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then, after completing the inverted transformations, find the confidence interval for the logistic curve.

Standard error $S_{\tilde{y}} = 0{,}278;\ K = 2{,}25.$

For example, the following year, the interval prediction of an integral indicator of financial stability for a test economy with a confidence probability of 0,95 is $\tilde{\Im}_{sl} = \left(0{,}663;\ 0{,}874\right)\cdot$

Thus, the obtained interval value of the predicted financial stability level indicates the existence in the test enterprise of the potential for increasing it (up to 0,875). However, there is also a likelihood of a slight decrease in the value of the integral index (up to 0,663).

The reasons for such deviations may be changes in the internal and external environment of the enterprise.

Conclusions. The conducted studies have revealed the anomalous value of the financial stability integral index over a ten-year period and established the nature of its occurrence. The analysis also showed that in the experimental time series there is a long trend of development, namely, there is a trend of development, namely, there is a trend. Therefore, this series can be used to build an economic-mathematical model and to determine predictive values.

We have also established the type of the most accurate trend model of the financial stability integral index of the test enterprise and its adequacy is proved with high probability.

Note that the algorithms presented in the paper are universal in nature and can be used in the study of other economic phenomena and categories.

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CONSISTENCY OF EXPERT OPINIONS DETERMINATION IN FINANCIAL ANALYSIS WITH USE SPECTRAL APPROACH

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Abstract

The problem of determining the level of estimations consistency during is considered group examination. The objective of the study is to develop a method for determining the consistency of peer reviews, without the number of key weaknesses inherent in existing methods. To increase the level of consistency, an expert feedback procedure is proposed, provided that no pressure is exerted on the expert. Expert evaluation the significance of the parameters of the financial condition of the enterprise for consistency with the spectral approach is presented in this article. The feasibility of using the spectral approach in financial analysis to verify the consistency of peer reviews is substantiated. An enhanced aggregated set of expert assessments, which is a strong base for further calculations, is defined.

Keywords: expert evaluation, consistency, spectral approach, the financial condition of the enterprise, financial parameters.

In the current conditions of the country's development, there is an urgent need to take into account the powerful arrays of financial and statistical reporting in making adequate financial decisions. This necessitates the involvement of experts' number to process such a wealth of data. Today, there are approaches that allow you to evaluate the quality of expert opinions by determining their degree of consistency, but most of them analyze all criteria at the same time, not individually. In addition, they do not take into account the competence of experts at the stage of calculating the consistency coefficient. Solving this problem will improve the quality of the peer review process, which in turn will have a significant impact on final decisions.

Today, scientists have developed many methods of assessing the financial and economic activity of the enterprise. To improve the quality of the evaluation process, some of the scientists involve expert diagnostics methods. Significant contribution to the study of this problem has been made by such scientists as: Beshelev S., Gurvich F., Malyshev N., Vernstein L.,

Bozhenyk A., Stoyanov E., Totsenko V. [1-4] and others. However, practically none of them considers the differences of the experts' opinion on each individual parameter when elaborating expert assessments, which makes the overall consistency possible.

The purpose of this article is to improve the accuracy of the assessment of expertise using the spectral approach.

The process of financial analysis requires the arrays of group expertise processing. The key problem here is determining the weight of the estimated object of the decision object. The methods of FCE estimation contain recommendations for the calculation of financial ratios, but practically none of them takes into account, unfortunately, the influence of these ratios on the decision making regarding the estimation of the financial condition of the enterprise. Therefore, to solve this problem, the authors of the scientific study propose to use and appropriately process expert knowledge. Recently, the problem of formalization of the peer review process has become increasingly important. However, there is no universal model for assessing the competence of the selected experts, which would allow for more accurate management decisions.

Consider the model proposed by the author of the research model of expert competence.

Questionnaire and self-assessment methods are suggested to determine competence.

For the **questionnaire**, the coefficient of competence is determined by the formula:

$$k_a = \frac{\sum_i \sum_j \gamma_{ij}}{\sum_i \gamma_i}, \quad (1)$$

where γ_{ij} – is the weight of the *j*-th characteristic (distinguished by the expert), which is estimated in the *i*-th gradation in points; γ_i – maximum weight of the *i*-th gradation in points.

I propose to include five blocks of questions in the questionnaire:

1. Experience.
2. Field of expert activity (enterprise, banking sphere, teaching activity).
3. Position (executor, middle manager, senior manager).
4. Theoretical level of preparation (Bachelor, Specialist, Master, PhD, Doctor of Economics, presence of academic non-social rank).
5. Image in business circles.

Five experts were involved in the research.

The results of the expert survey are shown in Table 1.

Table 1

Questionnaire of experts

Rating categories	**Balls**	**Experts**				
		1	**2**	**3**	**4**	**5**
Experience:	**30**					
up to 5 years	15					15
from 5 to 10 years	25	25				
More than 10 years	30		30	30	30	
Field of activity of the expert	**25**					
enterprise	15		15			
banking sphere	25	25			25	25
educational institutions	10			10		
Position	**25**					
performer	5					5
middle manager	15		15	15		
senior executive	25	25			25	
Theoretical level of preparation	**10**					
bachelor	5					
specialist	6		6		6	6
MSc	7	7				
Ph.D.	8					
Doctor of Economics	9			9		
availability of academic non-public title	10					
Image in business circles	**10**					
widely recognized in business circles man	10	10			10	
a person recognized as a specialist in several sectors of the economy	8					
a person recognized as a specialist in a particular field of economy	4		4			
little known in business circles man	2			2		2
Total	**100**	**92**	**70**	**66**	**96**	**53**

Substituting the results of the survey into formula (1), we determine the coefficients of experts' competence in the questionnaire:

Expert 1: $k_{a1} = \frac{25+25+7+25+10}{30+25+25+10+10} = \frac{92}{100} = 0{,}92$;

Expert 2: $k_{a2} = \frac{30+15+6+15+4}{30+25+25+10+10} = \frac{70}{100} = 0{,}7$;

Expert 3: $k_{a3} = \frac{30+10+9+15+2}{30+25+25+10+10} = \frac{66}{100} = 0{,}66$;

Expert 4: $k_{a4} = \frac{30+25+6+25+10}{30+25+25+10+10} = \frac{96}{100} = 0{,}96$;

Expert 5: $k_{a5} = \frac{15+25+6+5+2}{30+25+25+10+10} = \frac{53}{100} = 0{,}53$.

In order to increase the validity of peer review, it is advisable to supplement the questionnaire with self-assessment. This will allow objectively and comprehensively to form a comprehensive aggregated assessment of the expertise quality by the criteria of completeness and effectiveness.

Self-assessment is needed to further assess the expert's awareness. In the process of self-assessment, each specialist assesses their level of education on a 10-point scale, emphasizing the corresponding points:

- "0" points – expert is not aware of the essence of the investigated issue;
- "10" points – if the question falls within the sphere of narrow specialization of the expert.

The remaining (intermediate) 1-9 points are awarded depending on the expert's level of knowledge of the problem under study.

The expert's competence in self-assessment is calculated by the formula:

$$k_c = \frac{\sum_l \lambda_l}{\sum_l n}, \quad (2)$$

where λ_l - self-esteem (in points), which characterizes the degree of awareness of the specialist with the problem ℓ; n – is the highest possible self-esteem (10 points).

For self-assessment, questions are raised about awareness in the areas of financial sustainability, liquidity and mobility, business activity and profitability.

The results of the self-assessment of the experts selected for the scientific research are given in Table 2.

Table 2

Experts' self-assessment

Expert Awareness of Expert Awareness:	**Marks**	**Experts**				
		1	***2***	**3**	**4**	**5**
financial stability of the enterprise	**10**	10	7	9	10	6
liquidity and mobility	**10**	10	9	7	9	5
business activity	**10**	9	6	5	10	4
profitability	**10**	9	7	7	9	5
Total	**40**	**38**	**29**	**28**	**38**	**20**

Substituting the results of the survey into formula (2), we determine the coefficients of experts' competence on self-esteem:

Expert 1: $k_{c1} = \frac{10+10+9+9}{10+10+10+10} = \frac{38}{40} = 0{,}95$;

Expert 2: $k_{c2} = \frac{7+9+6+7}{10+10+10+10} = \frac{29}{40} = 0{,}73$;

Expert 3: $k_{c3} = \frac{9+7+5+7}{10+10+10+10} = \frac{28}{40} = 0{,}7$;

Expert 4: $k_{c4} = \frac{10+9+10+9}{10+10+10+10} = \frac{38}{40} = 0{,}95;$

Expert 5: $k_{c5} = \frac{6+5+4+5}{10+10+10+10} = \frac{20}{40} = 0{,}5.$

Therefore, a complex method of assessing the experts' competence was synthesized on the basis of two methods (questionnaire and self-assessment).

Thus, the competence of a specialist is determined by the formula:

$$k = \frac{\frac{\sum_i \sum_j \gamma_{ij}}{\sum_i \gamma_i} + \frac{\sum_l \lambda_l}{\sum_l n}}{2} = \frac{k_a + k_c}{2}. \quad (3)$$

Substituting the values of the competence coefficients in the questionnaire and self-assessment in formula (3), we define the generalized experts' competence coefficients.

Expert 1: $k_1 = \frac{0{,}92+0{,}95}{2} = 0{,}94;$

Expert 2: $k_2 = \frac{0{,}7+0{,}73}{2} = 0{,}71;$

Expert 3: $k_3 = \frac{0{,}66+0{,}7}{2} = 0{,}68;$

Expert 4: $k_4 = \frac{0{,}96+0{,}95}{2} = 0{,}96;$

Expert 5: $k_5 = \frac{0{,}53+0{,}5}{2} = 0{,}51.$

Since the competence factor of each expert is greater than 0.5, it can be argued that the expediency of their use in further analysis is fully justified. For this purpose it is necessary to normalize the competence coefficients. The competence coefficient must satisfy the condition:

$$\sum_{s=1}^{d} k_{ns} = 1, \quad (4)$$

where d –is the number of experts; k_{ns} – normalized coefficient of relative competence of the s-th expert.

Therefore, we normalize the coefficients of competence obtained by formula (3). Thus:

$$\sum_{s=1}^{d} k_s = 0{,}94+0{,}71+0{,}68+0{,}96+0{,}51=3{,}8.$$

$$k_{ns} = \frac{k_s}{\sum_{s=1}^{d} k_s} \quad (5)$$

Expert 1: $k_{n1} = \frac{0{,}94}{3{,}8} = 0{,}24;$ Expert 2: $k_{n2} = \frac{0{,}71}{3{,}8} = 0{,}19;$

Expert 3: $k_{n3} = \frac{0{,}68}{3{,}8} = 0{,}18;$ Expert 4: $k_{n4} = \frac{0{,}96}{3{,}8} = 0{,}25;$

Expert 5: $k_{n5} = \frac{0{,}51}{3{,}8} = 0{,}14.$

In the study, the results of which are highlighted in this article, five experts were involved in the collaboration, whose competence was evaluated in [5]. These specialists are offered to estimate a number of parameters of the financial state of the enterprise [6-8]. We will place all expert marks in Table 3.

Table 3

Score points provided by experts financial parameters

Options	**Mark**	**Expert Ratings**				
		e_1	e_2	e_3	e_4	e_5
Independence (autonomy) ratio	x_1	6	5	6	6	5
Financial stability ratio	x_2	6	6	5	6	6
Coefficient of financial stability	x_3	5	6	6	6	6
Maneuverability factor of own funds	x_4	4	5	3	4	4
The ratio of the provision of own working capital	x_5	5	5	6	6	6
Money solvency ratio	x_6	4	3	2	3	3
Ratio of estimated solvency	x_7	4	4	5	4	3
Ratio of critical (current) liquidity	x_8	6	6	6	6	5
Asset Mobility Ratio	x_9	3	3	4	3	3
Asset turnover ratio	x_{10}	3	4	3	4	5
Receivables turnover ratio	x_{11}	3	3	4	3	3
Ratio of accounts payable	x_{12}	3	2	1	2	2
Inventory turnover ratio	x_{13}	3	4	3	3	2
Turnover ratio of fixed assets	x_{14}	2	3	2	2	3
Equity turnover ratio	x_{15}	2	2	3	2	3
Cost-effectiveness	x_{16}	3	4	3	3	2
Profitability sale	x_{17}	3	2	3	3	3
Return on all assets	x_{18}	5	5	4	4	3
Ratio of receivables and payables	x_{19}	4	3	4	4	5
Return on equity	x_{20}	4	4	3	4	4

Once the data from the experts are collected, we process the estimates obtained. It is advisable to use the rank correlation method when processing the materials of collective expert estimation of the relative parameters weight. Therefore, the data obtained in points are ranked accordingly. A rank equal to one is assigned to the most important factor; rank with maximum number n – is the least important factor. If an expert assigns the same number of scores to several factors, then they are assigned standardized ranks. The standardized rank is the fraction of the sum of the seats occupied by factors of equal rank and the total number of such alternatives.

Analyzing the scores given to the indicators by the first expert: 6,6,6,5,5,5,4,4,4,4,4,4,3,3,3,3,3,3,3,3,2,2, let's determine the places, which takes each indicator according to the number of points: 1–3; 4–6; 7-11; 12-18; 19–20. Using the rules for determining standardized ranks, we obtain the following values: 2; 5; 9; 15; 19.5, where 2 = (1 + 2 + 3): 3; 5 = (4 + 5 + 6): 3; 9 = (7 + 8 + 9 + + 10 + 11): 5; 15 = (12 + 13 + 14 + 15 + 16 + 17 + 18): 7; 19.5 = (19 + 20): 2.

Similarly, we determine the ranks of all other experts and record the results in table 4.

Table 4

Matrix of ranks on indicators of financial condition of the enterprise

Marking	**Expert estimates**				
	e_1	e_2	e_3	e_4	e_5
x_1	2	5,5	2,5	3	5,5
x_2	2	2	5,5	3	2
x_3	5	2	2,5	3	2
x_4	9	5,5	14	9	8,5
x_5	5	5,5	2,5	3	2
x_6	9	15	18,5	14,5	13,5
x_7	9	10	5,5	9	13,5
x_8	2	2	2,5	3	5,5
x_9	15	10	14	9	5,5
x_{10}	15	15	8,5	14,5	13,5
x_{11}	15	19	20	18,5	19
x_{12}	15	10	14	14,5	19
x_{13}	19,5	15	18,5	18,5	13,5
x_{14}	19,5	19	14	18,5	13,5
x_{15}	15	10	14	14,5	19
x_{16}	15	19	14	9	13,5
x_{17}	5	5,5	8,5	9	13,5
x_{18}	9	15	8,5	9	5,5
x_{19}	15	15	8,5	18,5	13,5
x_{20}	9	10	14	9	8,5

After the expert data has been processed, it is necessary to assess the degree of expert opinions consistency. We use the dispersion coefficient of concordance (*W*), which is defined as the ratio of the variance estimate (*D*) to the maximum value of this estimate (D_{max}):

$$W = \frac{D}{D_{\max}}. \tag{6}$$

$$D = \frac{1}{m-1}\sum_{i=1}^{m}\left(\sum_{s=1}^{d} r_{is} - \bar{r}\right)^2, \tag{7}$$

where m – is the number of objects; r_{is} – rank given by the s-th expert of the i-th object; $\bar{r}$ - arithmetic mean of ranks.

$$\bar{r} = \frac{1}{m}\sum_{i=1}^{m}\sum_{s=1}^{d} r_{is}. \tag{8}$$

We denote $\sum_{i=1}^{m}\left(\sum_{s=1}^{d} r_{is} - \bar{r}\right)^2$ by Z_s^2. The results of the calculations are recorded in Table 5.

Table 5

Determination of the average ranks sum, squares of deviations of the ranks sum from the average sum

Marking	**Expert estimates**					**Ranks sum**	**Deviation of the ranks sum from the average sum**	Z_s^2
	e_1	e_2	e_3	e_4	e_5	r_s	Z_s	
x_1	2	5,5	2,5	3	5,5	18,5	-34	1156
x_2	2	2	5,5	3	2	14,5	-38	1444
x_3	5	2	2,5	3	2	14,5	-38	1444
x_4	9	5,5	14	9	8,5	46	-6,5	42,25
x_5	5	5,5	2,5	3	2	18	-34,5	1190,25
x_6	9	15	18,5	14,5	13,5	70,5	18	324
x_7	9	10	5,5	9	13,5	47	-5,5	30,25
x_8	2	2	2,5	3	5,5	15	-37,5	1406,25
x_9	15	10	14	9	5,5	53,5	1	1
x_{10}	15	15	8,5	14,5	13,5	66,5	14	196
x_{11}	15	19	20	18,5	19	91,5	39	1521
x_{12}	15	10	14	14,5	19	72,5	20	400
x_{13}	19,5	15	18,5	18,5	13,5	85	32,5	1056,25
x_{14}	19,5	19	14	18,5	13,5	84,5	32	1024
x_{15}	15	10	14	14,5	19	72,5	20	400
x_{16}	15	19	14	9	13,5	70,5	18	324
x_{17}	5	5,5	8,5	9	13,5	41,5	-11	121
x_{18}	9	15	8,5	9	5,5	47	-5,5	30,25
x_{19}	15	15	8,5	18,5	13,5	70,5	18	324
x_{20}	9	10	14	9	8,5	50,5	-2	4
Total						**1050**	**997,5**	**12438,5**
$\bar{r}$						52,5		

The maximum value of the variance is determined by the formula:

$$D_{\max} = \frac{d^2\left(m^3 - m\right) - d\sum_{s=1}^{d} T_s}{12\left(m-1\right)}, \tag{9}$$

where T_s – is the index of related rankings in the s-rank.

$$T_s = \sum_{k=1}^{H_S}\left(h_k^3 - h_k\right), \tag{10}$$

where H_s – is the number of groups of equal rank in the *s*-th ranking; h_k – is the number of identical ranks in the *k* group of related ranks when ranked by the *s* expert.

Substituting (7), (9) into (6), we write the expression to determine the concordance coefficient:

$$W = \frac{D}{D_{\max}} = \frac{12\sum_{i=1}^{m} Z_s^2}{d^2(m^3 - m) - d\sum_{s=1}^{d} T_s}. \quad (11)$$

According to Table 3 in the ranking expert s1 there are 5 groups of connected ranks (6;6;6), (5;5;5), (4;4;4;4;4), (3;3;3;3;3;3;3), (2;2), so $H_1 = 5$, $h_1 = 3$, $h_2 = 3$, $h_3 = 5$, $h_4 = 7$, $h_5 = 2$. Hence $T_1 = (3^3–3) + (3^3–3) + (5^3–5) + (7^3–7) + (2^3–2) = 510$. Similarly, we define $T_2 ... T_5$.

$T_2 = (3^3–3)+(4^3–4)+(5^3–5)+(5^3–5)+(3^3–3) = 348$;
$T_3 = (4^3–4)+(2^3–2)+(4^3–4)+(7^3–7)+(2^3–2) = 468$;
$T_4 = (5^3–5)+(7^3–7)+(4^3–4)+(4^3–4) = 576$;
$T_5 = (3^3–3)+(4^3–4)+(2^3–2)+(8^3–8)+(3^3–3) = 618$.

Substituting the values T_s, S and $m = 20$, $d = 5$ to formula 2.15 we obtain:

$$W = \frac{12 \cdot 12438{,}5}{186900} = 0{,}8 \cdot$$

The concordance coefficient takes values from 0 to 1. The greater the value of the concordance coefficient, the more consensual the experts' opinions are. At $W = 1$ there is complete consistency of experts' opinions; if $W = 0$, the information is completely inconsistent.

In this case, the value of the concordance coefficient is close to one, therefore, it can be concluded that the degree of concordance of experts' opinions is quite high.

The concordance coefficient is a random variable. The significance of the concordance coefficient is checked by Pearson's criterion (χ^2):

$$\chi^2 = \frac{12\sum_{i=1}^{m} Z_s^2}{dm(m+1) - \frac{1}{m-1}\sum_{s=1}^{d} T_s}. \quad (12)$$

Based on previously calculated data:

$$\chi^2 = \frac{12 \cdot 12438{,}5}{5 \cdot 20(20+1) - \frac{1}{20-1} 2520} = \frac{149262}{1967{,}37} = 75{,}87 \cdot$$

The calculated value χ^2 is compared with the table value for $n = m–1$ degrees of freedom and significance level (P = 0,95). In our case, at $n = 20–1 = 19$ degrees of freedom and P = 0,95 $\chi^2_{табл.} = 31.4$. Since 31,4 <75,87, the hypothesis about the consistency of experts in the ranking is accepted.

The author of the research proposes to use a spectral approach for the determination of consistency provided by many expert estimations, the proposed Totsenko V. [4].

Ask the expert evaluations (table. 1) as a set $V = \{v_j\}$, $j = (\overline{1, m})$, that represents the numbers of scale divisions with n divisions. Imagine a set *V* range, which is an *n*-component vector $R = \{r_i\}$, $i = (1, n)$, where r_i – is the number of experts who indicated the *i*-e scale division as an estimate.

$$k_s = \left(1 - \frac{\sum_{i=1}^{n}\sigma_i \left| i - \sum_{i=1}^{n} i\sigma_i \right| - \sum_{i=1}^{n}\sigma_i \ln\sigma_i}{G\left(\sum_{i=1}^{n}\left|i - (n+1)/2\right| + \ln n\right)}\right) z, \quad (13)$$

where $G = \frac{m}{\ln(m) n \ln(n)}$; *m* – number of experts; y_i – the sum of the coefficients of relative experts' competence, evaluation of which is presented and *i* division of the scale; *z* – boolean function that specifies the necessary and sufficient conditions under which the consistency coefficient k_s is equal to zero; *i(d)* – is the number of the scale division, which is the rounded estimates provided by the experts of the *d* group $d = (1,q)$; $y_{i(d)}$ – the sum of the coefficients of the experts' competence whose scores rounded to the division number *i(d)*.

In our case, the number of experts m = 5. In [5], the author has determined the coefficients of the relative expert's competence:

1st expert – 0,24; 2 – 0,19; 3rd – 0,18; 4 – 0,25; 5-y – 0,14.

We define the coefficients of consistency of expert assessments on each of the indicators. For parameter x_1: V = {6;5;6;6;5}, R = {0;0;0;0;2;3}.

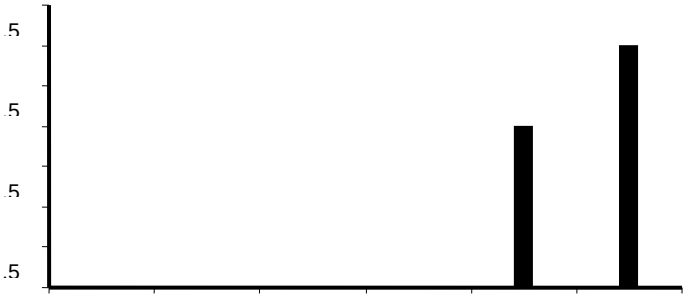

Fig. 1. The range R of expertise for indicator x_1

Consequently, the coefficient of expert estimates consistency for the independence coefficient (x_1) is calculated as follows:

$$k_{c1} = \left(1 - \frac{0{,}33\left|5-(5\cdot 0{,}33+6\cdot 0{,}67)\right| + 0{,}67\left|6-(5\cdot 0{,}33+6\cdot 0{,}67)\right| - (0{,}33\cdot \ln 0{,}33 + 0{,}67\cdot \ln 0{,}67)}{\frac{5}{\ln(5)\cdot 6\cdot \ln(6)}\left(\left|1-\frac{6+1}{2}\right| + \left|2-\frac{6+1}{2}\right| + \left|3-\frac{6+1}{2}\right| + \left|4-\frac{6+1}{2}\right| + \left|5-\frac{6+1}{2}\right| + \left|6-\frac{6+1}{2}\right| + \ln 6\right)}\right)\cdot 1 = 0{,}655.$$

For parameter x_2: V = {6;6;5;5;6}, R = {0;0;0;0;2;3}.

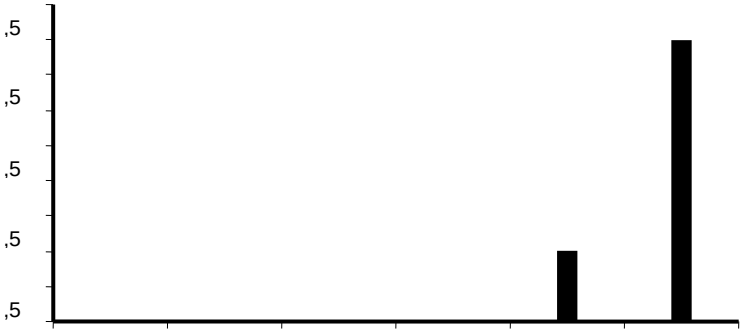

Fig.2. The range R of expertise for indicator x_2

$$k_{c2} = \left(1 - \frac{0{,}18\left|5-(5\cdot 0{,}18+6\cdot 0{,}82)\right| + 0{,}82\left|6-(5\cdot 0{,}18+6\cdot 0{,}82)\right| - (0{,}18\cdot \ln 0{,}18 + 0{,}82\cdot \ln 0{,}82)}{\frac{5}{\ln(5)\cdot 6\cdot \ln(6)}\left(\left|1-\frac{6+1}{2}\right| + \left|2-\frac{6+1}{2}\right| + \left|3-\frac{6+1}{2}\right| + \left|4-\frac{6+1}{2}\right| + \left|5-\frac{6+1}{2}\right| + \left|6-\frac{6+1}{2}\right| + \ln 6\right)}\right)\cdot 1 = 0{,}754.$$

Similarly determine the coefficients of uniformity for all other indicators.

$k_{c3} = 0{,}706,\ k_{c4} = 0{,}586,\ k_{c5} = 0{,}624,\ k_{c7} = 0{,}618,\ k_{c8} = 0{,}793,\ k_{c9} = 0{,}754,$
$k_{c10} = 0{,}485,\ k_{c11} = 0{,}754,\ k_{c12} = 0{,}545,\ k_{c13} = 0{,}609,\ k_{c14} = 0{,}655,\ k_{c15} = 0{,}659,$
$k_{c16} = 0{,}609,\ k_{c17} = 0{,}745,\ k_{c18} = 0{,}483,\ k_{c19} = 0{,}609,\ k_{c20} = 0{,}754.$

Quantification of the coherence of the of expert assessments is not an end in itself but is intended to justify the answer to the question regarding the possibility of using this set to compute the aggregated expert assessment. If the set of expert estimates it is impossible to recognize the information, you need a team of experts to offer a repeat assessment. Otherwise, you should answer the question: "do a lot of expert evaluations obtain generalized estimates with sufficient accuracy?" The answer to this question can be obtained by comparing the coherence of the investigated set of panel estimates coefficient with threshold application.

The threshold for the use $T_з$ is called of coherence of many expert assessments coefficient that calculates a generalized expert estimates with acceptable precision [4]. Relative to expert estimates, to characterize their accuracy it is more convenient to use the concept of permissible differences of opinion. This concept is easiest to formulate on the whole of the estimates of two experts. In this context, acceptable will consider the differences in the estimates of two experts for more than *b* scale divisions. The choice of value *b* (usually 1, 2) is determined by the quality requirements of expert information. The threshold for the use of the chosen coefficient coherence spectrum containing two equally competent experts that are remote to the *b* bars. It is important only the relative position of components. This pair can be placed anywhere in the scale, because the value of the coherence coefficient does not change under simultaneous shift of all components to the same value. We choose $b = 1$ to obtain high-quality expert information. For example, the experts gave the rating 5 and 6.

$$T_ç = \left(1 - \frac{0{,}5\left|5-(5\cdot 0{,}5+6\cdot 0{,}5)\right| + 0{,}5\left|6-(5\cdot 0{,}5+6\cdot 0{,}5)\right| - (0{,}5\cdot\ln 0{,}5+0{,}5\cdot\ln 0{,}5)}{\frac{2}{\ln(2)\cdot 6\cdot\ln(6)}\left(\left|1-\frac{7}{2}\right|+\left|2-\frac{7}{2}\right|+\left|3-\frac{7}{2}\right|+\left|4-\frac{7}{2}\right|+\left|5-\frac{7}{2}\right|+\left|6-\frac{7}{2}\right|+\ln 6\right)}\right)\cdot 1 = 0{,}588.$$

Important is the set *V* for which $k_c(V) \geq T_з$ [4].

If $k_c(V) < T_з$, then the set *V* does not carry enough information. Therefore, among the experts choose the least competent, and invite him to reconsider his assessment, and did not provide an estimates of other experts. Under conditions of equal competence choose expert, the evaluation of which module is more different from the average evaluation set *V*, and invite him to reconsider it. If the expert refused, his rating is excluded from the set *V*. Thereafter, determine the consistency of the obtained set of expert assessments coefficient. If at some step the requirement $k_c(V) \geq T_з$, such lot is considered significant and an average rating determined for him, is chosen as an agreed aggregate score. If at some step the process is terminated because of failure to do so, the team needs to be replaced.

So, evaluate the significance of our sets.

$k_{c1} = 0{,}655 \geq T_з$, $k_{c2} = 0{,}754 \geq T_з$, $k_{c3} = 0{,}706 \geq T_з$, $k_{c5} = 0{,}624 \geq T_з$, $k_{c7} = 0{,}618 \geq T_з$, $k_{c8} = 0{,}793 \geq T_з$, $k_{c9} = 0{,}754 \geq T_з$, $k_{c11} = 0{,}754 \geq T_з$, $k_{c13} = 0{,}609 \geq T_з$, $k_{c14} = 0{,}655 \geq T_з$, $k_{c15} = 0{,}659 \geq T_з$, $k_{c16} = 0{,}609 \geq T_з$, $k_{c17} = 0{,}745 \geq T_з$, $k_{c19} = 0{,}609 \geq T_з$, $k_{c20} = 0{,}754 \geq T_з$.

$k_{c4} = 0{,}586 < T_з$. It was proposed that a third expert to review it and he changed it to 4, resulting in a factor of coherence equal to $k_{c4} = 0{,}746 \geq T_з$. $k_{c6} = 0{,}545 < T_з$. It was proposed that a third expert to review it and he changed it to 3, resulting in the consistency ratio was equal to $k_{c6} = 0{,}706 \geq T_з$. $k_{c10} = 0{,}485 < T_з$. It was suggested that the fifth expert to review it and he changed it to 4, resulting in a factor of coherence equal to $k_{c10} = 0{,}626 \geq T_з$. $k_{c12} = 0{,}545 < T_з$. It was suggested that the third expert review his assessment and change it to 2, resulting in a coefficient of consistency equal to $k_{c12} = 0{,}706 \geq T_з$. $k_{c18} = 0{,}483 < T_з$. It was suggested that the fifth expert review his grade and change it to 4, resulting in a consistency coefficient of $k_{c18} = 0{,}624 \geq T_з$.

Therefore, only now we can conclude that expert opinions are fully consistent. The ultimate purpose of processing this set of expert assessments *V* is to determine an aggregate agreed estimate of the significance of the financial parameters.

To take into account the views of all experts, we propose to calculate an aggregate score that includes the competence of all experts:

$$e = \sum_{s=1}^{d} k_{ns} e_s , \qquad (14)$$

where k_{ns} – is the normalized coefficient of relative competence of the *s*-th expert; e_s – an estimate given by the s-m expert.

An aggregate estimate of the significance of the independence factor x_1:

$e_1 = 6\cdot 0{,}24+5\cdot 0{,}19+6\cdot 0{,}18+6\cdot 0{,}25+5\cdot 0{,}14=5{,}67.$

Aggregate evaluation of the significance of the financial stability ratio x_2:

e_2 = 6·0,24+6·0,19+5·0,18+5·0,25+6·0,14=5,57.

Similarly, we determine the aggregate estimates of the significance of all other financial parameters and record the results in Table 6.

Table 6

Determination of aggregate consistent peer review significance of the financial parameters

Options	Expert Assessment					Aggregated Assessment
	e_1	e_2	e_3	e_4	e_5	e
x_1	6	5	6	6	5	5,67
x_2	6	6	5	6	6	5,82
x_3	5	6	6	6	6	5,76
x_4	4	5	4	4	4	4,19
x_5	5	5	6	6	6	5,57
x_6	4	3	3	3	3	3,24
x_7	4	4	5	4	3	4,04
x_8	6	6	6	6	5	5,86
x_9	3	3	4	3	3	3,18
x_{10}	3	4	3	4	4	3,58
x_{11}	3	3	4	3	3	3,18
x_{12}	3	2	2	2	2	2,24
x_{13}	3	4	3	3	2	3,05
x_{14}	2	3	2	2	3	2,33
x_{15}	2	2	3	2	3	2,32
x_{16}	3	4	3	3	2	3,05
x_{17}	3	2	3	3	3	2,81
x_{18}	5	5	4	4	4	4,43
x_{19}	4	3	4	4	5	3,95
x_{20}	4	4	3	4	4	3,82

Analyzing Table 6, we can conclude that the aggregate assessment, which includes the competence of all involved professionals, allows obtaining accurate values of the weights of the parameters of the financial condition of the enterprise. And the qualitative estimates obtained are a good basis for building up a whole financial analysis methodology.

The possibilities of using expert judgment in the economy are unlimited. Already, the DSS has been established on the basis of such estimates, which are used by different companies to reduce the risk when planning their financial activities. The author substantiates the feasibility of using the spectral approach proposed by Totsenko V. in financial analysis for verification of expert estimates for consistency. The article discusses the methodology for determining the consistency of expert opinions, the use of which can significantly improve the accuracy of the peer review process. And this, in turn, will allow developing in the future an effective and high-quality system for assessing the financial condition of the enterprise.

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