly different low or high rating from the average. They are the ones that are of the greatest interest to us.

This method can be based on different data level. The surveys data of personnel or head of units can be used. It

depends of company strategy in conflict management [5]. By using this method, the company's management can avoid an employee's professional burnout and ineffective work. The results of research can be also available for the staff.

Actual psychological difficulties due to CoVid-19 can make a negative impact on tendency to conflict with colleagues. Force majeure situations are not so common, but last year, during the spread of the CoVid-19 disease, many companies switched to remote work. "Initially, the personnel evaluation procedure involved comparing the characteristics of the personnel with the specified standards" [6, 7]. "Management decision-making is the main purpose of the evaluation, but not the only one." The author mentions that the success of the company depends on the productive work of performers on orders.
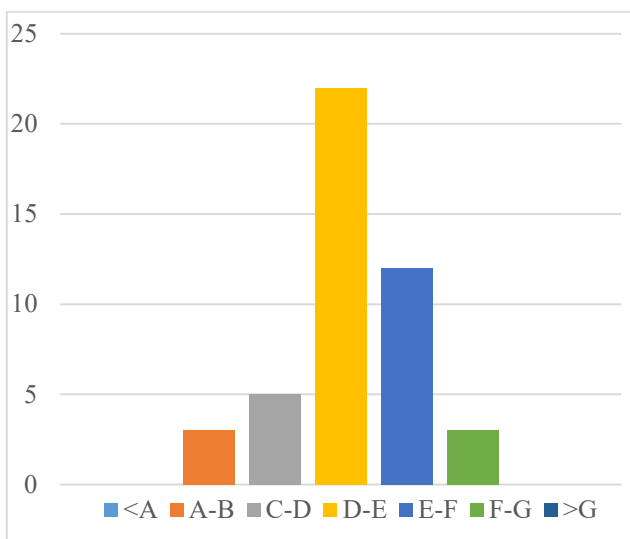

Figure 2. Visualization of cross-score Gaussian distribution for practical use.

The above information methodology of hidden conflict identification based on actual survey data. It allows to explore a conflict pairs from all staff. According to the information received during the survey, it is possible to judge how closely the relationships between employees in the team are interconnected. It is necessary to take into account this information so that the company is not harmed or damaged. To do this, it is recommended to identify conflicts in a timely manner, since pre-defined conflicts contribute to the fact that the enterprise will function normally, without any failures.

The important task for the heads of companies is to provide the economic security process [8]. The purpose of ensuring the economic security is to protect all business process and employees from internal and external threats and to eliminate the causes and conditions that generate them.

Personnel security is an important component of the economic security. Personnel security is a protection of the company from risks and threats associated with personnel and labor relations in general. It is necessary to monitor the personnel loyalty and motivation indicators to provide a personnel security.

The tasks for personnel security ensuring:

1. Personnel assessment implies the identification of various forms of disloyalty and unreliability of employees.

2. Compliance of employees with the current labor and civil legislation when performing labor duties monitoring.

V. CONCLUSION

The presented work analyzes and determines main steps of studying and identifying corporate conflicts. at enterprises. The approach for researches of conflicts presented. This analysis gives an idea of the practical application of personnel behavior styles. There is a need to develop an approach of hidden conflicts between specific participants identifying. Hidden conflicts are characterized by the absence of external aggressive actions between the subjects of the conflict. This type of conflict is dangerous because conflict participants can't have enough resources or possibilities for open conflict interaction. But at the same time, such a conflict also negatively affects business processes.

Thus, a hidden conflict is more dangerous, since it still needs to be noticed, understood the cause and found a solution. Conflict prevention presupposes its prediction. A forecast is a representation of a future conflict with a certain probability of indicating its place and time of occurrence.

Modern approaches are proposed to identify hidden conflicts in the enterprise:

- Traditional approach to conflict. Based on this approach, the conflict should be avoided, because it has harmful consequence.

- Second approach is based on human relations. This approach considers a conflict as a common event that has possible positive results in each organization.

- Interactive approach. Based on this approach, the conflict not only creates a positive breakthrough in the organization, but also the conflict is considered as an absolute necessity for the development of the organization.

The lack of a tool for timely detection of hidden conflicts does not allow to receive information and provide adequate managerial decisions.

Presented approach allows to identify personnel conflict on hidden stage.

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