

## ALGORITHMIZATION OF CALCULATION OF INVESTMENT CLIMATE RATING IN ENTERPRISES

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**Key words:** algorithmization of calculation, enterprise rating, investment climate.

In this article questions of creating of effective algorithms of calculation of investment climate rating in enterprises are examined. Estimate of investment climate based on calculation of indexes of outer and inner environment of activity and also integral estimate of economic state of enterprise is suggested. Interconnected algorithms of successive sampling of enterprises in accordance with indexes of outer and inner environment of activity are developed; it allows choosing enterprise for final calculation of rating of investment climate.

Effective functioning of economics of modern enterprises depends on involving outer investments or calculation of prognosticated effectiveness on investment into other enterprises. Both directions assume presence of variants of choice of recipient enterprise or variants of choice of organization of economic activity of enterprise within institutional environment. Estimate of investment attractiveness of potential investing object allows making decision when working out investment policy. Methods based on analytical calculations are more preferable because of objectiveness of the results and access for a large number of interested users.

Investing attractiveness of the enterprise with number "j" can be characterized by the index of investment climate rating  $R_{ИКП j}$ , consisting of essential indexes of outer activity environment of organization  $R_{ВНЕШ w}$ , indexes of inner environment  $R_{ВНУТР r}$ , separate critical inner economical indexes  $R_{ЭКОН e}$  of financial activity and business activity, and integral rating estimate of economical state of an enterprise  $R_{ЭСП j}$  by the sum total of economical indexes<sup>1</sup>. Indexes of outer environment  $R_{ВНЕШ w}$  can have two states - favorable (acceptable) and unfavorable (unacceptable). Introducing another more devel-

oped gradation is difficult. That's why it is reasonable to give them magnitudes of 1 and 0 correspondingly. Indexes of inner environment  $R_{ВНУТР r}$  and the most critical economical indexes  $R_{ЭКОН e}$  of financial activity and business activity of organization have similar states and magnitudes of 1 and 0 correspondingly.

Rating estimate of economical state of the enterprise  $R_{ЭСП j}$  can be defined by different methods<sup>2</sup>. Providing comparability of activity of different enterprises which have different magnitude of amount of considered indexes we suggest involving correction factor equal to the amount of considered indexes. The more acceptable indexes are considered, the higher attractiveness of investment climate of an enterprise  $R_{ИКП j}$  is and the higher is its accuracy.

Rating estimate of an enterprise  $R_{ЭСП j}$  is formed in accordance with the methodology adopted in the company with the help of the indexes of outer financial accounting of the enterprise and accounting policy of the enterprise. If we take for definiteness minimal magnitude  $R_{ЭСП j}$  as the best one, as in the system of financial analyses БЭСТ-Ф<sup>3</sup>, then the expression of rating of attractiveness of investment climate of organization will be the following<sup>4</sup>:

$$R_{ИКП j} = (s + m + n) \cdot \frac{\prod_{w=1}^s R_{ВНЕШ w, d} \cdot \prod_{r=1}^m R_{ВНУТР r, p} \cdot \prod_{e=1}^n R_{ЭКОН e, t}}{R_{ЭСП j}}, \quad (1)$$

\* Kuvshinov Mikhail Sergeevich, Cand. Sc. (Technics), Associate Professor of South Ural State University, Cheliabinsk.

where  $s$  is the amount of essential indexes of outer environment;  $m$  is the amount of essential indexes of inner environment;  $n$  is the amount of used economical indexes of activity;  $w$  is a number of index in the list;  $d$  is a number of an enterprise in the list of enterprises compared by outer indexes;  $r$  is a number of index in the list;  $p$  is a number of enterprise in the list of enterprises, compared by inner indexes;  $e$  is a number of indexes in the list;  $t$  is a number of enterprise in the list of enterprises compared by economical indexes.

When choosing an enterprise from the comparable list or a variant of development of one enterprise we must use all the magnitudes as the amount of indexes of outer environment and the amount of indexes of inner environment for

all the comparable variants to provide the best accuracy of the estimate  $R_{ИКП j}$ .

A priori it is clear that the amount of enterprises  $d$ , which can be potential objects of investment only according to the indexes of outer environment  $R_{БНЕСШ w, d}$ , formally is rather high. However, the presence of favorable environment in some region does not result in investment boom towards all the enterprises situated in this region. At the same time presence of unacceptable inner index  $R_{БНУТР r, p}$  shortens the list of pretenders. In similar way, acceptable by both inner and outer indexes of enterprise with number  $t$  are eliminated from the list of pretenders because of critical economical indexes  $R_{ЭКОН e, t}$ ,

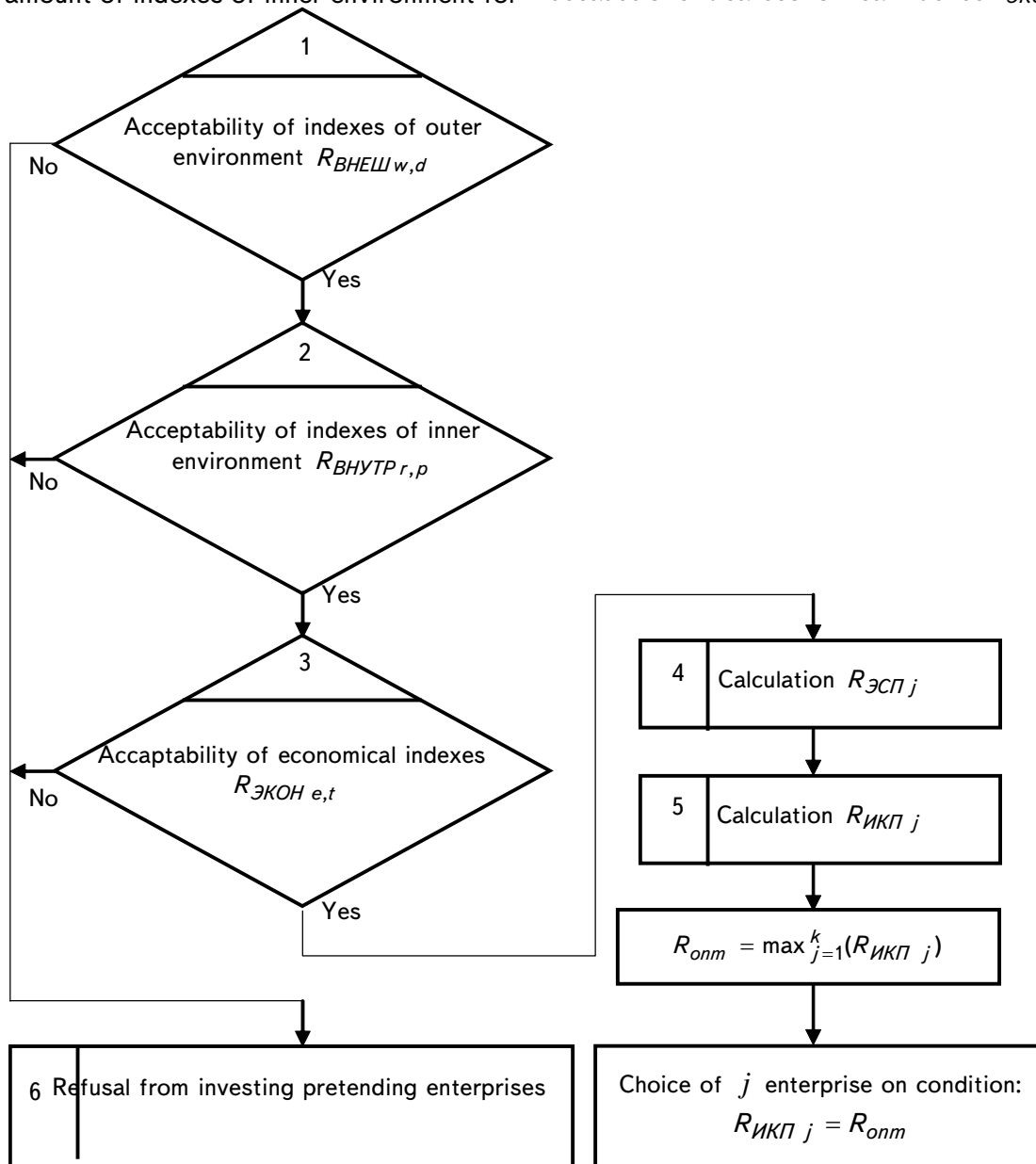


Fig. 1. Algorithm of choosing investment object by  $R_{ИКП}$

which already have quantitative magnitude and also shorten the list of pretenders. Only filtered off in indicated sequence pretenders can be compared by rating estimates.

The analysis of financial economic state is carried out by the participants of investment market according to the indexes of outer financial accounting and other documents accessible for a large number of interested users.

Lots of variants of outer and inner environment of activity of an enterprise result in necessi-

ty of realization of all the described dependences in the form of algorithm, appropriate for computer processing. Computer model of algorithm of calculating of investment climate rating in an enterprise allows getting calculations of the past periods and prognosticating calculations of future periods for supposed variants of input data. It is prognosticating that makes this model valuable for a leader when choosing managing decision.

In fig. 1 general structure of algorithm of choosing an investment object by estimate

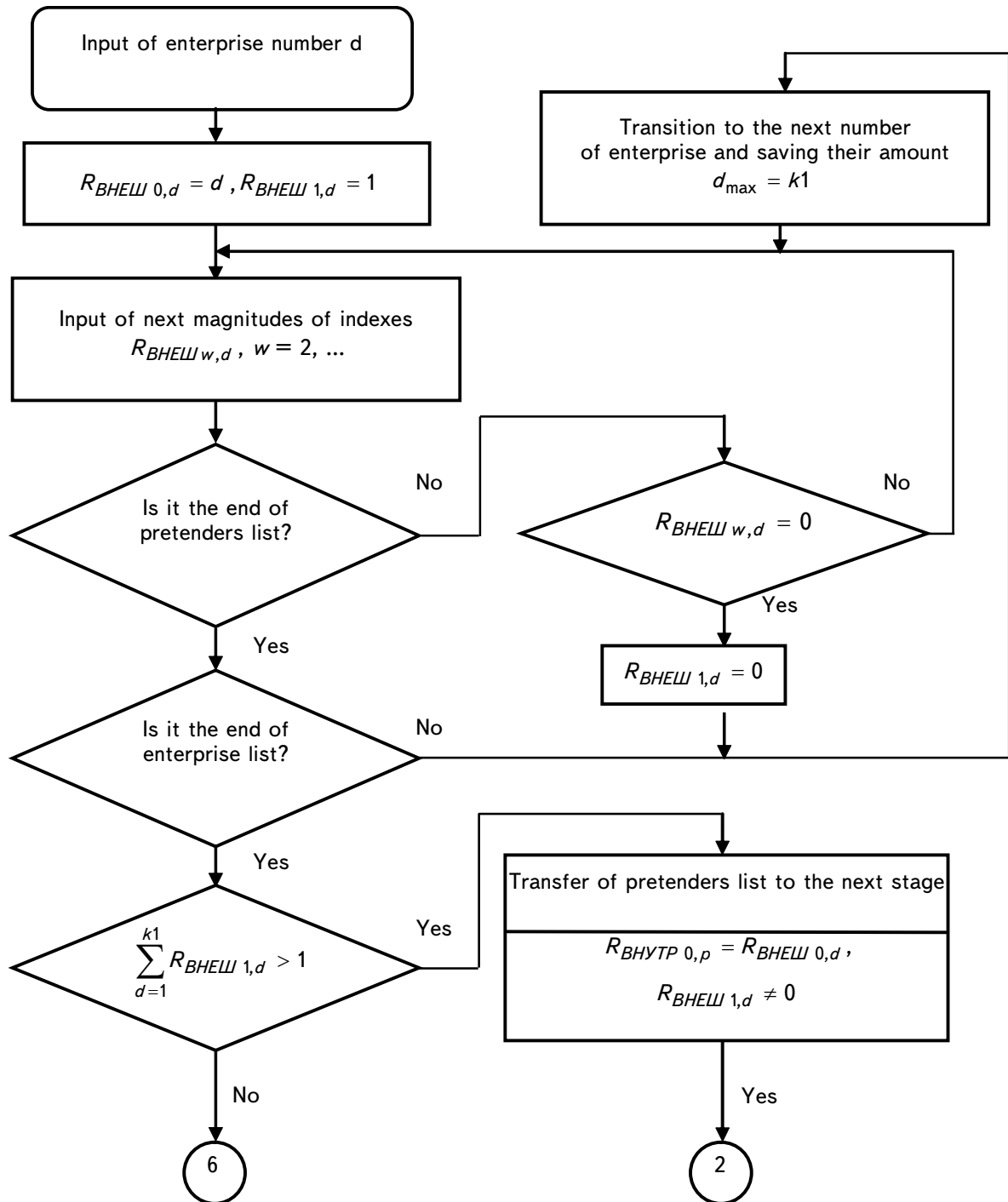


Fig. 2. Example of realization of procedure of acceptability determining

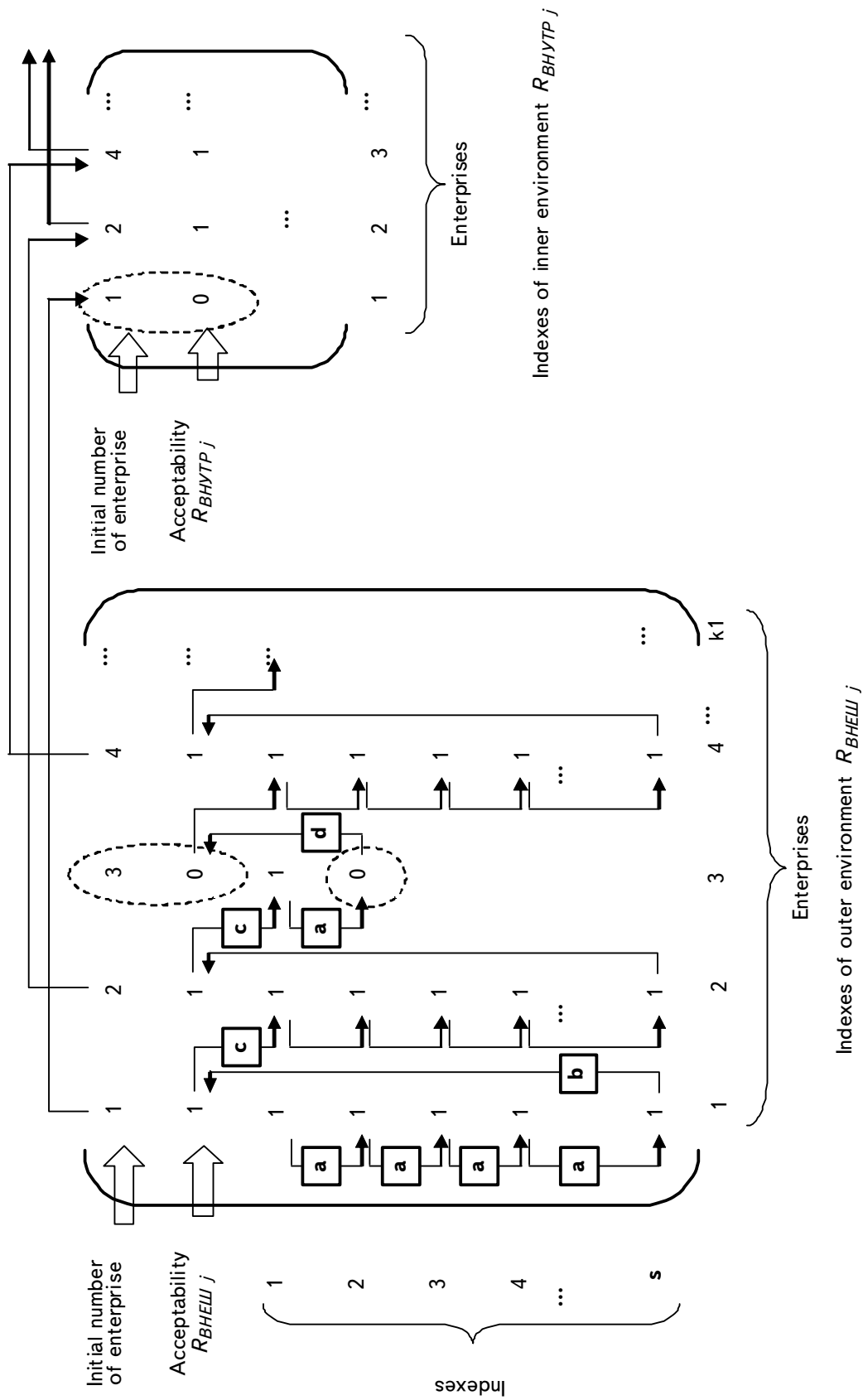


Fig. 3. Scheme of forming acceptability of indexes of activity environment of enterprises

$R_{ИКП_j}$  is shown; it consists of predetermined procedures “1”... “5”, described in particular independent algorithms.

The estimate of every considered type of indexes is effected sequentially by introducing parameters of forming elements and acceptable meanings, calculating magnitudes of calculated indexes, sorting in accordance with the level of criticality for an investor and sequential considering with the comparing of actual (calculating) magnitudes of indexes with acceptable magnitudes.

When comparing we make decision either about acceptability and transition to the next element of list of indexes, or to the completion of considering of the given enterprise as potential investment object.

All the indicated activities are carried out sequentially for all the comparable enterprises till the end of their list. When refusing from the considering the current pretending enterprise, the next enterprise is considered.

In every following predetermined procedure only the enterprises going through the previous procedures are considered.

Acceptability of current indexes  $R_{BHEW_{w,d}}$  of outer environment is determined by their composition. In fig. 2 as an example algorithm of procedure of defining acceptability by indexes of outer environment is shown. In fig. 3 the scheme of forming of factor of acceptability of enterprises by system of outer indexes and selection of enterprises for transfer into the next procedure is shown.

To provide possibility of decision making it is necessary to form a list of enterprises with giving each company a number which then will be used as indicator of enterprise during the automatic data processing (the first line of array  $R_{BHEW_{0,d}}$  (see fig.3), containing initial number of an enterprise).

The next step of the procedure is introduction of individual indexes of outer environment for every enterprise with number  $d$  from the indicated list in to the general data array, where every enterprise has its own column with number  $d = 1, \dots, k_1$ , and indexes are input into the same name lines with numbers  $w = 2, 3, \dots, s + 1$  in accordance with signs to the expression (1). On default  $R_{BHEW_{1,d}} = 1$  (second upper line of array  $R_{BHEW_{1,d}}$  in fig. 3).

The next step of the procedure is forming the second line of array  $R_{BHEW_{1,d}}$  for all the pretending enterprises by way of control of magnitudes of acceptability in columns.

Acceptability of the considered current index (steps  $a$  for the first and second enterprises in fig. 3) allows estimating acceptability of the next index for analyzed enterprise. Acceptability of all the indexes for enterprise provides possibility of the step  $b$  (see fig. 3) by giving acceptability of the enterprise in a whole and transfer to the analysis of acceptability of indexes of the next enterprise (step  $c$  in fig. 3).

Presence of even one zero in the column (see fig. 3, third enterprise) forms zero in the second line of this column (see fig. 3, step  $d$ ). If the amount of units in the second line is less than two, then the process of considering of data set of enterprises as pretenders stops, that is checked by exceeding the unite of sum of magnitudes in the second line in all the columns. This is an escape because of state “No” from the predetermined procedure “1” (see fig. 1).

In other case enterprises possessing whole acceptability by indexes  $R_{BHEW_{w,d}}$ , are transferred according to their identification numbers into data array for introducing into predetermined procedure “2” (see fig. 1) with the help of additional predetermined procedure “Transfer of the list of pretenders to the next stage”. This is an escape because of the state “Yes” from the predetermined procedure “1” (see fig. 1).

Acceptability of indexes of inner environment  $R_{BHYTP_{r,p}}$  is determined similarly. Predetermined procedure “2” realizing it is like predetermined procedure “1” with the change of signs in accordance with expression (1) to  $r = 2, \dots, m + 1$ .

For predetermined procedure “3” composition of economical indexes is based as indexes of financial resistance, solvency, profitability, efficiency of managing and business activity, which depend on indexes of accountability. That’s why enlarged structure of algorithm of predetermined procedure “3” of calculating acceptability of economical indexes  $R_{ЭКОH_{e,t}}$  (see fig. 1) includes input (calculation) of indexes of accountability, calculating economical indexes  $R_{ЭКОH_{e,t}}$ , keeping them for further use, estimate of their acceptability on every index

and pretending enterprise and transfer of the list of acceptable pretenders to the next stage.

Calculation  $R_{ЭСП j}$  in the predetermined procedure "4" is described in the author's work.

Calculation  $R_{ИКП j}$  in predetermined procedure "5" is effected in accordance with expression (1). Final choice of the pretenders is effected by maximum  $R_{ИКП j}$  from the rest of the list. Realization of the indicated algorithms in concrete environment of programming does not cause difficulties.

There by, presence of interconnected algorithms of forming intermediate results allows, on the basis of data about indexes of inner and outer environment of activity of the organization and data of its outer necessary financial accountability, forming analytical estimate of investment climate of enter-

prise, characterizing its investment attractiveness and providing basis for working out effective investment policy.

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<sup>2</sup> *Kuvshinov M.S.; Savitskaya G.V.* Analyses of Economic activity of Enterprise. M., 2001. 336 p.; System of Financial Analysis БЭСТ-Ф [Electronic Resource]. Access Mode: [http:// www.bestnet.ru/iprog/fan/fan.exe](http://www.bestnet.ru/iprog/fan/fan.exe); *Sheremet A.D., Negashev E.V.* Methods of Financial Analyses. M., 1999. 208 p.

<sup>3</sup> System of Financial Analysis ...

<sup>4</sup> *Kuvshinov M.S.*

<sup>5</sup> There.