Innovative Approach for Assessing Management System Flexibility for Determining Mechanism Functioning Mode for Ensuring Economic Security of Organizations

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Abstract **– The article develops and tests a new approach to assessing the management system flexibility of a textile enterprise and its economic security. A questionnaire with a list of statements characterizing the flexibility of the enterprise economic security system as a whole and its individual components is provided. Determining the flexibility of an enterprise economic security system depends on two types of parameters: 1) parameters characterizing flexibility of an economic security system as a whole; 2) parameters characterizing the flexibility of components of an economic security system. This approach is based on the interpretation of the results of an expert assessment and using the tools of economic and mathematical modeling allows to determine the level of flexibility of an economic security system in the range from 0 to 1. The definition of flexibility itself is not an end in itself, since the ability of an enterprise to react to threats of various levels depends on their intensity level. That is, it is expedient for the management of enterprises to take into account the actual level of flexibility, which allows to determine the most probable mechanism operation mode for enterprise ensuring economic security (forced, of increased activity, rational, reserve) in accordance with the level of flexibility of the economic security system.**

Keywords **– flexibility, management system, economic security, economic security system, mechanism.**

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1. Introduction

The current state of development of most Ukrainian industrial enterprises is characterized by the presence of a significant number of problems and contradictions. This is caused by the crisis phenomena in the economy due to the war between Ukraine and Russia, the COVID-19 pandemic and the drop in domestic demand for the products of such enterprises. Taking into account the negative trends, the management of enterprises is actively searching for innovative approaches and new management tools that will allow to face new challenges and threats and contribute to increasing business efficiency. This explains the necessity of forming new approaches to agile management in ensuring the economic security of textile enterprises.

The application of agile management in practical activities of textile enterprises contributes for prompt development and management decisions. When implementing agile management, the company's management must realistically assess both the company's current activity and its development prospects. Because not every management function can and should be implemented by agile teams. And, in addition, when several teams operate within the same enterprise, their work must be based on the principles of cooperation and be oriented towards achieving a strategic goal (for example: increasing the profitability of the enterprise, increasing its market value, etc.), otherwise conflicts are possible.

There are a number of methodologies that have explored various aspects of agile management [4]. As well as a number of approaches to assessing the organization's flexibility should be highlighted, among which are the following:

1) assessment of an enterprise flexibility taking into account weak and strong signals was proposed by Yarulina D. Sh. [8]. This approach is quite interesting, provided that such signals can be clearly identified;

2) assessment of an enterprise flexibility as a function of amount of funds directed for production development of new products, as well as products that are assimilated by production, was proposed by V. M. Samochkin [6]. It should be noted that from the standpoint of a purely "technological approach" to enterprise management, the proposed methodology allows evaluating production flexibility, but the flexibility of management processes and systems using it is quite difficult to evaluate;

3) assessment of the strategic flexibility of the enterprise proposed by O. V. Shatilova [7]. The proposed approach allows to transform strategic directions of an enterprise development in accordance with an environment of its operation and requests of a management component.

In addition to the above approaches, there are others, however, from the standpoint of clearly identifying the features of the functioning of a specific enterprise and ensuring its economic security, the assessment of the flexibility of the management system in general and the economic security system in particular requires some improvement and further development.

Economic security of macro-, meso-, and micro-level, as well as formation of an economic security system of individual economic entities is highlighted in works [2], [5], and others.

Taking into account significant scientific achievements in the above field, it should be noted that a certain range of scientific and methodological issues remains insufficiently researched, including evaluation of effectiveness of an enterprise management systems.

2. Research Method

In the context of this study, determining the list of parameters characterizing flexibility of an enterprise economic security system is possible by adapting the Bain&Company interactive survey [3] to determine the flexibility of organizational management. Analysis of works of domestic and foreign scientists on issues of economic security allows us to draw conclusions that flexibility is one of the key principles in building a system of economic security at an enterprise. These principles are the basis for formation of defining characteristics and parameters of an economic security system.

Determining the flexibility of the economic security system will make it possible to determine its adaptive capabilities towards changing conditions of external environment, and on the basis of obtained results to identify problematic points and determine ways to eliminate them. Determining the flexibility of an enterprise economic security system depends on two types of parameters:

1. Parameters characterizing the flexibility of an economic security system as a whole.
2. Parameters characterizing the flexibility of components of an economic security system.

The list of these parameters is given in table 1 in the form of statements to which one can give one of three simple answers: yes, no, difficult to determine. Let's use this table for a questionnaire assessment of the characteristics of the flexibility of the enterprise economic security system.

Table 1. The list of statements for evaluating the characteristics of the flexibility of the enterprise economic security system

№	Statements that characterize the flexibility of the economic security system as a whole (par. 1) and the flexibility of the components of the economic security system (par. 2)	Answer		
		Yes	No	Difficult to determine
1.1	The enterprise has clear strategic orientations, including the field of economic security			
1.2	The enterprise managers trust and empower employees			
1.3	The enterprise managers pay sufficient attention to the security of the enterprise functioning and interaction with contact audiences			
1.4	The enterprise organizational structure and/or the structure of economic security is optimal and does not need improvement			
1.5	The enterprise activities include the practice of developing and implementing programs for adapting to conditions of external environment			
2.1	The enterprise employees have a sufficient level of qualification			
2.2	Teams of employees at the enterprise are small (3–9 people), cross-functional, self-governing, cooperate with real customers and focus not only on performance, but also on safety			
2.3	The best and most innovative and active employees strive to work in agile teams, and this is encouraged by the company management			
2.4	The enterprise deploys agile teams wherever needed and in sufficient numbers to make a significant impact on overall company performance and security			
2.5	Even those employees of the company who do not work in agile teams perceive the values			

№	Statements that characterize the flexibility of the economic security system as a whole (par. 1) and the flexibility of the components of the economic security system (par. 2)	Answer		
		Yes	No	Difficult to determine
	of agile management and contribute to the changes			
2.6	The enterprise attracts, motivates and maintains sufficient personnel potential to create a agile enterprise and to eliminate critical bottlenecks (including in the field of economic security)			
2.7	The company activities are focused on customers and adapt to changes in their needs			
2.8	The enterprise combines diverse activities and resources to focus more on business performance and security			
2.9	Planning, budgeting and resource allocation processes are agile enough to quickly direct resources to the enterprise top priorities, including economic security			
2.10	The enterprise receives a positive financial result, characterized by a tendency towards growth			
2.11	There is an increase in the market value of the enterprise and/or an increase in the welfare of its owners			
2.12	The enterprise production system allows to quickly implement solutions in a modular way			
2.13	The enterprise information system allows to quickly implement solutions in a modular way			

Doing the questionnaire, each interviewee (expert) should put only one mark (for example, "x" or "+") in front of each of the 18 rows of the table 1, clearly answering the question (statement). At the same time, the option of the answer "difficult to determine" is allowed to be marked a limited number of times (otherwise "lazy" experts will simply answer the majority of statements with the banal "I don't know", that is, the formal "difficult to determine"). Therefore, for the statements characterizing the flexibility of the economic security system as a whole, we will allow at most one "difficult to define" answer, and for the statements characterizing the flexibility of the components of the economic security system, at most two such answers. So, if the expert has already put one "x" or "+" in the "Difficult to determine" column opposite pars. 1.1–1.5 in the system, then the rest of the cells in this column are blocked (and the expert cannot physically mark anything there). Similarly, if the expert has already checked some two cells in the "Difficult to determine" column opposite pars. 2.1–2.13 in the system, then the remaining cells in this column are blocked. At this stage, thus, correct questionnaire results are formed immediately, without returning to experts for revision.

If we only have L experts, then each of them will provide a questionnaire filled with answers in the form of the table 1, in which there will be no more than three uncertain answers of the "difficult to determine" type. Let us denote $\tilde{g}_{kl}$ as processed answer by *l*-th expert regarding *k*-th statement ($k=\overline{1,18}$), moreover, after numerical processing, the experts' answers will be as follows:

1) $\tilde{g}_{kl}=2$, if marked "yes";
2) $\tilde{g}_{kl}=-2$, if marked "no";
3) $\tilde{g}_{kl}=\pm 0.5$, if marked "difficult to determine".

We will generate uncertainty of the evaluation of mark for the answer "difficult to determine" using pseudo-random numerical sequences. This uncertainty is necessary because the result of taking into account a significant number of expert answers of the "difficult to determine" type cannot have any bias either in the direction of "yes" or "no".

The average score of k-th statement is equal to:

$$\tilde{g}_k=\frac{1}{L}\cdot\sum_{l=1}^{L}\tilde{g}_{kl} \quad \left(k=\overline{1,18}\right) \tag{1}$$

where we consider all experts to be of equal value (with approximately the same experience and propensities for inaccurate answers, doubts, hesitations, etc.). The divergence of experts' judgments can be estimated using the root mean square deviation [1]:

$$\sigma_k^{(g)}=\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[\tilde{g}_{kl}-\tilde{g}_k\right]^2} \tag{2}$$

At the same time, the worst case (the largest deviation) will be when half of all experts mark "yes" against some statement, and half - "no". In the case of an even number of experts, this will obviously be *L*/2. Then the average score of the *k*-th statement will be equal to 0, and the root mean square deviation (2) will be equal to:

$$\sigma_k^{(g)}=\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\tilde{g}_{kl}^2}=\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}4}=\sqrt{\frac{1}{L}\cdot 4L}=\sqrt{4}=2 \tag{3}$$

In the case of an odd *L*, the largest root mean square deviation will be when either experts marked "yes" against some statement, and the rest ($\frac{L-1}{2}$ or $\frac{L+1}{2}$) – "no". Then the average score of the *k*-th statement will be equal to:

$$\tilde{g}_k=\frac{1}{L}\cdot\left(\frac{L-1}{2}\cdot 2+\frac{L+1}{2}\cdot(-2)\right)=\frac{1}{L}\cdot(L-1-L-1)=-\frac{2}{L} \tag{4}$$

Taking this into account, the root mean square deviation (2) will be equal to:

$$\sigma_k^{(g)}=\sqrt{\frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L-1}{2}}\left[2-\left(-\frac{2}{L}\right)\right]^2+\sum_{l=1}^{\frac{L+1}{2}}\left[-2-\left(-\frac{2}{L}\right)\right]^2\right)}=$$
$$=\sqrt{\frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L-1}{2}}4\left(\frac{L+1}{L}\right)^2+\sum_{l=1}^{\frac{L+1}{2}}4\left(\frac{1-L}{L}\right)^2\right)}=$$
$$=2\sqrt{\frac{1}{L}\cdot\left(\frac{L-1}{2}\cdot\left(\frac{L+1}{L}\right)^2+\frac{L+1}{2}\cdot\left(\frac{1-L}{L}\right)^2\right)}=2\sqrt{\frac{1}{L}\cdot\left(\frac{(L-1)(L+1)(L+1+L-1)}{2L^2}\right)}=$$
$$=2\sqrt{\frac{1}{L}\cdot\left(\frac{(L-1)(L+1)\cdot 2L}{2L^2}\right)}=2\sqrt{\frac{(L-1)(L+1)}{L^2}}=\frac{2}{L}\sqrt{(L-1)(L+1)} \quad (5)$$

that is, in the case of an odd number of experts, the largest (worst) root mean square deviation is uniquely determined:

$$\sigma_k^{(g)}=\frac{2}{L}\sqrt{(L-1)(L+1)}.$$

We will assume that the spread of experts' assessments obeys the normal law [1]. Then, with sufficient accuracy for the practice, it is considered that the acceptable discrepancy of expert judgments is such that it does not exceed 50...150% of the maximum discrepancy (i.e., root mean square deviation) [1]. That is, if the root mean square deviation of the estimate of the *k*-th statement does not exceed 150% of the maximum root mean square deviation, then the judgments of the experts regarding the *k*-th statement in this case are considered agreed. So, if:

$$\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[\tilde{g}_{kl}-\tilde{g}_k\right]^2}\le 3 \quad (6)$$

for an even number of experts:

$$\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[\tilde{g}_{kl}-\tilde{g}_k\right]^2}\le\frac{3}{L}\sqrt{(L-1)(L+1)} \quad (7)$$

for an odd number of experts, then the average rating of the k-th statement (1) in this case is already determined. If the corresponding inequality (6) or (7) is violated, then the experts must revise their judgments about the *k*-th statement until the corresponding inequality (6) or (7) is fulfilled. At the same time, other statements are not reviewed.

When the average scores of all 18 statements $\tilde{g}_1$, $\tilde{g}_2$, ..., $\tilde{g}_{17}$, $\tilde{g}_{18}$ already known, the flexibility of the enterprise economic security system can be calculated as:

$$g=\frac{1}{36}\cdot\sum_{k=1}^{18}\tilde{g}_k \quad (8)$$

where dividing by 36 is due to the fact that the maximum value of the average score is equal to 2. Thus, the values of this flexibility indicator lie in the range from -1 to 1. Negative flexibility will mean that there are negative trends in the enterprise economic security system (just most of the answers to the statements in table 1 will be negative - "no"). Positive flexibility will mean positive trends. If the value (8) is close to 0, then this will indicate stagnant processes in the system of economic security of the enterprise.

In a more general case, the weights of each of the 18 components should be taken into account when determining flexibility. These weights can be determined at the same time as determining the evaluations of the statements in the table. 1. At the same time, the range of the weight of the statement can be arbitrary: from 3 to 5, from 1 to 10, from 10 to 50 (with an arbitrary step). Then, if w_{kl} – weight of the *k*-th statement, offered by the *l*-th expert, the average weight of the *k*-th statement is equal to:

$$w_k=\frac{1}{L}\cdot\sum_{l=1}^{L}w_{kl}\quad\left(k=\overline{1,18}\right) \quad (9)$$

As before, the disagreement between the experts' judgments about the weights can be estimated using the root mean square deviation:

$$\sigma_k^{(w)}=\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[w_{kl}-w_k\right]^2} \quad (10)$$

If $w_{kl}\in\left[w_{\min};w_{\max}\right]$, then in the worst case half of all experts will estimate this weight as $w_{\min}$, and the rest as $w_{\max}$. In the case of an even number of experts, the average weight of the *k*-th statement will be equal to:

$$w_k=\frac{1}{L}\cdot\left(\sum_{l=1}^{L/2}w_{\min}+\sum_{l=1}^{L/2}w_{\max}\right)=\frac{1}{L}\cdot\left(w_{\min}\cdot\frac{L}{2}+w_{\max}\cdot\frac{L}{2}\right)=\frac{w_{\min}+w_{\max}}{2}$$

and the root mean square deviation (10) will be equal to:

$$\sigma_k^{(w)}=\sqrt{\frac{1}{L}\cdot\left[\sum_{l=1}^{L/2}\left(w_{\min}-\frac{w_{\min}+w_{\max}}{2}\right)^2+\sum_{l=1}^{L/2}\left(w_{\max}-\frac{w_{\min}+w_{\max}}{2}\right)^2\right]}=$$
$$=\sqrt{\frac{1}{L}\cdot\left[\sum_{l=1}^{L/2}\left(\frac{w_{\min}-w_{\max}}{2}\right)^2+\sum_{l=1}^{L/2}\left(\frac{w_{\max}-w_{\min}}{2}\right)^2\right]}=\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left(\frac{w_{\max}-w_{\min}}{2}\right)^2}=$$
$$=\sqrt{\left(\frac{w_{\max}-w_{\min}}{2}\right)^2}=\frac{w_{\max}-w_{\min}}{2}. \quad (11)$$

In case of odd *L* the largest root mean square deviation will be when $\frac{L-1}{2}$ or $\frac{L+1}{2}$ experts assessed the weight of a statement as $w_{\min}$, and the rest ($\frac{L+1}{2}$ or $\frac{L-1}{2}$) as $w_{\max}$. Then the average score of the *k*-th statement will be equal to:

$$w_k=\frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L-1}{2}}w_{\min}+\sum_{l=1}^{\frac{L+1}{2}}w_{\max}\right)=\frac{1}{L}\cdot\left(w_{\min}\cdot\frac{L-1}{2}+w_{\max}\cdot\frac{L+1}{2}\right)=$$
$$=\frac{w_{\min}L-w_{\min}+w_{\max}L+w_{\max}}{2L}=\frac{L\cdot\left(w_{\min}+w_{\max}\right)+w_{\max}-w_{\min}}{2L} \quad (12)$$

or:

$$w_k = \frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L+1}{2}} w_{\min} + \sum_{l=1}^{\frac{L-1}{2}} w_{\max}\right) = \frac{1}{L}\cdot\left(w_{\min}\cdot\frac{L+1}{2} + w_{\max}\cdot\frac{L-1}{2}\right) =$$
$$= \frac{w_{\min}L + w_{\min} + w_{\max}L - w_{\max}}{2L} = \frac{L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L} \quad (13)$$

These two values can be averaged:

$$\frac{1}{2}\cdot\left(\frac{L\cdot(w_{\min}+w_{\max}) + w_{\max} - w_{\min}}{2L} + \frac{L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L}\right) =$$
$$= \frac{1}{2}\cdot\left(\frac{2L\cdot(w_{\min}+w_{\max})}{2L}\right) = \frac{w_{\min}+w_{\max}}{2},$$

however, it should be taken into account that the averages (12) and (13) can differ greatly over a wide scale of weights. Therefore, we determine the root mean square deviation separately for (12) and (13). Considering the squared differences:

$$\left(w_{\min} - \frac{L\cdot(w_{\min}+w_{\max}) + w_{\max} - w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{2Lw_{\min} - L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{L(w_{\min}-w_{\max}) - (w_{\max}-w_{\min})}{2L}\right)^2 = \frac{(L+1)^2(w_{\max}-w_{\min})^2}{4L^2}$$

and:

$$\left(w_{\max} - \frac{L\cdot(w_{\min}+w_{\max}) + w_{\max} - w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{2Lw_{\max} - L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{L(w_{\max}-w_{\min}) - (w_{\max}-w_{\min})}{2L}\right)^2 = \frac{(L-1)^2(w_{\max}-w_{\min})^2}{4L^2},$$

we get the following root mean square deviation (10) for the average (12):

$$\sigma_k^{(w)} = \sqrt{\frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L-1}{2}}\frac{(L+1)^2(w_{\max}-w_{\min})^2}{4L^2} + \sum_{l=1}^{\frac{L+1}{2}}\frac{(L-1)^2(w_{\max}-w_{\min})^2}{4L^2}\right)} =$$
$$= \sqrt{\frac{1}{L}\cdot\left(\frac{L-1}{2}\cdot\frac{(L+1)^2(w_{\max}-w_{\min})^2}{4L^2} + \frac{L+1}{2}\cdot\frac{(L-1)^2(w_{\max}-w_{\min})^2}{4L^2}\right)} =$$
$$= \sqrt{\frac{1}{L}\cdot\frac{(L-1)(L+1)(w_{\max}-w_{\min})^2}{8L^2}(L+1+L-1)} =$$
$$= \sqrt{\frac{(L-1)(L+1)(w_{\max}-w_{\min})^2}{4L^2}} = \frac{w_{\max}-w_{\min}}{2L}\sqrt{(L-1)(L+1)}.$$

Since for the mean (13) the squares of the differences are:

$$\left(w_{\min} - \frac{L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{2Lw_{\min} - L\cdot(w_{\min}+w_{\max}) + w_{\max} - w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{L(w_{\min}-w_{\max}) + (w_{\max}-w_{\min})}{2L}\right)^2 = \frac{(L-1)^2(w_{\max}-w_{\min})^2}{4L^2}$$

and:

$$\left(w_{\max} - \frac{L\cdot(w_{\min}+w_{\max}) - w_{\max} + w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{2Lw_{\max} - L\cdot(w_{\min}+w_{\max}) + w_{\max} - w_{\min}}{2L}\right)^2 =$$
$$= \left(\frac{L(w_{\max}-w_{\min}) + (w_{\max}-w_{\min})}{2L}\right)^2 = \frac{(L+1)^2(w_{\max}-w_{\min})^2}{4L^2}$$

are the same as for (12), then the root mean square deviation (10) for the mean (13) will be similar:

$$\sigma_k^{(w)} = \sqrt{\frac{1}{L}\cdot\left(\sum_{l=1}^{\frac{L+1}{2}}\frac{(L-1)^2(w_{\max}-w_{\min})^2}{4L^2} + \sum_{l=1}^{\frac{L-1}{2}}\frac{(L+1)^2(w_{\max}-w_{\min})^2}{4L^2}\right)} =$$
$$= \frac{w_{\max}-w_{\min}}{2L}\sqrt{(L-1)(L+1)}.$$

Therefore, for an odd number of experts, the largest (worst) root mean square deviation of the weights is also uniquely determined:

$$\sigma_k^{(w)} = \frac{w_{\max}-w_{\min}}{2L}\sqrt{(L-1)(L+1)},$$

moreover, with a sufficiently large number of experts, this deviation will almost coincide with (11).

We will assume that the acceptable difference of expert judgments regarding the weight does not exceed 75% of the maximum difference. So, if:

$$\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[w_{kl} - w_k\right]^2} \le 0.75\cdot\frac{w_{\max}-w_{\min}}{2} = 0.375\cdot(w_{\max}-w_{\min}) \quad (14)$$

for an even number of experts:

$$\sqrt{\frac{1}{L}\cdot\sum_{l=1}^{L}\left[w_{kl} - w_k\right]^2} \le 0.375\cdot\frac{w_{\max}-w_{\min}}{L}\sqrt{(L-1)(L+1)} \quad (15)$$

for an odd number of experts, then the average weight of the *k*-th statement (9) in this case is already determined. If the corresponding inequality (12) or (13) is violated, then the experts must revise their judgments regarding the weight of the *k*-th statement until the corresponding inequality (12) or (13) is fulfilled. At the same time, other weights are not reviewed.

Taking into account the weights, the flexibility of the enterprise economic security system should be calculated as:

$$g = \frac{\sum_{k=1}^{18} w_k\tilde{g}_k}{2\cdot\sum_{k=1}^{18} w_k}. \quad (16)$$

Apparently, as the flexibility indicator (8) without taking into account the weights, the values of the flexibility indicator (14) lie in the range from –1 to 1 as well.

3. Results

For an example of application of the developed method of assessing the flexibility of the economic security system, we will review the textile enterprise PJSC "Lileia", which is a very powerful enterprise of light industry. 29 experts were involved in the survey: mainly representatives of the management and leadership of PJSC "Lileya" were included in this expert group. During the first survey the opinions of experts regarding the trust of authority to employees (par. 1.2), the self-management of small teams of employees (par. 2.2), as well as the fact that the production system at the enterprise allows rapid implementation of solutions in a modular way (paragraph 2.12) turned out to be rather divergent: consistency inequality (17):

$$\sqrt{\frac{1}{29}\cdot\sum_{l=1}^{29}\left[\tilde{g}_{kl}-\tilde{g}_{k}\right]^{2}}\le\frac{3}{29}\sqrt{28\cdot30}=\frac{6}{29}\sqrt{210}\approx2.9982 \quad (17)$$

was violated for k=2, 7, 17. After re-evaluating only these three statements, the inequalities (15) have already been satisfied (k=2, 7, 17). In the list of agreed answers of experts regarding the statements characterizing the flexibility of the economic security system of PJSC "Lileia" (2) are highlighted in gray.

Instead, expert evaluations of weights on a scale from 1 to 5 turned out to be agreed immediately (Table 3).

Table 2. List of agreed answers of experts regarding statements characterizing the flexibility of the economic security system of PJSC "Lileia"

The expert's number	*Statements that characterize the flexibility of the economic security system as a whole (par. 1) and the flexibility of the components of the economic security system (par. 2)*																	
	1.1	*1.2*	*1.3*	*1.4*	*1.5*	*2.1*	*2.2*	*2.3*	*2.4*	*2.5*	*2.6*	*2.7*	*2.8*	*2.9*	*2.10*	*2.11*	*2.12*	*2.13*
1	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*?*	*?*	*No*
2	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*
3	*No*	*No*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*?*	*No*	*No*	*No*	*?*	*No*	*Yes*	*Yes*	*Yes*
4	*Yes*	*?*	*No*	*Yes*	*?*	*?*	*Yes*	*No*	*?*	*Yes*	*No*	*Yes*	*?*	*?*	*Yes*	*Yes*	*Yes*	*No*
5	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
6	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*No*	*No*	*?*	*Yes*	*?*	*Yes*	*?*	*No*	*No*	*Yes*
7	*Yes*	*Yes*	*No*	*Yes*	*?*	*Yes*	*?*	*?*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*?*	*No*	*Yes*	*No*
8	*Yes*	*?*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*No*	*No*
9	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*?*	*?*
10	*No*	*No*	*Yes*	*Yes*	*No*	*Yes*	*No*	*?*	*No*	*No*	*No*	*No*	*No*	*Yes*	*No*	*No*	*Yes*	*No*
11	*?*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*?*	*Yes*	*?*	*No*	*No*
12	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*	*?*	*Yes*	*No*	*No*	*Yes*	*Yes*	*?*	*Yes*	*No*	*No*
13	*Yes*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*?*	*No*	*?*	*Yes*	*Yes*	*No*	*No*	*No*	*No*
14	*Yes*	*Yes*	*Yes*	*?*	*?*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*
15	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*?*	*No*	*Yes*	*No*	*No*
16	*Yes*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*?*	*No*	*No*	*Yes*	*No*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*No*
17	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*?*	*?*	*No*	*No*	*No*
18	*Yes*	*?*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*?*	*Yes*	*No*	*No*
19	*?*	*?*	*Yes*	*Yes*	*?*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*Yes*	*No*
20	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*
21	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*Yes*	*?*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*No*
22	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*?*	*No*
23	*Yes*	*?*	*Yes*	*No*	*?*	*Yes*	*No*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*?*	*Yes*	*Yes*	*?*	*?*
24	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*	*No*	*Yes*	*Yes*	*Yes*	*?*	*No*
25	*Yes*	*No*	*?*	*Yes*	*Yes*	*No*	*No*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*?*	*Yes*	*?*	*No*
26	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*?*	*No*	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
27	*Yes*	*No*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*
28	*Yes*	*?*	*No*	*?*	*No*	*Yes*	*No*	*Yes*	*Yes*	*No*	*No*	*Yes*	*Yes*	*?*	*Yes*	*Yes*	*No*	*No*
29	*?*	*?*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*?*	*Yes*	*No*	*No*	*Yes*	*Yes*	*Yes*	*No*	*Yes*	*No*	*No*

Table 3. List of expert weights of statements characterizing the flexibility of the economic security system of PJSC "Lileia"

The expert's number	Statements that characterize the flexibility of the economic security system as a whole (par. 1) and the flexibility of the components of the economic security system (par. 2)																	
	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12	2.13
1	*1*	3	**5**	**4**	**5**	**4**	4	3	3	5	3	3	**5**	2	4	**5**	4	*3*
2	*4*	3	**5**	**4**	**3**	**5**	5	4	1	3	2	3	**5**	4	3	**5**	2	*2*
3	*1*	5	**5**	**5**	**5**	**3**	4	4	5	3	2	5	**3**	3	2	**5**	3	*3*
4	*3*	3	**4**	**4**	**5**	**5**	5	2	4	4	3	4	**5**	3	2	**5**	4	*1*
5	*1*	5	**3**	**5**	**5**	**4**	5	3	3	5	4	4	**5**	1	4	**5**	3	*2*
6	*4*	5	**5**	**5**	**5**	**5**	3	3	3	4	2	5	**5**	3	3	**5**	3	*3*
7	*1*	2	**5**	**4**	**5**	**4**	5	3	3	3	3	4	**5**	2	2	**5**	5	*1*
8	*1*	5	**5**	**4**	**5**	**5**	4	4	2	4	5	3	**5**	2	2	**4**	4	*2*
9	*2*	5	**5**	**5**	**5**	**4**	3	3	3	4	2	4	**5**	5	5	**4**	3	*3*
10	*4*	4	**5**	**5**	**5**	**5**	4	2	2	3	2	5	**5**	2	4	**5**	3	*1*
11	*1*	2	**5**	**5**	**5**	**5**	2	5	2	5	5	5	**5**	5	3	**5**	4	*1*
12	*2*	4	**5**	**3**	**5**	**5**	4	2	4	3	2	5	**4**	1	2	**5**	4	*2*
13	*3*	4	**5**	**5**	**4**	**5**	5	5	3	3	3	5	**5**	3	3	**5**	4	*3*
14	*2*	4	**4**	**3**	**5**	**5**	3	2	3	4	2	5	**3**	3	3	**4**	3	*3*
15	*2*	5	**4**	**5**	**3**	**4**	5	1	4	4	4	5	**4**	2	3	**3**	3	*1*
16	*2*	4	**5**	**4**	**4**	**5**	3	4	1	5	5	5	**2**	5	2	**5**	2	*4*
17	*1*	3	**5**	**5**	**4**	**4**	5	5	2	4	5	3	**4**	3	1	**5**	3	*1*
18	*3*	4	**4**	**4**	**5**	**5**	4	2	3	5	2	5	**5**	5	1	**4**	3	*1*
19	*1*	4	**5**	**5**	**5**	**5**	4	3	2	5	2	4	**5**	3	2	**5**	4	*2*
20	*1*	5	**5**	**5**	**4**	**5**	5	5	2	4	1	3	**3**	3	3	**5**	5	*2*
21	*2*	5	**5**	**5**	**5**	**5**	4	5	5	2	4	4	**5**	5	4	**4**	1	*1*
22	*2*	5	**5**	**4**	**3**	**5**	3	4	2	5	3	5	**5**	4	3	**5**	4	*1*
23	*1*	3	**5**	**5**	**5**	**5**	5	4	1	3	3	4	**4**	2	4	**5**	2	*1*
24	*3*	4	**5**	**5**	**5**	**5**	2	5	5	4	4	4	**5**	4	5	**5**	3	*1*
25	*2*	4	**5**	**5**	**5**	**3**	5	3	1	4	3	5	**5**	4	1	**5**	4	*3*
26	*4*	3	**5**	**3**	**5**	**4**	5	4	3	2	3	2	**5**	5	1	**5**	3	*3*
27	*1*	5	**5**	**4**	**3**	**5**	5	4	4	4	4	3	**4**	5	1	**3**	4	*1*
28	*5*	5	**5**	**5**	**5**	**5**	3	1	3	3	1	5	**5**	4	3	**5**	2	*2*
29	*1*	5	**3**	**5**	**5**	**5**	5	1	2	4	5	5	**5**	3	4	**5**	3	*1*

As a result, the flexibility of the economic security system of PJSC "Lileia" according to formula (14) turned out to be equal to 0.329, which can be considered a satisfactory value for the development of the general strategy of ensuring the economic security of this enterprise. It should be noted that if the weights of statements were not taken into account when calculating flexibility, then according to formula (8) it would have been g=0.291, that is, the flexibility would be less at 11.5%. However, this is not an "artificial increase" in flexibility. The fact is that, in particular, the connection between the statement about clear strategic orientations (par. 1.1) and the implementation of solutions in a modular way using the information system of PJSC "Lileia" (par. 2.13) was considered by experts to be too weak (pay attention to the relatively small weight values in the corresponding columns of Table 3 - they are highlighted in italics on purpose). There is an explanation for this - in fact, these statements themselves are quite vague, which has prompted some experts to reduce their impact on the essence of flexibility. Instead, statements about the safety of the enterprise functioning and interaction with contact audiences (par. 1.3), about the optimality of the enterprise organizational structure (par. 1.4), about the practice of developing and implementing programs for adapting to the conditions of the external environment (par. 1.5), about the sufficient level of employee qualifications (par. 2.1), as well as about the combination of various types of activities and resources (par. 2.8) and the growth of the market value of the enterprise (par. 2.11) were assessed as very important. In the table 3 relevant columns are highlighted in bold. Of course, it should be noted that high weights do not at all mean that flexibility should increase - these are only indicators that the flexibility of the economic security system of PJSC "Lileia" is formed much more effectively on the basis of paragraphs 1.3-1.5, 2.1, 2.8, 2.11 than paragraphs 1.1 and 2.13. In particular, the high weight of the statement about the optimality of the organizational structure of the enterprise (par. 1.4) does not mean that this structure is really optimal or close to it.

Flexibility can also be translated into a more convenient interval from 0 to 1 using a ratio

$$g_{01} = \frac{g+1}{2} \tag{18}$$

In the case of g=0.329 for PJSC "Lileia" we get g_{01}=0.6645, which gives reason to believe that the flexibility of the economic security system of PJSC "Lileia" is at a level not lower than 66.5% (of the maximum possible level of flexibility).

4. Conclusions

The definition of flexibility is not an end in itself, since the ability of an enterprise to respond to threats of different levels of intensity depends on its level. That is, it is expedient for the management of enterprises to take into account the actual level of flexibility, which makes it possible to determine the most probable mode of operation of the mechanism for ensuring the economic security of the enterprise (Table 4).

Table 4. Determination of the mechanism operation mode for ensuring the economic security of an enterprise in accordance with the level of flexibility of economic security system

The level of flexibility of an enterprise economic security system	Mechanism operation modes for ensuring economic security
РГ$_{СЕБ}$=0 – 0,25	Forced
РГ$_{СЕБ}$=0,26 – 0,50	Increased activity
РГ$_{СЕБ}$=0,51 – 0,75	Rational
РГ$_{СЕБ}$=0,76 – 1	Reserve

It should be emphasized that proposals for the formation of a mechanism for ensuring an enterprise economic security of were given in many works, however, identification of such mechanism operation modes depending on the intensity of threats and the level of flexibility of an enterprise economic security system was not carried out.

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