ADAPTED METHODOLOGY FOR ASSESSING THE ECOLOGICAL AND ECONOMIC EFFICIENCY OF INVESTMENTS IN TERRITORIAL NATURAL AND RECREATIONAL SYSTEMS

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ABSTRACT

The main problem of the development of Territorial Natural Recreational Systems (TNRS) is the resource provision of modernization processes, which is impossible without investments. The TNRS area is not attractive to investors. This is due to the low profitability of investments because of the ecological and social orientation of investment objects, a long payback period and the need for costs to preserve and restore the integrity of natural ecosystems in the context of the targeted usage of specially protected natural areas. The limited resources, the need for significant investments in the development of such systems requires ensuring the efficiency of investments. The analysis of scientific works and practical experience in the development of natural and recreational zones, the study of methodological approaches to the assessment of investment projects made it possible to adapt the investment assessment methodology. The usage of this methodology will contribute to ensuring the ecological and economic efficiency of investments attracted for the development of Territorial Natural and Recreational Systems.

Keywords: Territorial Natural and Recreational System, Ecological and Economic Efficiency, Investment Assessment Methodology.

JEL Classification: C49, G31, H80, Q26

INTRODUCTION

Natural and recreational tourism makes a significant contribution to the economy of those states where great attention is paid to the development of territories with a unique nature (Eagles et al., 2002 & 2016; Emerton et al., 2006; Dunets et al., 2019; Lisin, 2018). Kazakhstan has the significant natural recreational potential, which is used ineffectively (Koshkinbaeva et al., 2019). The unique natural environment of the territories, the infrastructure of these territories and the recreational services provided there are constituent components linked into a single Territorial Natural Recreational System (hereinafter TNRS). The state of each of the components of such a system does not correspond to international standards and norms of the recreational sphere. It was mentioned World Tourism Organization Reports and Publications UNWTO Tourism Highlights (2017). This prevents the optimal usage of the resource potential of territories that rich in natural environment, the

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saving of natural potential, the development on this basis of ecological tourism (internal and external), which will contribute to the implementation of the country's sustainable development strategy.

The territorial natural and recreational system is a territory with a rich natural potential for the recreation of people in conjunction with the socio-economic processes taking place on it.

The economic development of a territorial natural and recreational system can be defined as a change or transition to a qualitatively new state of its processes, resources and subjects, which ensures their balanced functioning in the economic, social, socio-cultural and environmental aspects: economic growth, normal social climate, harmonious, spiritual, the cultural and physical development of individuals, and the ecological well-being of the territory.

The relevance of the research results is due to the need to ensure the efficiency of investments attracted for the development of TNRS due to their limitations and the need for significant investments. It seems important for solving the problem of increasing the efficiency of investments in projects for the development of TNRS, the proposal of the authors of this article to use an adapted methodology of environmental and economic assessment. This methodology will significantly enrich the toolkit for investment planning for the development of TNRS.

The economic development of territorial natural and recreational systems should not only reduce budgetary expenditures to ensure the status of specially protected natural areas, but also increase the economic and social benefits from using their potential. It will also contribute to the harmonization of interests and relations of society, the state, the business environment in the use of territorial natural resources.

LITERATURE REVIEW

A fundamental contribution to the scientific-theoretical, methodological and practical aspects accompanying the conditions for the economic development of territorial recreational systems was made by many scientists who conducted their research in different years, in different countries and territories. Particular attention in these works was paid to the sustainable development of tourism in natural protected areas (Eagles et al., 2002 & 2016; Emerton et al., 2006; Ceballos-Lascuráin, 1996; Dunets et al., 2019).

In studies devoted to the economic characteristics and directions of development of recreational systems, many scientists note the importance and necessity of large investments in the development of territories with a unique nature. The main value of such territories is the unique nature that attracts people for recreation and requires special care. It was pointed by Lisin (2018).

Theoretical and methodological aspects of the economic usage of the natural potential and the development of TNRS have found wide coverage in the works of domestic and foreign scientists. Problems, consequences and prospects for the use of natural resources are closely related to human life (Koshkinbaeva et al., 2019).

Investment remains the main factor in the development of organizational systems. Modern requirements for the results of the implementation of investment projects can be satisfied subject to a preliminary qualitative assessment of investment projects (Nurmagambetova, 2014).

The economic and environmental aspects of the assessment of investment projects are reflected through the calculation of many indicators, such as the internal rate of return, the coefficient of social losses, the environmental index of the financial flow, the integral

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environmental and economic effect, the estimated environmental and economic damage (Khalfiev & Magaril, 2009; Nuzhina, 2014; Krass, 2013).

The available scientific research and practical approaches to investing, assessing the effectiveness of investment projects, and developing recreational areas are of great importance, since they provide knowledge on these issues and serve as the basis for making decisions on the development of natural recreational areas. But ensuring the environmental and economic efficiency of investments attracted for the development of TNRS, actualizes the development of new theoretical and methodological approaches to their assessment, corresponding to modern socio-economic realities.

METHODOLOGY

The proposed by the authors, an adapted methodology for the ecological and economic assessment of investments attracted for the development of TPP is based on the methods of retrospective forecasting, net present value, internal rate of return, assessment of environmental income and outflows and the coefficient of sociological losses. To determine the internal rate of return (or profit) of an investment project for uneven cash flows, a dynamic method was used.

The combination of these techniques expresses a comprehensive assessment of the potentials combined into an integral indicator.

The methodology allows, with a high degree of justification, based on cost characteristics, to establish the potential for the effectiveness of investment in projects for the development of TNRS.

RESULTS

Any investment project can be assessed from various sides: financial, technological, organizational, time, environmental, social, etc. All of them are important, but the financial aspects of investment activities in many cases are of decisive importance.

A certain imprint on the scale, specialization, structure and dynamics of the development of TNRS is imposed by territorial natural, climatic and economic conditions. Unique natural resources without developed communication systems, communal infrastructure, cultural and art objects are unattractive for a large group of consumers of recreational services (Altaibayeva et al., 2018 & 2020).

The development of a territorial recreational natural system primarily depends on the effectiveness of recreational activities and infrastructure, since the effects of these activities extend to the entire system. Therefore, we assume that the development of recreational activities will lead to the development of the entire territorial natural recreational system, and this is possible if investments are comprehensively directed towards: modernizing the recreational business, improving the conservation of the natural environment, modernizing the technical infrastructure of the recreational area (road infrastructure, heat and power supply, water supply, sewerage, communications).

Alternative projects of varying cost could be considered, but they will be limited by the possibility of reimbursement from the income from recreational services forecasted for a certain period.

In order to comply with the interests of investors and not to encourage dependent sentiments in business, investment, in our opinion, should be carried out on the principles of repayment and payment. But the fee should be at the level of government programs accepted for investment, it should definitely not be high, since the project has a social orientation. For

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private investors in the framework of state-private partnerships (SPP), preferences and other measures should be provided to stimulate their participation.

In Kazakhstan, the recreational business in the natural area is seasonal. This is reflected in the uniformity of cash flows from the provided recreational services. The authors tested the methodology for assessing the ecological and economic efficiency of an investment project for 1 billion tenge with an investment period of 5 years, using the example of the Bayanaul territorial natural and recreational system. To predict the volume of direct recreational services provided by the tourism business, we used the statistical data of the natural recreational area over the past five years according to the following annual indicators:

1. number of beds, units;
2. occupancy of beds, %;
3. actually served days of stay, man-days;
4. volume of services rendered, thousand tenge;
5. The average price of a bed-day of stay, tenge.

Based on these data, the average growth rates were calculated on a retrospective basis in terms of the volume of recreational services over the past five years. Taking into account the average growth rates, the indicators of the volumes of activity for the next five years were projected. The purpose of forecasting the indicators of the volume of activity was to forecast income from recreational activities. We note that the predicted income from recreational activities for all competitive projects for the development of recreational activities within the same recreational area will be approximately the same, provided that the forecasts of the volumes of recreational activities are calculated on a retrospective basis based on statistical data. The usage of statistical data to predict the volumes of recreational activities will allow avoiding manipulations aimed at overestimating these volumes.

The forecast of costs for alternative projects will differ, as they depend on the planned activities for the development of the TNRS.

When the income and expenses from recreational activities have predicted, it is possible to calculate the projected cash flows from operating, investing, financing activities and the projected net cash flow. In terms of net cash flow value, the alternative competitive projects will differ, as the flows from operating, financing and investing activities will be different. They depend on the estimated operating expenses, the recorded income and expenses for financing and investment activities, represented by a specific project. Differences will be due to the different cost of investments requested by the project, the timing of their return, and the planned costs for project activities.

Based on our example, we calculated the return on investment over five years. We have conditionally calculated income and expenses for this period.

The internal rate of return of the project (IRR) can be determined by linear interpolation of two values of the net present value (NPV) (Khalfiev & Magaril, 2009; Nuzhina, 2014; Krass, 2013).

$$IRR=A+ [NPV_A/ (NPV_A - NPV_B)] *(B+A) \quad (1)$$

Where,

A – low discount rate (7%);
B – high discount rate (15%);
NPV_A – the net present value at a low rate;
NPV_B – the net present value at a high discount rate.

We took the required percentage of remuneration of 7% for a low discount rate, based on the fact that it is used in the implementation of state programs for the development of entrepreneurship and social projects. The internal rate of return of the project must be above

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7%, otherwise it will mean that it is unprofitable. The high rate was taken as 15% (the average rate of a commercial loan for long-term projects, not for SPP programs at the moment).

Next, the net present cash flows were calculated. To calculate them, the discount factor using the compound interest method is used.

$$NPV = NCF * DF \quad (2)$$

Where,

NCF: Net cash flow
DF: Discount factor

$$DF = 1/(1+K)^n \quad (3)$$

Where,

K – rate of profit
n - number of years of the project

Based on the calculations of the internal rate of return of the TNRS development project, conclusions can be drawn that will be an intermediate assessment of its financial efficiency. Based on our case, the following conclusions were made:

1. IRR is 12.97% for Bayanaul recreation at an internal rate of profit;
2. The internal rate of profit exceeds the required rate of 7%. This means that the presented project is profitable and you can use borrowed funds to invest in recreational activities at 7%;
3. According to the method of internal rate of profit, the project is selected, where the IRR is higher. If the IRR in the alternative project is more than 12.97%, then the alternative project may be chosen.

Ecological flow model investments that stimulate the development of organizational systems and increase competitiveness also affect the state of the ecological and economic system as a whole, since any activity related to the use of natural resources affects the environment.

The positive impact of the project on the environment:

1. The market for environmental works and services is expanding;
2. The investment attractiveness of recreation is increasing.

Among the reasons for the insufficient consideration of environmental factors when assessing the effectiveness of investment projects are:

1. The complexity of identifying factors of impact on the environment, due to their diversity;
2. The lack of adapted methods to give a comprehensive assessment of the effectiveness of investment projects for the development of systems;
3. Insufficient institutional definition of the relationship to compensate for damage to the environment (Khalfiev & Magaril, 2009).

The model of financial resources can be represented by the formula that was recommended by Gusarova (2014), Nuzhina (2014) and Krass (2013):

$$ЭколП.i = ЭСД.n – ОД.n = Bd.n. – [Hn – ОД.n * Iэкол.n] \quad (4)$$

Where,

ЭСД.n - the ecological component of the cash flow;
ОД.n - environmental component of the cash outflow;
Bd.n. - the benefits received;
Hn - the total value of the conditionally assumed damage;
Iэкол.n - ecological index in the framework of the considered activity.

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We propose to define the ecological component of the cash inflow (ЭСДп) as the sum of eco-income and payments for the use of natural resources.

The value of each specific natural resource is determined by the income that its owner can receive from using it. If the income exceeds the income received from a similar type of activity in neighboring territories, then we can say that additional income is received due to the natural properties of a natural object. In our example, we conventionally call this additional income "*Eco-income*". To determine it, we calculated the share of eco-income in the price of one bed-day of stay in a recreation area.

To calculate the environmental component of the outflow of funds, investment and operating costs are allocated for the implementation of environmental measures provided for by the project (ОДп is the value of the outflow of funds; n is the number of the calculation step, n=0,1,2 ..., n_i). To calculate the ecological component of the outflow, we used statistical data on the costs of environmental protection, on average over the last five years.

For predictive calculations of ЭСДп (the ecological component of the cash flow) and ОДп (environmental component of the cash outflow), it is necessary to calculate the growth rates for the last five years on a retrospective basis.

The cost estimate of the conditionally assumed damage is taken as an adverse environmental impact.

Depending on the forms of expression of losses and characteristics of the object of influence, economic, environmental, social and socio - economic consequences of the implementation of an investment project can be distinguished; conditionally assumed damage will have similar characteristics. It was mentioned by Nuzhina (2014).

The possibility of losses and negative changes in the environment caused by the implementation of the investment project was designated as Н. The economic conditionally assumed damage - the loss of products, services, property, fuel, energy, raw materials and other materials as a result of waste generation and irrational use of resources was designated as, Нэ. For its value, we used the environmental components of the cash outflows.

Environmental conditionally assumed damage (Нэкол) - deterioration of the state of ecological systems and natural resources. In this indicator, we included statistical data on payments for regulatory and excess emissions and funds recovered in compensation for damage caused by violation of environmental legislation on average over the past five years.

Social conditionally presumed damage (Нс) - an increase in psychological stress on the population, a decrease in the quality and life expectancy, we take for now equal to zero (other approaches to its definition are currently being investigated by the authors).

Conventionally assumed socio-economic damage (Нс-э) - the costs of social security and health care due to the increase in morbidity caused by environmental pollution, we took equal to zero, since the costs of social contributions in statistical data are included in the costs of environmental protection, i.e. they are included in the Нэ indicator and are not formed separately in statistical data.

The most effective method for determining social losses is the method of expert assessments. The experts are invited to estimate the value of the coefficient of social losses (Кс.п), which ranges from 1.00 to 2.00; the value of the factor: 1.0 is insignificant for the social consequences of the project; - 1.25 - is of insignificant importance for the social consequences of the project; 1.5 - has no definite meaning; 1.75 - essential for the social impact of the project; 2.00 - Obvious and significant for the social impact of the project.

The coefficient of social losses (Кс.п) is determined by the formula that was recommended by Gusarova (2014), Nuzhina (2014) and Krass (2013):

$$Кс.п = \sum_{м\ m=1} P_{i.m} \div М \qquad (5)$$

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Where,

$P_{i.m}$: the assessment of i factor by the expert M;
M: the number of experts.

The total value of the conditionally assumed damage (Hn) as a result of the implementation of the investment project can be calculated by the formula:

$$H_n = Нэ + Нэкол + Нс\text{-}э * Кс.п \quad (6)$$

The value of H_n should not exceed the normative conditionally assumed damage Hnn, which is calculated in compliance with the standard indicators of the quality of the environment. To take into account the ratio of the normative (there are no data) and conditional expected damage in assessing the effectiveness of an investment project, it is necessary to calculate the environmental index of the project:

$$Iэкол.n = Hnn \div Hn \quad (7)$$

If the value of Iэкол.n exceeds 1, this means that the permissible damage is exceeded (for the calculation, there are no data on the normative conditionally assumed damage).

Based on cash flows for five years from the investment ДПи, operational ДПо for activities and the calculated eco-flow of ЭколП.i, which, in turn, consists of inflows and outflows for five years (ДПи, ДПо, ЭСДэ, ОД.n) of funds for the project, you can calculate the main indicators of the effectiveness of the investment project.

Accumulation in one cash flow of expenses for environmental support of the project with the subsequent indication of positive and negative environmental consequences allows you to determine:

1. The of costs and the result of environmental protection measures;
2. The optimal connection between the volume level of the ratio of these indicators to achieve the required level of environmental safety of the project;
3. Integral indicators expressing the effectiveness of costs for environmental protection. It was described by Nuzhina I.P. in her
4. The integral ecological and economic effect is calculated by the formula:

$$Еи.э–э = Кс.n(ДПи + ДПо + ЭколП_э \div (1+E)^n) \quad (8)$$

Where,

Еи.э–э: the integral ecological and economic effect
E: the discount rate (the recommended value of the percentage used to finance the implementation of government programs in Kazakhstan).

The project will be considered effective if Еи.э–э has a positive value.

CONCLUSION AND RECOMMENDATIONS

Thus, the proposed methodology for the environmental and economic assessment of investments attracted for the development of TNRS can be built into a specific algorithm, which is presented in Table 1.

Based on our calculation, the internal rate of return and the integral ecological and economic effect had positive values; this, when making a decision on investing in the project for the development of the TNRS under consideration, inclines towards a positive conclusion. Unfortunately, we cannot compare the results of evaluating the effectiveness of contingent investments according to the Bayanaul TNRS with any practical example, since there is no

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experience in evaluating investments in a similar definition as TNRS. Comparison with other definitions, in our opinion, will distort the principle of comparability.

Table 1
ALGORITHM FOR ASSESSING THE ENVIRONMENTAL AND ECONOMIC EFFICIENCY OF THE INVESTMENT PROJECT FOR THE DEVELOPMENT OF TNRS

1. Calculation of the internal rate of return of the project
STEP 1. Formation of initial data on the volume of services provided by the placements for the previous five years according to statistical data;
STEP 2. Calculation of average growth rates by indicators of the volume of services rendered by placements to forecast the volume of services;
STEP 3. Calculation of the projected volumes of services provided by the placements for the forecasted years (based on the data from STEPS 1 and 2);
STEP 4. Calculations of projected costs for operating activities (Entering data on the object);
STEP 5. Calculation of cash flow from operating activities (*ДПо*) based on STEPS 3 and 4;
STEP 6. Calculation of the cash flow from financial activities (*ДПф*), taking into account the flows from the considerable project;
STEP 7. Calculation of cash flow from investment activities (*ДПи*), taking into account flows from the considerable project;
STEP 8. Calculation of the net cash flow (*NCF*) for the project based on the data from STEPS 5, 6 and 7;
STEP 9. Calculation of the net present value (*NPV*) at low and high discount rates based on the data from STEP 8;
STEP 10. Calculation of the internal rate of return (IRR) based on data from STEP 9;
Internal rate of return (IRR) analysis and comparison with alternative projects.
2. Calculation of the integral ecological and economic effect
STEP 11. Calculation of the share of eco-income in the price of a bed-day staying on the basis of statistical data;
STEP 12. Calculation of Eco-income *(ЭД)* based on data from STEP 11;
STEP 13. Entering data payment for the use of natural resources (statistical data);
STEP 14. Calculation of the environmental component of the cash inflow (*ЭСД*) based on the data from STEPS 12, 13
STEP 15. The amount of cash outflow (*ОД.п*) based on statistical data;
STEP 16. Calculation of the coefficient of social losses (*Ксп*) based on a social survey;
STEP 17. Calculation of conditionally assumed damage (*Нп*) based on statistical data and STEP 16;
STEP 18. Ecological index of the project (*Iэкол.п*) based on STEP 17 and standards (no data);
19. Calculation of the ecological flow *(ЭколП$_i$)* based on the data from STEPS 14, 15;
STEP 20. Integral ecological and economic effect (*Еи.э–э*);
Analysis of the integral ecological and economic effect (*Еи.э–э*) and comparison with alternative projects.

The proposed adapted methodology for assessing the environmental and economic efficiency of investments attracted for the development of TNRS has its own characteristics:

1. The investment project is complex consolidated (investment value) throughout the recreational area, including investments for specific investment objects;
2. Forecast data on the cost of the volume of recreational services can be calculated on the basis of statistical data (district, tourism industry);
3. If alternative projects are considered, then the initial data on the predicted cost of the volume of recreational services for calculating the internal rate of return and ecological flow for calculating the integral ecological and economic effect of the project will be the same.
4. The proposed adapted methodology for environmental and economic assessment of an investment project can be used for:
5. Selection of investment projects for territorial natural recreational systems;
6. Planning the possible amount of financing when approving state programs for the development of tourism in natural recreational areas.

The above assessment methodology is aimed at ensuring the effectiveness of attracted investments for the TNRS. With the help of the project evaluation results, business entities and authorities will be able to ensure sustainable environmentally acceptable development of

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TPRS by limiting or completely eliminating the negative impact of the consequences of the investment project on the economy, the environment and the population.

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