



RISK MANAGEMENT IN INVESTING IN HUMAN CAPITAL

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ABSTRACT

The article considers approaches to human capital in terms of investment efficiency. The main nuances arising from the implementation of such investments are shown. Possible investment directions and, accordingly, the nature of the possible return on them, depending on which component of human capital is invested, are indicated.

A methodology for the formation of a risk management system arising during the implementation of investment policies is proposed, and features related to the nature and nature of human capital are shown. Possible risks are indicated and described when making investments related to human capital and its accumulation.

In the practical part, an experiment on the application of this technique in practice is described, the possibilities that it provides are examined, ways to increase its effectiveness are described, and potential problem areas are indicated.

Keywords: Efficiency, Human Capital, HR Recruiting, Investing, Potential risks, Risk Management, Training.

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1. INTRODUCTION

Human capital is one of the main values of modern society, as well as the most important factor in economic growth of both the country's economy as a whole and a single enterprise [1-4].

Human capital is the knowledge, abilities, health, skills that are formed by a person as a result of investing in himself. They lead to an increase in the qualifications of the employee, which contributes to an increase in the quality of labour and thereby leads to an increase in human well-being. That is why it is necessary to invest money in each of its components to increase its effectiveness. Being a complex economic concept, human capital includes the following components presented in Fig.1.

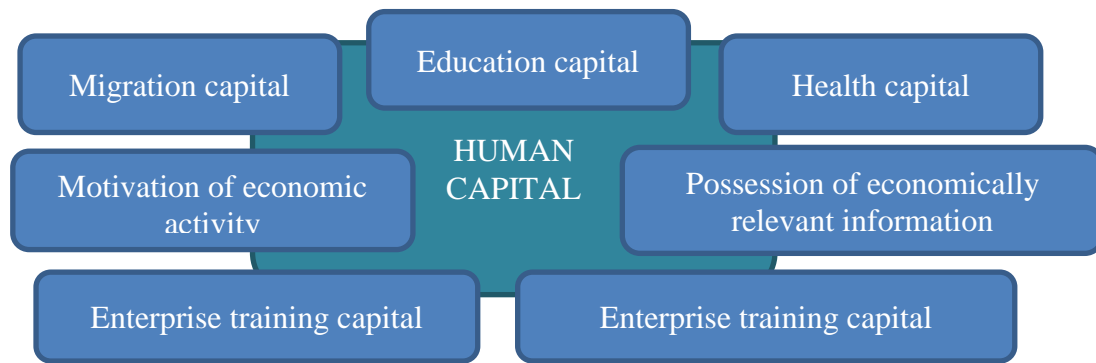


Figure 1 Components of human capital

The very nature of human capital also determines the features of investing in it, which distinguish them from other types of investments:

- the formation of human capital through investment is most advantageous to carry out in the initial period of a person's life since the return on investment in human capital directly depends on its life;
- the results of investing in human capital do not always have a monetary form, but can acquire social, psychological, cultural, moral and other effects that increase the economic result;
- investments in human capital multiply the productive qualities of a person, his efficiency and productivity as an employee, but also as a student, i.e. investments accelerate and facilitate the process of further accumulation of knowledge and experience;
- the transfer of human capital can also be carried out informally, in the process of joint labour activity (for example, the transfer of production experience);
- human capital accumulated as a result of investments is a significant factor in its reproduction in the next generation (for example, the level of education of a mother is a determining factor in the future level of education of her children).

It is only natural that when it comes to investing, the question of possible risks also arises. The risk factor is essential in investing. Indeed, investment is always associated with the immobilization of the financial resources of the enterprise and is usually carried out in

conditions of uncertainty, the degree of which can vary significantly. Therefore, when investing in human capital, it is essential to assess, analyze and manage risk.

2. METHODOLOGY

2.1. Basic Principles of Investing in Human Capital

It should be understood that the key differences and features of such a category as human capital also determine the characteristics of investments in it.

Human capital, as an integral economic concept, determines the possibility of investing in developing its components. The very scheme of the elements of human capital and the types of investments in it are presented in Fig.2.

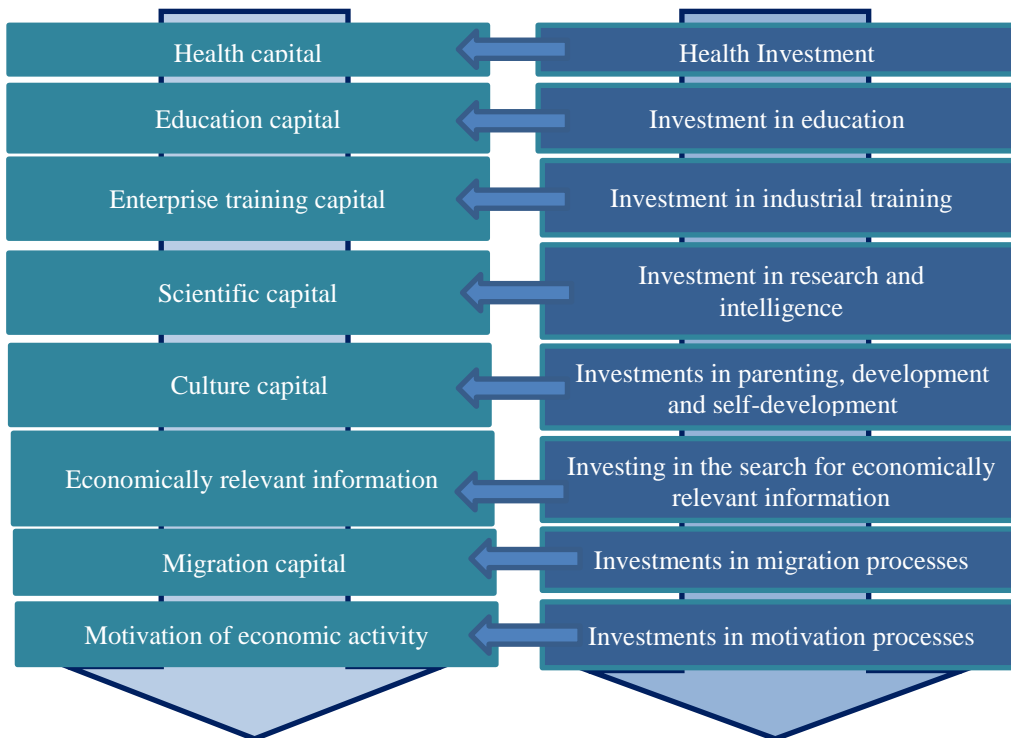


Figure 2 Types of investments and components of human capital

The scheme shows various types of investing in human capital; if we approach this issue more generally, then investment can be called any measure taken to increase the labour of workers (for example, improving their skills or developing abilities). All possible directions for investing in human capital can be grouped into three groups:

- investments in education - it is an investment in general and particular education, formal and non-formal, as well as any types of training and training in the workplace;
- investment in health - this is any cost of health care, including the cost of disease prevention, medical care, insurance, diet, improving housing conditions;
- mobility costs are costs due to which employees have the opportunity to migrate from places with low (relatively) productivity to places with high productivity.

However, companies make investments as long as these investments generate net income. By investing in their employees, companies strive to intensify their labour return, increase labour productivity, reduce the loss of working time and thereby strengthen their competitiveness. The potential impact on the back on individual components of human capital is illustrated in Fig .3.

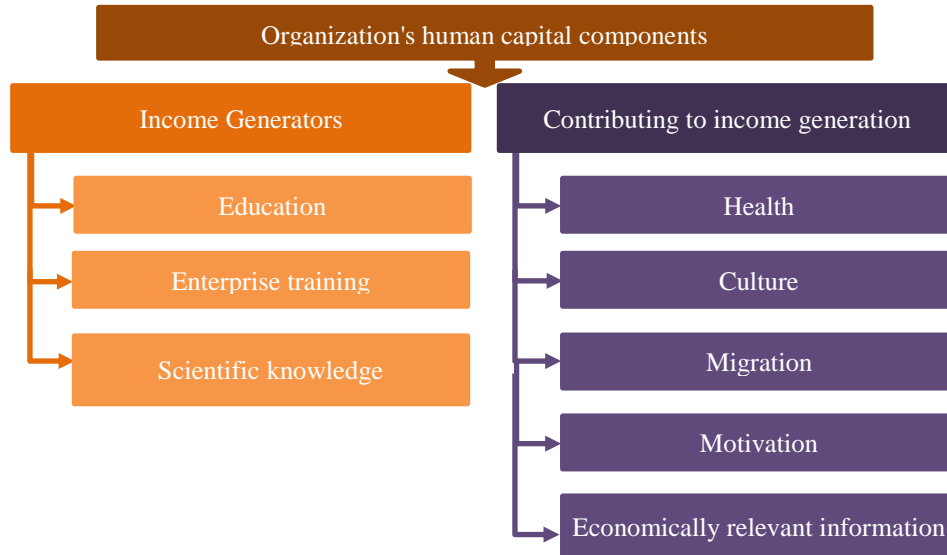


Figure 3 The structure of ensuring the return on the components of the company's human capital
Among the main areas of investment made by enterprises, dominate:

- organization of vocational training and retraining courses;
- payment of expenses of employees for treatment and preventive measures;
- construction of health and fitness centres, kindergartens, etc.

In terms of costs, in-house training in developed countries is comparable to other training sectors.

2.2. Potential Risks in Investing in Human Capital and their Management System

Investing in human capital is a high-risk activity due to its duration and uncertainty; the latter is closely related to the quality of the accumulated capital [5-6].

Implementation of investments in human capital by an enterprise is accompanied by the action of a whole set of risks, which both simultaneously and sequentially affect the economic efficiency of the investment process. At the same time, the effectiveness of making one type of investment at the same time can be affected by both risks specific to this type of investment and those that are characteristic of other areas of investment costs. An enterprise that invests in human capital expects to have a long-term, predictable socio-economic return on investment in the future. In full measure, such an effect can be expected only when the probability of the occurrence of various components of the investment risk is minimized. In all other cases, the likelihood of occurrence of specific risk components will have a very significant impact on the degree of effectiveness of investing in human capital:

1) a partial or complete loss of the possibility of obtaining predicted returns in the future – the onset of such a situation is characteristic, first of all, of the case when it is impossible, through any reason, to put into practice the knowledge and skills that should be formed during the professional development of the employee;

2) partial or complete loss of the number of funds - the occurrence of such damage may be caused, first of all, by the dismissal of the employee directly during the process of professional development or immediately after it;

3) the need for re-investment by the enterprise of funds to ensure quantitative and high-quality staffing of the staff, which may be accompanied by even substantial investment costs - the reasons for this need, in the first place, maybe difficulties encountered in the process of closing vacancies [7-10].

Depending on which component of human capital will be invested, investments can be divided into:

- direct impact investments - which include investments aimed at the development of human capital to generate income (for example, training in the workplace).
- indirect investment - investments that contribute to a higher salary or even income (for example, maintaining health).

The risk management system, when investing in human capital, in essence, does not differ from the standard risk management system, but it has its characteristics. It should also include some critical steps:

- risk identification and assessment of the likelihood of its occurrence;
- analysis of possible consequences and determination of a potential loss;
- determination of methods and tools for managing identified risks;
- creating a strategy to reduce the likelihood of a risk event
- minimize possible negative consequences;
- implementation of a risk management strategy;
- assessment of the results achieved and, if necessary, adjustment of the strategy.

A schematic representation and relationship of these steps are presented in Fig. 4.

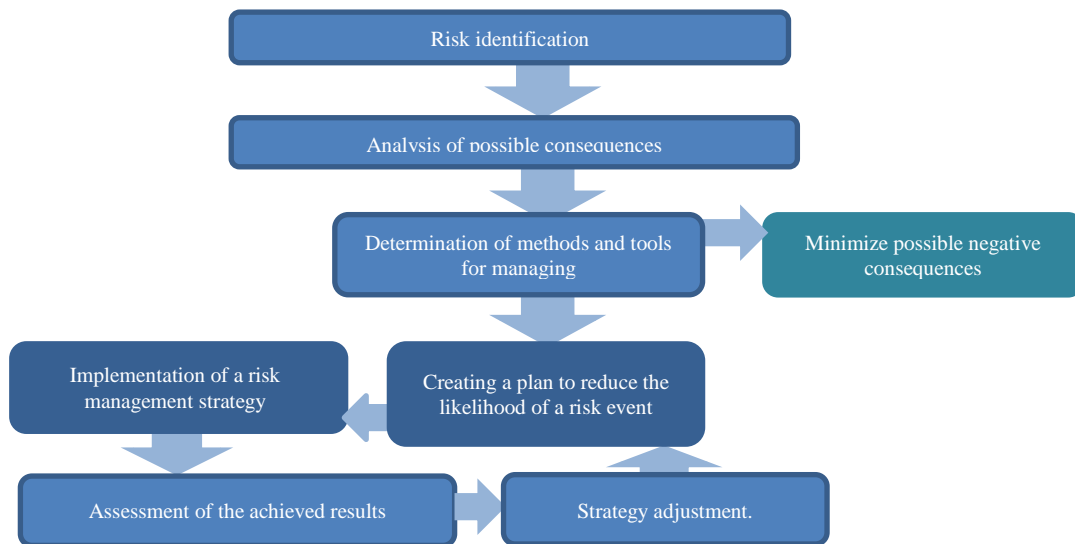


Figure 4 Risk management scheme for investing in human capital.

As a tool for risk management, we can distinguish traditional approaches, such as:

1. rejection of excessively risky investments,
2. reduction of risk, or its diversification,
3. limiting the costs of high-risk investments,
4. delegation of risk, by outsourcing activities, or insurance,

adoption of risk and the formation of reserves to compensate for losses. In general, the choice of a particular instrument in each case is individual, but this choice depends primarily on the ratio of potential benefits and risk level. A general view of the matrix for choosing a management tool is presented in Fig. 5.

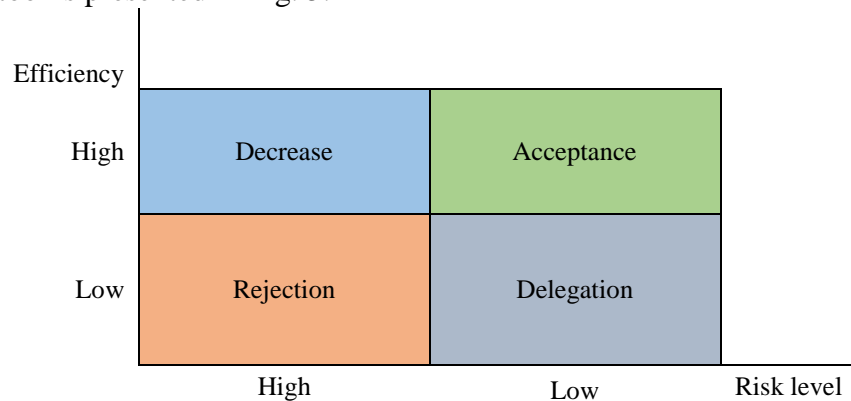


Figure 5 Selection matrix for a management tool.

2.3. Risks and Effectiveness of Investing in Human Capital

Investing in human capital predetermines some inherent risks for this type of investment; among them, it should be highlighted:

- risks of early employee departure associated with the dismissal of an employee from the organization before investing in its development will fully pay off and make a profit.
- risks of ineffective training arising due to the organization's erroneous choice of training programs or due to the low degree of assimilation of the training content by trained employees;
- risks of inconsistencies in employee development programs with the organization's development strategy.

Moreover, investments in human capital themselves should be evaluated in terms of efficiency and utility, not for the carrier itself, that is, for the employee, but the enterprise as a whole.

A general criterion that shows the effectiveness of human capital is determined by the function of particular standards (health, education, migration and training) and can be calculated by the formula:

$$W = f (W1, W2, W3, W4)$$

where W is the generalizing criterion responsible for the effectiveness of human capital, and W1, W2, W3, W4 are particular criteria for the effectiveness of health, education, migration, and training, presented in the integrative effect of human capital.

The total cost of education, retraining of a particular employee or all employees of the company, is an investment in the knowledge capital of this company. However, investments in human capital are justified when there is a tendency to increase the efficiency of the company, and the contribution of a specific employee to this trend is traced.

At each stage, the economic efficiency of training is determined by the ratio of costs and results. The result of investment in human capital should be considered an increase in labour productivity. There is a certain relationship between these indicators, which can be expressed by the following formula:

$$I_e = (Prod_a - Prod_b) \cdot Pr/I$$

where I_e is the efficiency of investments in human capital at the i -th stage; $Prod_b$ – development of the employee before training; $Prod_a$ – development of an employee after training; Pr is the unit price of a product; I - investment in human capital.

It should be clarified that this approach to the assessment of investments allows us to determine the quantitative evaluation of factors that have a direct impact on improving labour efficiency, while some elements of secondary importance cannot be assessed. As mentioned above, the effectiveness of investments is opposed to possible risks, while it should be borne in mind that at different stages of the formation of human capital, investment risks have a greater or lesser chance of occurrence. We single out the steps of investing and designate the risks most often pursuing them.

3. RESULTS AND DISCUSSION

The basis of the experiment will be the analysis of the risk management of investments in the human capital of an industrial machine-building enterprise. The nature of the work of this organization is closely related to the effective use of human capital, which means that both the issue of productive investment and risk management will be critically important. The characteristics and indicators of the human capital of this company are presented in Table 1.

Table 1 Human capital indicators

Indicators	2016	2017	2018	2019
Headcount staff, people	86 969	83 921	82 724	83 076
managers	6 958	7 392	6 523	6 523
specialists	12 176	13 045	11 741	12 176
employees	5 218	5 653	6 088	5 218
workers	60 878	58 269	60 878	60 009
apprentice	1 739	2 609	1 739	3 044
Number of employees trained	29 875	30 746	31 900	42 000
Labour costs, thousand dollars per year	2035000	1969000	2023000	2174000
Net investment in human capital, thousand dollars per year	54 600	74 200	66 700	77 200
Labour costs per employee, dollars per year	23 399	23 463	24 455	26 169
Percentage of employees trained	34,35%	36,64%	38,56%	50,56%

The company invested in various components of human capital, while the three most promising areas were recognized - these are investments in knowledge capital, health capital and motivation capital. The total investment in human capital development programs was about \$ 60 million per year, While the number of investment programs was 19.

The calculated investment efficiency, the level of potential risk, as well as the main parameters of investment programs, are presented in Table 2.

Based on the obtained data on the ratio of investment efficiency and the risks associated with them, a matrix of managerial impact selection will be constructed, shown in Fig. 6.

Risk Management in Investing in Human Capital

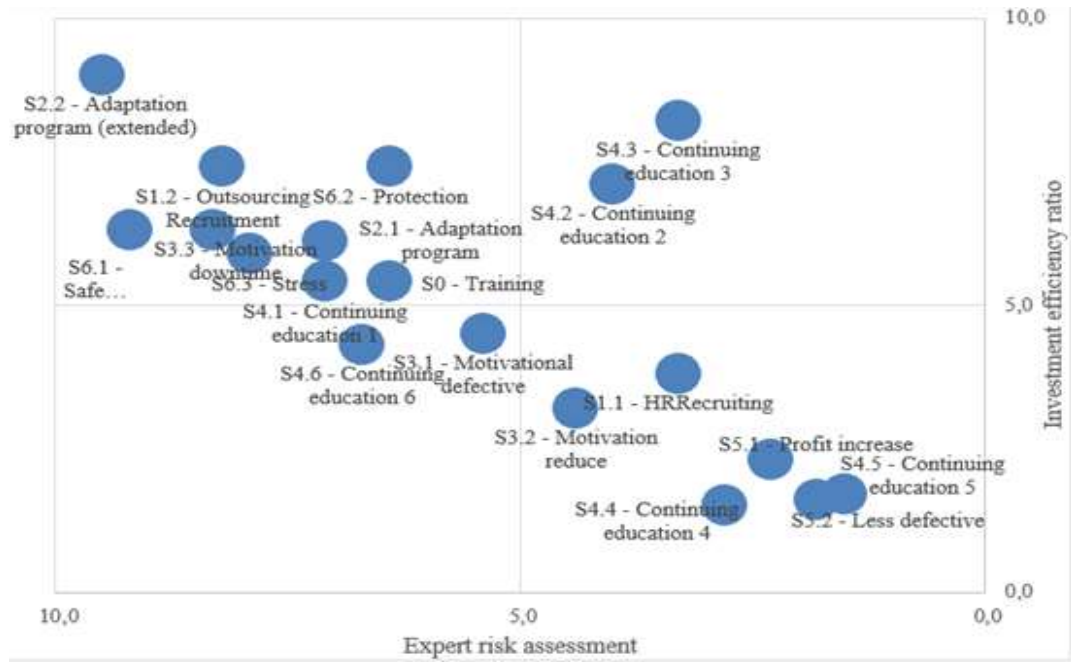


Figure 6 Matrix of choosing a management tool for risk management of investment projects

Table 2 Areas of investment programs for the development of human capital

Stages	Annual program costs	The number of participants in the program	Total yearly potential losses from failure to achieve goals	Calculated return in the form of profit	Investment efficiency ratio	Expert risk assessment (10 point scale)
Stage 0 - Apprentice Training	7 225	1 739	36 125	19 016	5,4	6,4
Stage 1 - Human Resources Recruiting	1 554	13 045	6 270	49 649	3,8	3,3
Stage 1 - Recruitment outsourcing by a recruitment agency	3 790	8 697	18 450	87 012	7,4	8,2
Stage 2 - Adaptation program for new employees	2 580	30 439	12 132	8 295	6,1	7,1
Stage 2 - Adaptation program for new employees (extended)	3 780	17 394	10 494	82 211	9,0	9,5
Stage 3 - Motivational program to reduce defective	845	60 878	3 258	69 158	4,5	5,4
Stage 3 - Motivation program to reduce material loss	1 754	69 575	8 724	9 854	3,2	4,4
Stage 3 - Motivational program to reduce production downtime	1 023	13 045	3 627	2 177	6,3	8,3
Stage 4 - Continuing education program (option 1)	2 570	8 697	9 815	5 786	5,4	7,1
Stage 4 - Continuing education program (option 2)	2 305	13 045	8 727	10 923	7,1	4,0
Stage 4 - Continuing education program (option 3)	3 100	24 351	5 526	71 632	8,2	3,3
Stage 4 - Continuing education program (option 4)	2 876	27 830	13 734	14 917	1,5	2,8
Stage 4 - Continuing education program (option 5)	1 450	36 527	6 603	66 032	1,6	1,8
Stage 4 - Continuing education program (option 6)	2 378	17 394	6 488	11 222	4,3	6,7
Stage 5 - Profit increase Salary increase	3 400	27 830	11 354	71 465	2,3	2,3
Stage 5 - Program less defective more salary	1 250	67 836	4 936	67 155	1,7	1,5
Stage 6 - Safe Environment Program	9 780	69 575	31 227	19 560	6,3	9,2
Stage 6 - Protection First Program	5 760	78 272	16 607	12 166	7,4	6,4
Stage 6 - Stress reduction program	2 580	73 054	3 922	59 592	,9	7,9

Analysis of the matrix makes it clear that the projects Stage 3 - Motivational program to reduce defective and Stage 4 - Continuing education program (option 6) are low-efficient and high-risk, the ratio of costs, possible profits and potential risks is the worst for them, and therefore, the company is worthwhile in future periods, curtail funding for these programs.

The next series of investment programs show high efficiency, but at the same time carries the embryos of potentially high risks%

Stage 0 - Apprentice Training

Stage 1 - Human Resources Recruiting

Stage 1 - Recruitment outsourcing by a recruitment agency

Stage 2 - Adaptation program for new employees

Stage 2 - Adaptation program for new employees (extended)

Stage 3 - Motivational program to reduce production downtime

Stage 4 - Continuing education program (option 1)

Stage 6 - Protection First Program

Stage 6 - Stress reduction program

Therefore, the company should consider the possibility of either reducing the volume of investments while maintaining their effectiveness or discuss options to reduce the high risk of these projects.

The following 6 projects show a low return on investment, with a low level of risk:

Stage 3 - Motivation program to reduce material loss

Stage 4 - Continuing education program (option 4)

Stage 4 - Continuing education program (option 5)

Stage 5 - Profit increase Salary increase

Stage 5 - Program less defective more salary

Stage 6 - Safe Environment Program

Risk management options suggest the possibility of delegating part of the risks. Still, since we are talking about investments within a closed production complex, with minimal outsourcing services, perhaps in this situation, you should either find ways to improve the efficiency of investments or consider the possibility of reducing costs.

And finally, two projects showing a high return on investment, with minimal risk:

Stage 4 - Continuing education program (option 2);

Stage 4 - Continuing education program (option 3)

What is characteristic of both projects relates to the fourth stage of investment, in which projects are concentrated that directly affect the growth of human capital, and whose contribution to increasing profitability and production efficiency is most noticeable.

6. CONCLUSION

Speaking about risk management when investing in human capital, one should always remember the complexity and complexity of the concept of human capital itself; often, the potential effect of investing is difficult to evaluate from the cost-profit ratio. Investments in human capital carry both the potential to significantly increase production efficiency and possible profits and the grain of possible losses from unjustified spending on investing in unprofitable components of human capital. The risk management system for investment in human capital, despite the complexity and complexity, should be as effective as other risk management systems. The proposed methodology for risk management when investing in

human capital, although it does not pretend to be universal and redundant, shows excellent results when applied correctly.

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