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APPLICATION OF A PRIORI RANKING METHOD FOR STUDYING THE PROSPECTS OF MANAGERIAL DECISION-MAKING IN RISK ASSESSMENT

ЗАСТОСУВАННЯ МЕТОДУ АПРІОРНОГО РАНЖУВАННЯ ДЛЯ ДОСЛІДЖЕННЯ ПЕРСПЕКТИВ ПРИЙНЯТТЯ УПРАВЛІНСЬКИХ РІШЕНЬ ПРИ ОЦІНЦІ РИЗИКІВ

ANNOTATION

The article deals with the practical aspects of the application of the method of choice when making managerial decisions and applies a priori ranking method for enterprises. According to the results of this method, the most influential factors were identified on the level of riskiness of the enterprise and recommendations were given for the effective risk assessment at the enterprise and making managerial decisions in the enterprise risk assessment. The factor which, from the viewpoint of respondents surveyed, has the most influence on the researched indicator has the least amount of ranks, and the least influential factor is the highest amount of ranks. Then a histogram of the distribution of the sum of the rank of the influence of the selected factors on the degree of riskiness of the enterprise was constructed. The final stage of the study is an assessment of the significance of the coefficient of concordance on the Pearson criterion. The final stage of the study is an assessment of the significance of the coefficient of concordance on the Pearson criterion.

Key words: a priori ranking method, managerial decision-making, risk assessment, financial stability of enterprise.

АНОТАЦІЯ

У статті розглянуто практичні аспекти застосування методу вибору при прийнятті управлінських рішень та застосовано апріорний метод ранжування для підприємств при оцінці ризиків. За результатами даного методу визначено найбільш впливові фактори на рівні ризикованості підприємства та надані рекомендації щодо ефективної оцінки ризику на підприємстві та прийняття управлінських рішень при оцінці ризиків підприємства. Загальна тривалість процесів управління (цикли управління) складається з часу для збору, передачі та обробки інформації; розробка та прийняття рішень; організація виконання рішень. Звідси встановлена важливість фактору часу в управлінні організаціями та підприємствами. Необхідно скоротити час на виконання певних операцій, спростити організаційні та документальні процедури, використовувати технічні засоби для виконання ряду управлінських операцій. Інформація може мати суттєвий вплив у порядку зменшення їх внеску. Фактор, який, з точки зору опитаних респондентів, має найбільший вплив на досліджуваний показник, має найменшу кількість рангів, а найменш впливовим фактором є найбільша кількість рангів. Потім була побудована гістограма розподілу суми рангу впливу вибраних факторів на ступінь ризикованості підприємства. Заключним етапом дослідження є оцінка значущості коефіцієнта відповідності за критерієм Пірсона. Також оцінювали ступінь узгодженості думок усіх опитаних респондентів. Необхідність такої оцінки обумовлена тим, що наведені результати дослідження мають сенс, якщо середній ступінь узгодженості думок респондентів не випадковий. З огляду на вищезазначене можна відзначити, що найбільший вплив на ступінь ризикованості підприємства має частка залученого капіталу, рівень прибутку на капітал і діяльність, рівень фінансового ризику та ліквідність коштів, оскільки ці фактори є значущими для формування фінансової стійкості підприємства. Крім того, такі фактори, як розмір основних фондів, величина чистого доходу та рівень інвестиційної

привабливості, мають значний вплив на раціональний баланс місцевих і національних податків. Фактори, пов'язані з зовнішніми факторами ризику, мають найменший вплив на раціональний баланс місцевих і національних податків.

Ключові слова: метод апріорного ранжування, прийняття управлінських рішень, оцінка ризиків, фінансова стійкість підприємства.

АННОТАЦИЯ

В статье рассмотрены практические аспекты применения метода выбора при принятии управленческих решений и применен метод априорного ранжирования для предприятий. По результатам данного метода, выявлены наиболее влиятельные факторы на степень рискованности предприятия и даны рекомендации по эффективной оценке рисков на предприятии и принятия управленческих решений в оценке риска предприятия. Было определено фактор, с точки зрения опрошенных респондентов больше всего влияет на исследуемый показатель, имеет наименьшую сумму рангов, а фактор, меньше влияет – наибольшую сумму рангов. Далее было построено гистограмму распределения сумм рангов влияния отобранных факторов на степень рискованности предприятия. Заключительным этапом исследования является оценка значимости коэффициента конкордации по критерию Пирсона.

Ключевые слова: метод априорного ранжирования, принятия управленческих решений, оценка рисков, финансовая устойчивость предприятия.

Problem statement. The process of production management, carried out by the control apparatus, has a cyclic continuous character and proceeds in time and space. By its temporal parameters, it can be measured in duration – from several minutes to several months. Spatial characteristics of the management process can range from groups, brigades of performers to the enterprise as a whole. Thus, the control cycle is characterized by two types of measurements: the cycle time and the spatial frame of the cycle.

The total duration of management processes (management cycles) consists of time for the collection, transmission, and processing of information; development and decision-making; organization of decisions' execution. Hence the importance of time factor in the management of organizations and enterprises. It is necessary to shorten the time to perform certain operations, to simplify organizational and documentary procedures, to use technical means to perform a number of management operations. The peculiarity of the method of a priori ranking of factors is that

factors that according to a priori information can have a significant impact ranked in descending order of their contribution. Contribution of each factor is estimated by the value of the rank assigned by the researcher to this factor at the ranking of all factors based on their intended effect on the parameters optimization. When collecting opinions by interviewing experts, each of them is invited to fill out a questionnaire, which lists the factors of their dimension and estimated variation intervals. By completing the questionnaire, the specialist determines the place of factors ranked row. To conduct a priori ranking of factors that affect the degree of riskiness of an enterprise, it is necessary to perform the following tasks:

1. To select the factors influencing the degree of riskiness of the enterprise.

2. Estimate, using a priori ranking method, the degree of influence of the selected factors on the dependent variable.

Analysis of publications and allocation of outstanding problems. According to the criterion of information certainty, the adoption of managerial decisions can be carried out in the following conditions: certainty, insufficiency, risk (probabilistic certainty), complete uncertainty [4; 8]. Quantitatively some author such as I. Blank, T. Borisova, V. Granaturov attempt to assess the risks with the help of score assessments but they only simulate quantitative characteristics since their availability greatly simplifies the decision-making process, but it is quite often suboptimal there [1; 2; 6].

The purpose of the article. For an effective risk assessment at the enterprise and the adoption of managerial decisions in the enterprise risk assessment, it is necessary to determine the degree of riskiness of the investigated enterprise. Therefore, it is necessary to identify and analyse factors that influence the degree of riskiness of an enterprise using a priori ranking.

The main material. An important role is played by determining the sequence of stages of developing and making managerial decisions. The names of the blocks give an idea of the content of stages of the process of forming a managerial decision. One should pay attention to such features. In order to determine the purpose and criteria for solving a problem, the multidimensional problems should be taken into account in the first place. The development of a managerial solution is a complex of various managerial actions, where each subsequent action is a logical continuation of the previous one.

After the wording of the goal and the choice of the criterion of optimality or expediency, the choice of specific factors and conditions that will depend on the outcome of the decision will be made. A well-founded selection of factors is a prerequisite for the development of a scientifically sound and, therefore, effective solution [7, p. 78].

1. Problem statement. The first step in solving the problem is its definition. There are two ways

to consider the problem. First, the problem is considered to be a situation when the goals are not achieved (you will learn about the problem because there may not be something to happen). In this case, our influence on the problem situation will be reactive management. Secondly, as a problem, one can also consider a potential opportunity (for example, an active search for ways to increase the efficiency of a unit, even if things are going well); it will be proactive management.

In this case, you determine the problem when you come to the conclusion that something can be done either to improve the course of the case or to benefit from the opportunity provided. It is possible to distinguish two phases of the diagnostic phase of a complex problem: awareness and establishment of symptoms of complications or opportunities; finding out the causes of the symptoms detected.

2. Formulation of limitations and decision criteria. In order to make managerial decisions realistic and feasible, internal and external constraints must be taken into account. Internal can be attributed to insufficient resources of the organization – financial, time, technological, human, as well as moral and ethical considerations, to external – the current legislation.

The limitation of corrective actions limits the possibilities for decision-making. Before proceeding to the next stage of the process, the leader must unbundle the essence of the restrictions and only then identify alternatives. In addition to identifying limitations, the supervisor needs to determine the standards to be used for evaluating the choices (criteria for decision-making).

3. Identification of alternatives. Ideally, it is desirable to identify all possible actions that could eliminate the causes of the problem and thereby make the organization able to achieve its goals. In practice, the manager, as a rule, limits the number of choices to seriously consider the whole number of alternatives that appear to be most desirable.

4. Evaluation of alternatives. When identifying alternatives, a certain preliminary estimate is required. Both the quantity and the quality of alternative ideas grow when the initial generation of ideas (identification of alternatives) of departments from the assessment of the final idea. This means that only after the list of all ideas has been compiled one should proceed to the assessment of each. For mapping solutions, you need to have a standard for which you can measure the likely results of implementing each possible alternative. Such standards are called decision-making criteria that are set up in the second stage.

5. Choice. If the problem was correctly identified, and possible solutions are carefully weighed and evaluated, and choices are made, thus making a decision is relatively easy. The manager simply chooses an alternative with the most favourable overall outcomes. If the problem is complex and you have to take into account many factors (or if information and analysis are subjective), it may happen that no alternative

will be the best choice. In this case, the main role belongs to analysis, experience, and intuition.

6. Realization of the decision. The process does not end with the choice of an alternative. At the stage of implementation, measures are taken to specify the solution and bring it to the executors, the value of the solution lies in the fact that it is implemented. The level of effectiveness of a solution will increase if it is recognized by the person to whom it affects. A good way to gain recognition is to attract such people to the process of its adoption.

7. Control over the execution of the decision. In the control process, deviations are detected and corrections are introduced to help realize the solution in its entirety. Controls establish a kind of feedback between control and control systems.

The success of results of business entities depends to a large extent on the adopted concept of risk management. Determining the purpose of the risk management process is complicated by the existence of a direct relationship between risk and profit, so companies must independently determine the level of risk they agree to for the planned profit.

In this case, the investigated phenomenon is the degree of riskiness of the enterprise. Based on the logical-economic analysis, 12 factors (x_j) that have an effect on the phenomenon under study (dependent variable (Y)) were selected as a result of the study of literary sources on determining the possible factors of influence on the degree of riskiness of the enterprise.

Consequently, the following factors influence the degree of riskiness of an enterprise: X1 – level of financial risk; X2 – level of profitability of capital; X3 – level of investment attractiveness; X4 – share of attracted capital; X5 – the value of net income; X6 – level of profitability of activity; X7 – share of the market of the enterprise; X8 – liquidity level; X9 – the size of fixed assets; X10 – economic and political situation in the country; X11 – number of employees; X12 – changes in legislation (tax increase).

A survey of respondents in the number of 24 people directly related to the enterprise was conducted to determine the degree of influence of X_j on Y . All respondents have higher education, mostly economic, the average age of the respondents is 30 years. This survey was conducted among the company's employees and university professors. Each respondent was asked to complete a questionnaire listing factors that could affect the researched indicator. The factor, which in the opinion of this respondent most influences the degree of riskiness of an enterprise, is ranked 1, etc., and the rank value is not repeated.

The factor that, from the viewpoint of respondents surveyed, has the greatest impact on the researched indicator has the smallest sum of ranks, and the least influential factor – the highest sum of ranks.

Then a histogram of the distribution of the sum of the rank of the influence of the selected factors on the degree of riskiness of the enterprise was constructed, based on the received sum of rank in terms. At the same time, the corresponding factors are on the abscissa axis, and the ordinates are their respective amounts (Fig. 1).

Based on the analysis of the constructed histogram of the distribution of sums of ranks, it is possible to group selected factors according to the degree of their influence on the degree of riskiness of the enterprise.

The group of factors that most affect the degree of riskiness of the enterprise can be attributed: the share of attracted capital, the level of return on capital and the level of financial risk. This group of factors has the greatest impact on the researched indicator since it is the share of attracted capital, the level of financial risk, and the level of profitability of capital determine the dependence of the enterprise on creditors and investors.

Also important is the level of financial risk, which is a key factor in shaping the financial

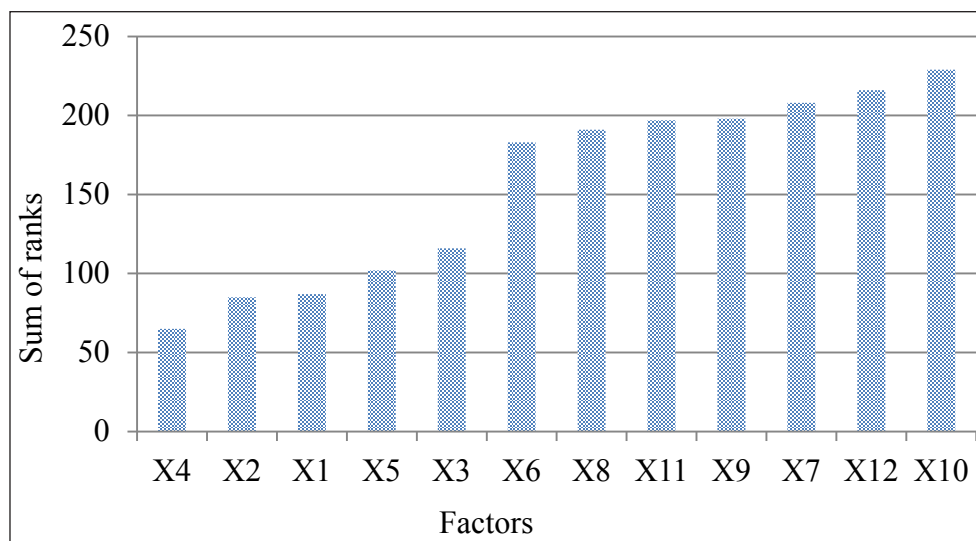


Fig. 1. Histogram distribution of the sum of rank factors that affect the degree of riskiness of the enterprise

sustainability of the enterprise, which reflects the state of financial resources of the enterprise, in which rational disposal of them guarantees the availability of own funds, sustainable profitability, and ensuring the process of expanded reproduction.

The second group of factors, according to respondents, includes: the value of net income, the size of fixed assets, the level of profitability of activity, and the level of liquid assets. That speaks about an important role of a financial condition of the enterprise in a certain degree of riskiness of the enterprise. These factors reflect the profitability of an enterprise and the ability to meet their obligations. That is, the enterprise's inability to prevent a reduction in the volume of liabilities or to finance the growth of its assets directly depends on these factors.

The number of employees, the level of investment attractiveness, and the market share have a small impact on the degree of riskiness of the enterprise and belong to the third group of factors. These factors form the company's position in the market and its attractiveness both for investors and for suppliers and consumers.

The fourth group of factors includes changes in legislation (tax growth) and the economic and political situation in the country, and these factors have the smallest impact on the degree of riskiness of the enterprise. These factors are external, which indicates the company's firmness to external risks.

The degree of coherence of opinion of all interviewed respondents was also assessed. The need for this assessment is due to the fact that the above results of the study make sense if the average degree of consistency of opinion of respondents is not accidental.

In our case, the coefficient of concordance for the performed calculations is 0.4911, that is, experts' opinions are agreed on 48.11%.

The final stage of the study is an assessment of the significance of the coefficient of concordance on the Pearson criterion. Thus, the calculated value was $\chi^2 = 127,02$ more tabular for the 5% level of significance for the number of degrees of freedom 11 ($\chi^2_{\text{tabl}} = 44,46$), then the null hypothesis about the coincidence of the opinions of the interviewed experts should be considered rejected. That is, with a probability of 0.95, it can be argued that the consistency of the opinions of all interviewed respondents is not accidental.

Conclusion. In view of the above, it can be noted that the greatest impact on the degree of riskiness of an enterprise is the share of attracted capital, the level of return on capital and activities, the level of financial risk, and liquidity of funds, because these factors are significant in shaping the financial sustainability of the enterprise. Also, factors such as the size of fixed assets, the value of net income, and the level of investment

attractiveness have a significant impact on the rational balance of local and national taxes. Factors related to external risk factors have the smallest impact on the rational balance of local and national taxes.

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