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Voronezh State University of Architecture and Civil Engineering

D. Sc. in Engineering, Prof. of Department of Construction Organization,

Examination and Management of Property V. Ya. Mischenko

Penza State University of Architecture and Civil Engineering

D. Sc. in Engineering, Prof. Department of Economics,

Organization and Investment B. B. Khrustalyov

Russia, Voronezh, tel.: 8(4732)71-52-02;

e-mail: postmaster@pgasa.penza.com.ru

V. Ya. Mischenko, B. B. Khrustalyov

METHOD OF CALCULATION OF INNOVATIVE POTENTIAL OF REGIONAL BUILDING COMPLEX ENTERPRISES

It is proved that the higher innovative potential of an enterprise, the more attractive it to the investor and more capable of taking over innovative project.

Keywords: innovative projects, enterprises, potential.

At the first stage of implement of investment in innovations related to the construction sector, it is necessary to evaluate the innovative capacity of companies, realizing the innovation, because it affects the probability of successful innovation in the market. The innovative potential $П_{ин}$ of the company consists of innovative readiness $И_г$, innovation activity $И_а$, and innovation reliability $И_н$:

$$П_{ИН} = \sqrt[3]{И_Г \times И_А \times И_Н}.$$

Innovative readiness is the ability of companies to implement innovation. This is the most important indicator of innovative capacity. It is characterized by indicators of production, labor, management and investment potential (see Table).

Table

Indicators for the calculation of the innovative capacity of the transport company

Potential	Formula	Indicators
Labor	$\Pi_{mp} = \sqrt[3]{И_{pв} \times И_{кв} \times И_{нт}}$	$И_{pв}$ is the index of usage of operating time; $И_{кв}$ is the index of usage of skill of production workers; $И_{нт}$ is the index of labor intensity of production workers
Production	$\Pi n = \sqrt[3]{И_{mp} \times И_{мат} \times И_{mex}}$	$И_{mp}$ is the index of usage of human resources; $И_{мат}$ is the index of supply with material resources; $И_{mex}$ is the index of supply with technical resources
Management	$\Pi_{упр} = К_{cm} \times К_{mу}$	$К_{cm}$ is the coefficient of personnel stability; $К_{mу}$ is the coefficient of laboriousness of management
Investment	$\Pi_{u} = R/P$	R is the amount of involved resources of company; P is the economic income of company

Innovative activity characterizes the extent of the use of innovation in the process of implementation of industrial and economic activity.

It is determined by the ratio of size of innovative products, rubles, to the total output, roubles:

$$И_A = \frac{V_{ИННОВ}}{V}.$$

Innovative reliability is the ability of transport companies to operate effectively in the context of the implementation of the innovation project.

It is determined on the basis of analysis of financial and economic activities of enterprises, taking into account the views of experts of the transport enterprises of all levels.

Evaluation of labor resources usage is based on analysis of three components: disposable fund of working time, production skills and productive power of labor.

1. Index of usage of operating time of production workers ($И_{рв}$) is determined by formula

$$И_{рв} = \sum_{i=1}^{n} Ф_{рв} \bigg/ \sum_{i=1}^{n} t_{np},$$

где n is the quantity of production workers; $Ф_{рв}$ is the calculation fund of operating time, shared of one worker; t_{npi} is the time, spent by i-м worker for job production during $Ф_{рв}$, h (taking into account time for each job, except for real loss — idle time, absence etc.);

2. Index of usage of skill of production workers ($И_{кв}$) is offered to calculate by formula

$$И_{кв} = \sum_{i=1}^{n} \ t_{np} - t_{н} \ \bigg/ \sum_{i=1}^{n} t_{np},$$

where $t_{н \ i}$ is the time, spent by i-м worker for operating jobs, which are lower of higher than actual skills of worker.

3. Index of labor intensity of production workers ($И_{нт}$) is determined by formula

$$И_{нт} = \frac{t_{н}}{t_{ф} \times d},$$

where t_n is the standard time to carry out a job for work order; $t_{ф}$ — actual time spent on carry out a job; d is the average-progressive reduction of standard time.

By combining these indicators, it is possible to quantify the index of effectiveness of the use of human resources:

$$И_{тр} = \sqrt[3]{И_{рв} \times И_{кв} \times И_{нт}}.$$

To evaluate the use of material resources, an analysis of the following indicators are carried out: the index of contract security, the production supply index, index of organization of resources supply.

1. Index of contract security ($И_{до}$) is determined by comparing the number (cost) of material resources (raw materials, fuel), obtained from the suppliers of the enterprise with violation of the periods and size of deliveries, and total size of deliveries over the same period of the contract:

$$И_{до} = \frac{M_{нс}}{M_{пл}},$$

where $M_{нс}$ is the number (cost) of material resources available for the period with the late delivery (late); $M_{пл}$ is the the number (cost) of material resources, which should have been received during the period under the contracts.

2. The production supply index ($И_{on}$) characterizes the level of supply with different kinds of resources (raw materials, fuel), or different types of services and is determined by the following ratio:

$$И_{on} = \frac{M_{ф}}{M_{n}},$$

where $M_{ф}$ is the the number of resources (services) received during the period in production in the relevant units of measurement; M_{n} is the the necessary quantity of resources in the appropriate units of measurement, which must be received during the period by the plan.

3. The index of organization of supply with material resources ($И_{м}$) is determined by multiplying the coefficient for the production supply and coefficient of contractual security $И_{до}$:

$$И_{мат} = И_{до} \times И_{on}.$$

The basic parameters that characterize the use of technical resources are yield on capital investment of fixed assets, turnover of capital, profitability of turnover means, profitability of fixed assets.

1. The indicator of yield on capital investment reflects the efficiency of use of embodied in basic production assets labour and characterizes the amount of products per 1 rouble of value of fixed assets.

Such situation should be considered as effective when increase in labour efficiency outstrips the level of equipment of workers with capital assets. Indicator of yield on capital investment is proposed to be calculated by the formula

$$Ф_{отд} = C_{усл} / Ф_{n},$$

where $C_{усл}$ is the the annual volume of produced services in cost measurement, thousand roubles; $Ф_{n}$ — the average cost of fixed asserts for the same period, thousand roubles.

2. The degree of use of turnover means is characterized by the coefficient of turnover, which is calculated by the formula

$$К_{об} = B / OC,$$

where B is the the proceeds from the principal activity that is the provision of services, as well as proceeds from the sale of materials and services for a certain period of time, OC — the average value of turnover means over the same period.

3. Profitability of turnover means and fixed assets determines their costs per unit of production and can be determined by the formula

$$Э_{ф} = П / Ф,$$

where $\varPi$ is the annual profit of organization; $\varPhi$ is the the average annual net book value (turnover means and fixed assets).

As synthesis indicator of the state of production assets in the enterprise is proposed to take the index of usage of technical resources:

$$\textit{И}_{mex} = \sqrt[3]{\varPhi_{отд} \times К_{об} \times Э}_{\,ф}.$$

It should be borne in mind that theoretically indicators can take any value ($\varPhi_{отд}$, $К_{об}$, $Э_{ф}$). To calculate $\textit{И}_{mex}$ these values are limited between 0 and 1, while if the value <0, the formula takes into account $\textit{И}_{mex} = 0$ if value > 1, the formula takes into account the value $= 1$. The index characterizing the level of the productive potential of enterprise $\textit{И}_{nn}$ is determined by the formula

$$\textit{И}_{nn} = \sqrt[3]{\textit{И}_{mp} \times \textit{И}_{мат} \times \textit{И}_{mex}}\ .$$

The degree of effectiveness of management of enterprise can be assessed by analyzing a group of management resources. Quantification of managerial resources can be made using indicators such as rate of stability of personnel and laboriousness of management.

1. The coefficient of stability of staff is used to assess the level of organization of production management at the enterprise or its individual units and is calculated by the formula

$$К_{ст} = 1 - \frac{P_{y}}{P_{ср} + P_{n}},$$

where P_{y} is the number of employees, voluntary terminated or because of violations of labor discipline in the reporting period; $P_{ср}$ is the average full list of employees in the enterprise in the period prior to the reporting period; P_{n} is the the number of newly hired workers during the reporting time.

2. The coefficient of laboriousness of management is used to determine the value of labor management inputs and is determined by the ratio of total average full list of engineers and technical employees (P_{u}), clerical help (P_{c}), junior service personnel ($P_{м}$) to the average full list of production (main and auxiliary) workers (P_{o} and $P_{в}$):

$$К_{my} = 1 - \frac{P_{u} + P_{c} + P_{м}}{P_{o} + P_{в}}.$$

3. Combining the coefficients of the stability of personnel and laboriousness get a general index of controllability:

$$\textit{И}_{упр} = К_{ст} \times К_{my}.$$

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The rate for calculating the investment potential of the transport companies $\Pi_И$ is calculated using the following formula:

$$\Pi_И = \frac{R}{P},$$

where R is the the volume of involved resources of the enterprise; P is the the economic income of the company.

The overall level of innovative readiness $И_г$ can be assessed by the following formula:

$$И_Г = \sqrt[4]{\Pi_{ТР} \times \Pi_П \times \Pi_{УПР} \times \Pi_И} \cdot$$

Using this formula it must be taken into account that the theoretically levels of efficiency of resource usage can take values from 0 to 1, but any company at the practical implementation of its activities at least minimally uses all the resources and at least slightly is influenced on environment. In this regard, it is necessary to enter the maximum and minimum limits at the rate of 5 %.

Also, these restrictions will prevent the impact of minor factors. Thus, if during the processing of initial data values of the level of resource usage = 0, for use in the formula value of 0.05 is adopted, if the value of the level of resource usage = 1 value 0.95 is adopted.

Each individual organization reacts differently on the influence of environmental factors, depending on the state internal medium, the level of capacity. Therefore, under the impact of similar factors, the result of their influence will be different. In this regard, the quantification of the factors affecting the level of mobility of transport companies, should be carried out individually for each of the company complex.

Accordance to the methodology of calculating the innovation capacity, all the companies on the basis of the values of received indicator can be attributed to one of three groups. The first group is enterprises with a low capacity (less than 0.4), the second group — with an average capacity (from 0.41 to 0.66), and the third group — with the innovative capacity (more than 0.67).

Thus, the higher the innovation potential of the company, the more attractive it for the investor and more capable of taking over the innovation project.

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