American Journal of Interdisciplinary Research and Development
ISSN Online: 2771-8948
Website: www.ajird.journalspark.org
Volume 03, April, 2022

EVALUATION OF EFFICIENT USE OF INVESTMENT IN THE PRODUCTION OF MANUFACTURED METAL GOODS IN EXCEPT MACHINERY AND EQUIPMENT

Usmanov Bakhtiyor
Tashkent State Economy University Independent Researcher,
Republic of Uzbekistan
E-mail: bakhtiyor.usmanov@gmail.com

Annotation
This article examines the areas of effective use of investments in the production of finished metal products, in addition to machinery and equipment, and analyzes the methods of evaluating these processes. Priorities for investment are assessed by an expert method. It also proposes authorial approaches to the scientific study of problems related to the efficient use of investments and the improvement of investment efficiency.

Keywords: investor, investment, efficiency, investment attractiveness, valuation methods, expert evaluation.

Introduction

In the context of uncertainty and competitive economic development, any investor pays special attention to the efficiency of the facility in directing their investments. In other words, both investors and investment objects face the problem of effective use of investments. The choice of the optimal solution to this issue on the basis of mutual agreement of both parties guarantees the effectiveness of the investment.

Of course, in this process, the government will encourage the expansion of investment in various sectors of the economy, further improve the investment climate, create and implement a single investment policy aimed at supporting the development of enterprises with foreign investment, including foreign investment. should be coordinated on the basis of.

Because the results of the analysis of socio-economic development in the world, based on current problems and important directions of economic development, it is necessary to develop a system of strategic priorities of investment policy in order to ensure long-term development prospects. Improving the efficiency of investment, the development of attractive investment projects based on the potential of each sector and their targeted placement is an important task.

It is known that each country plays an important role in ensuring its sustainable economic development in the long run. In recent years, the development of prudent investment policy has become increasingly important in ensuring macroeconomic stability and high economic growth in our country. To increase the effectiveness of

investment policy, many institutions are being established to create a favorable investment climate. Our country has a favorable investment climate for domestic and foreign investors, a number of benefits and preferences.

However, the analysis of the efficient use of investments shows that the efficiency of investment in the economy, in particular in the production of finished metal products other than machinery and equipment, is lower. In particular, 60-65% of the investments are directed to the construction of buildings and structures, 10-15% to other purposes and only 20-30% to the technological modernization of production processes.

Hence, one of the most pressing issues today is the scientific study, research and development of scientific proposals to improve the efficiency of investment.

Analysis of the Relevant Literature

Indeed, the economic and financial evaluation of investment projects is very important in the process of selecting and justifying the optimal options for investing in real assets [1].

At the same time, it is necessary to make greater use of existing opportunities and potential of the sectors by identifying the impact of factors influencing investments and priorities for attraction, to eliminate sharp interregional differences in different sectors and industries of the economy [2].

In world practice, they say that economic analysis methods can be used to evaluate the effectiveness of investments. Assessing the integrated effectiveness of investment projects in the national economy implies that they reflect all the socio-economic aspects of its implementation. In particular, it emphasizes the need to take into account not only direct internal factors, but also external outcomes and costs related to relevant sectors of the economy, as well as environmental, social and other non-economic impacts [3].

In addition, clear definition of investment priorities, attraction of internal and external financial resources on the basis of rational regulation of investment activities, taking into account all conditions determine the future of the national economy, and investment multiplier is another important indicator in assessing investment efficiency [4].

Studying the efficiency and development of investments increases the ability to pursue a prudent investment policy [5]. Income and product price analysis is also important to increase investment efficiency [6].

The basis for making investment decisions is to decide whether or not to accept a particular investment project or to implement one of the proposed options of the project, calculating the selected criteria of its economic efficiency [7].

Therefore, in assessing the effectiveness of investments, it is necessary to pay attention to the analysis of economic and financial indicators of the object, management decisions, the technological structure of the use of investments and other factors. It is

also advisable to use the method of expert evaluation in assessing the effectiveness of investments.

Research Methodology

In this study, analytical comparison, logical and comparative analysis, grouping and expert evaluation, as well as economic-mathematical methods were widely used. It also presents analytical conclusions based on an extensive study of the research work of foreign and domestic scientists on the subject.

Analysis and Results

In our previous research, we asked, "In addition to which machines and equipment, which of the following is the most efficient way to invest investment resources in the production of finished metal products?" Now, in addition to machinery and equipment, which economic activities are most effective in directing the production of finished metal products, in addition to machinery and equipment? We will try to find an answer to the question and do it using the method of "expert assessment".

The advantage of this method is that if the possibility of quantitative assessment of economic events is completely or insufficient and requires the formation of personal opinions about a particular process or object, this method is used and certain conclusions are drawn based on the opinions of experts (experts). decisions are made [8].

Experts are leading experts in a particular field or field, who, within their competence, draw conclusions on a particular event or process. The essence of the method of expert assessment is the intuitive-logical analysis of problems by experts. The generalized opinions obtained as a result of the work of the experts are considered to be the solution to the problem. The complex use of intuition, logical reasoning, and quantitative judgment allows for an effective solution to the problem.

The application of the expert assessment method focuses on issues such as quantitative selection of experts and the formation of expert groups, assessment of their competence, determining the degree of consistency of expert opinions, data processing by experts and making specific decisions based on the results.

Generally, the number of experts in groups should be between 7 and 20. Sometimes this amount can be as much as 10 to 30. While a very small number of experts leads to unreliable results, a very large number of experts causes problems of an organizational nature. It is therefore recommended to use the following inequality in determining the required number of experts [9]:

$$m \le \frac{3}{2 \cdot Q_{\max}} \cdot \sum_{i=1}^{m^*} Q_i \qquad (1)$$

Here, m^* - total number of candidates, Q_{max} - the maximum value of the competency coefficient, Q_i - competence of the i-th expert.

Sometimes the following formula is also used to determine the minimum number of experts [10]:

$$N = 0.5\left(\frac{3}{\alpha} + 5\right) \quad (2)$$

Here, α - the parameter is the minimum level of expertise error, the value of which varies in the $0 < \alpha \leq 1$ range.

Experts' assessments play a key role in assessing the level of competence of experts, and different methods are used to determine their level of competence. One such method is determined using the following formula [11]:

$$K_j = \frac{\sum\left(X_{ij} \times M_i\right)}{\sum\left(M_i \times S_i\right)} \quad (3)$$

Here, K_j - j is the competency coefficient of the expert, X_{ij} - the evaluation of the i-th object by the j-th expert, M_i - i is the average value of the object, S_i - i is the sum of the values of the chi object.

“Consensus of experts” is very important in expert evaluation. The "concordance coefficient" is used to assess the degree of consistency of expert opinion and is determined as follows [12]:

$$W = \frac{12 \times S}{d^2 \times \left(m^3 - m\right)} \quad (4)$$

Here, W - concordance coefficient, d - involved expert - number of specialists, m - objects, i.e. the number of processing industries, S - is a quantitative quantity in the concordance coefficient, which is determined as follows:

$$S = \sum_{i=1}^{m}\left(\sum_{s=1}^{d} r_{is} - \bar{r}\right)^2 \quad (5)$$

Here, r_{is} - the i-th object is the rating or color given by the s-th expert, which is determined as follows:

$$r_i = \sum_{s=1}^{d} r_{is}\ , \ \left(i = \overline{1,m}\right) \quad (6)$$

(6) - the average of the r_i in equation ($\bar{r}$) is found using the following formula:

$$\bar{r} = \frac{1}{m} \times \sum_{i=1}^{m}\sum_{s=1}^{d} r_{is} \quad (7)$$

If the evaluations of the objects evaluated by the expert-experts overlap, then the concordance coefficient is determined as follows [13]:

$$W = \frac{12 \times S}{d^2 \times \left(m^3 - m\right) - d \times \sum_{s=1}^{d} T_s} \quad (8)$$

Here, T_s - s is an indicator of the interconnected colors between the ranked values, which is defined as follows:

$$T_s = \sum_{k=1}^{H_s} \left(h_k^3 - h_k\right) \quad (9)$$

Here, H_s - s is the number of groups with equal colors between the ranked values, h_k - the number of equal colors in the k-th group. If, in the estimates of experts, there are no comparative colors, in that case $H_s = 0$, $h_k = 0$ and $T_s = 0$ will be.

It is recommended to use the following verbal-numerical scale of Harrington to assess the quality of the degree of consistency of expert opinion (Table 1).

Table 1 Harrington's verbal-numerical scale [14]

No	Numerical values of the concordance coefficient	Levels of consistency of expert opinion
1	$0 \le W < 0{,}2$	Consistency is very low
2	$0{,}2 \le W < 0{,}37$	Consistency is low
3	$0{,}37 \le W < 0{,}64$	Consistency is average
4	$0{,}64 \le W < 0{,}8$	Consistency is high
5	$0{,}8 \le W \le 1{,}0$	Consistency is very high

Harrington's verbal-numerical scale shows that the degree of coherence of expert opinion varies between 0 and 1. The closer the value of the concordance coefficient, the higher the degree of coherence of expert opinion, and vice versa.

In practice, if m > 7, then the χ^2 - criterion is used to assess the significance of the concordance coefficient [15].

χ^2 - distribution $v = m$-1 assumes the following value with the degree of freedom:

$$\chi^2 = \frac{12 \times S}{d \times m \times (m+1) - \frac{1}{m-1} \sum_{s=1}^{d} T_s} \quad (10)$$

If $W > \chi^2$, the degree of consistency of expert opinion is reasonable, otherwise such consistency turns out to be insignificant.

In practice, the "entropy concordance coefficient" is also used to assess the degree of consistency of expert opinion, and it is defined as follows [16]:

$$W_e = 1 - \frac{H}{H_{\max}} \quad (11)$$

Here, H - entropy and H_{max} – is the maximum value of entropy, which is found as follows:

American Journal of Interdisciplinary Research and Development
ISSN Online: 2771-8948
Website: www.ajird.journalspark.org
Volume 03, April, 2022

$$H = -\sum_{i=1}^{n}\sum_{j=1}^{m} p_{ij} \log_2 p_{ij} \quad (12)$$

If we assume that $p_{ij} = m_{ij} / m$ and $m_{ij} = m / n$, then the following equation is formed:

$$H = -\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{m} \log_2 \frac{1}{n} = \sum_{j=1}^{m} \log_2 n = m \cdot \log_2 n \quad (13)$$

Here, p_{ij} - i-th object and j-th color probability estimate, m - experts and n - number of colors.

The entropy concordance coefficient gives a slightly rougher result than the normal concordance coefficient, and its value is 1 ($W_e = 1$) when the level of significance of all objects is found to be the same by experts.

The high value of the concordance coefficient obtained during the expert evaluation confirms the high degree of consistency of expert opinion. In this case, the opinions of experts on the object of assessment or socio-economic process are usually considered close to each other.

Now, based on the above methodology, we will first formulate the content of the question to be presented to the members of the formed expert group, and its content will be as follows:

Question: In the future, which of the following areas is most effective in attracting investment financing sources?

In order to find an answer to this question, the experts adopted a "5-point rating scale" and set the following points for priority areas of activity (Table 2).

Table 2 Scores indicated by experts on the priority areas in which investments should be attracted

No	Evaluated priority investment areas	Number of experts				
		1	2	3	4	5
1	Modernization of production of finished metal products in addition to machinery and equipment and renewal of fixed assets	5,0	4,5	4,5	4,0	5,0
2	Funding of scientific developments and ideas in the field of production of finished metal products, in addition to machinery and equipment	4,0	4,0	4,5	4,0	5,0
3	In addition to machinery and equipment, support for small business in the production of finished metal products and further improvement of production infrastructure	4,0	4,5	5,0	4,5	4,5
4	Expansion of production activities of the production of finished metal products in addition to machinery and equipment and the organization of new productions	4,5	4,0	4,0	4,5	4,5

It should be noted that the maximum assessment or color ($r_{max} = 5$) indicated by

experts in the priority investment areas reflects the priority areas of activity in which investment funds should be attracted.

It follows that if the average score in any activity is high ($\bar{r}_{max}$), attracting investment in this type of activity becomes a priority, and this activity is the highest priority (Figure 1).

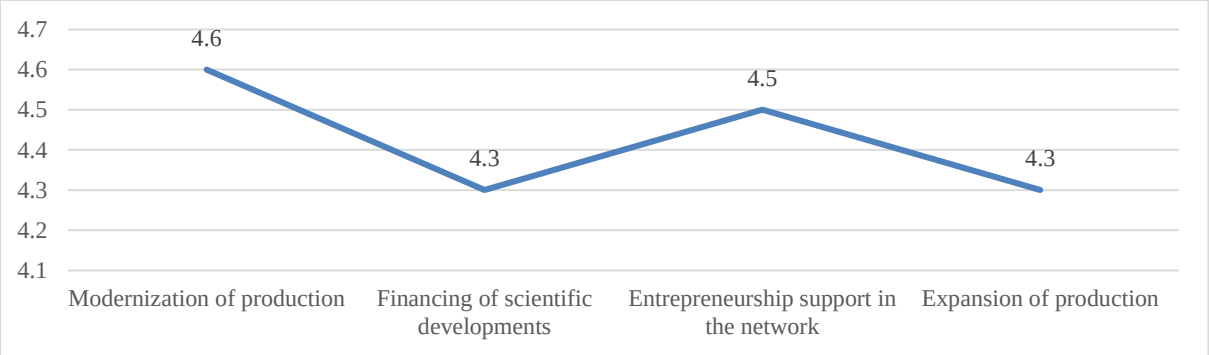

Figure 1. The average of the scores indicated by experts on the priority areas in which investments should be attracted, ($\bar{r}_i$)

As can be seen from the figure, the most important in the production of finished metal products, in addition to machinery and equipment, is the modernization of production. takes second place. In third place are two areas: funding for research and development in the industry, followed by 4.3.

Now, in order to prove the validity of the above opinions, we first calculate the level of competence of the members of the formed expert group using formula 3, and the degree of consistency of their opinions using formula 8. Figure 2 below shows the competence levels of the experts.

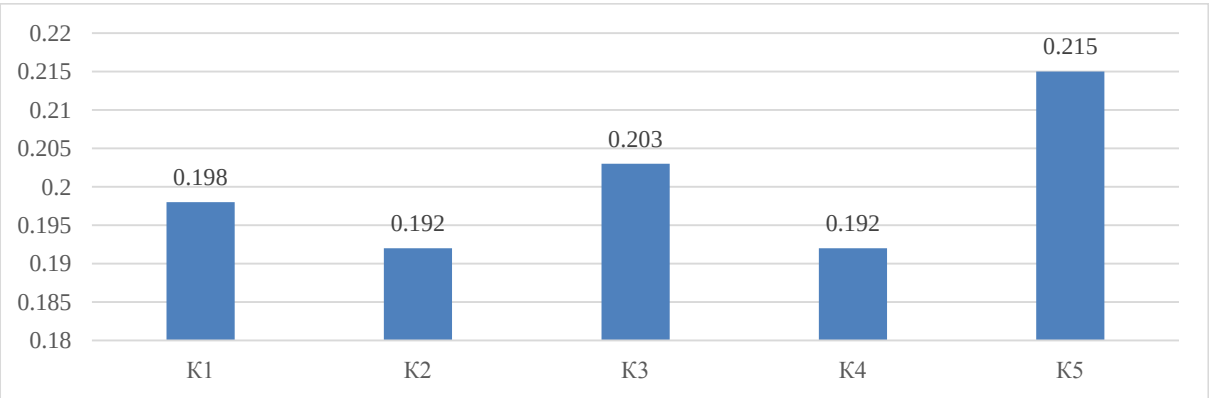

Figure 2. Levels of competence of experts
(K_i - coefficient)

The analysis of the competence levels of the experts showed that the competence level of the fifth expert was the highest with a value of 0.215, while the competence levels of the second and fourth experts were the lowest with a value of 0.192.

Conclusion

Now, as mentioned above, using formula 8, we calculate the degree of coherence of the opinions of experts, i.e. the concordance coefficient (W).

Since we have 5 experts selected in the process under consideration, we will have Formula 10 $d = 5$ and the number of objects being evaluated $m = 10$.

The results of the analysis show that the degree of coherence (W) of the opinion of experts in the field, ie the value of the concordance coefficient is 0.74, which corresponds to the 4th order of the Harrington verbal-numerical scale.

Based on the value obtained of the concordance coefficient, it was concluded that the scores indicated by the experts on the priority areas confirm the high degree of coherence of the expert opinion. It turns out that in the future, in addition to machinery and equipment, modernization of the production of finished metal products and attracting investment in the renewal of fixed assets will be more effective than in other areas.

References

1. Pardaev M.Q., Kholikulov A.N., Jumaeva G. Analysis of investment projects. Study guide. - T .: "Science and Technology" Publishing House, 2019. - 234 pages.
2. Qobilov A.E. Multi-criteria decision-making model in assessing the priorities of foreign direct investment in Kashkadarya region // Scientific electronic journal "Economy and Innovative Technologies". № 4, July-August, 2020.
3. Kseniya E. Azzheurova E.A. Mediterranean // Journal of Social Sciences MCSER Publishing, Rome-Italy Vol. 6, No. 5, S2 September 2015.
4. Mirzarayimov D.U. Prospects for the evaluation and development of investment efficiency in the country // Electronic scientific journal of Finance and Banking. 5 son. September-October, 2019. p. 146-151.
5. Qiufang Fan, Jintao Liu, Tao Zhang, Haomin Liu. An Evaluation of the Efficiency of China's green investment in the "Belt and Road" countries // Structural Change and Economic Dynamics. Volume 60, March 2022, Pages 496-511. https://doi.org/10.1016/j.strueco.2022.01.003
6. Na Zhou, Qiaosheng Wu, Xiangping Hu, Deyi Xu, Xiaolin Wang. Evaluation of Chinese natural gas investment along the Belt and Road Initiative using super slacks-based measurement of efficiency method // Resources Policy. Volume 67, August 2020, 101668. https://doi.org/10.1016/j.resourpol.2020.101668
7. Viera Bartošová, Peter Majerčák, Dagmar Hrašková. Taking Risk into Account in the Evaluation of Economic Efficiency of Investment Projects: Traditional Methods // Procedia Economics and Finance. Volume 24, 2015, Pages 68-75. https://doi.org/10.1016/S2212-5671(15)00614-0
8. Orlov A.I. Organizational and economic modeling: Textbook: at 3 o'clock - M .: Publishing house of MSTU im. N.E. Bauman. - 2009. Part 2: Expert assessments. - 2011. - 486 p.

9. Duizen E.Yu. Method of expert evaluation: a guide to action. Creative Economy, 2014, No. 2(86). - 30 p.
10. Chernysheva T.Yu. Hierarchical model of evaluation and selection of experts. Reports of TUSUR, No. 1 (19), part 1, 2009.
11. Garifulin A.F. Expert evaluation in the development of an effective strategy. Economist's Handbook No. 8, 2013. - 4 p.
12. Gubsky M.I. Methodology for assessing the state of development of logistics in the Republic of Belarus. Problems of Management No. 3 (40) 2011. - 123 p.
13. Zhilyakova E.V., Larin S.N. Methods and techniques for conducting an independent examination. Bulletin of VSU. Series: Economics and Management. 2009. No. 2. - 113 p.
14. Galinovsky A.L., Samsonov K.S. Comparison of various methods for monitoring and diagnosing the quality of ceramics by expert evaluation. Innovation and expertise. 2017. Issue 1 (19). - 68 p.
15. Zhilyakova E.V., Larin S.N. Methods and techniques for conducting an independent examination. Bulletin of VSU. Series: Economics and Management. 2009. No. 2. - 113 p.
16. Davnis V.V. Forecast models of expert preferences: monograph / V.V.Davnis, V.I.Tinyakova; Voronezh. state un-t. - Voronezh: Voronezh Publishing House. state un-t, 2005. - 45 p.