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# ECONOMIC STUDY AND RISK ESTIME OF THE INVESTMENT IN THE HUMAN CAPITAL

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**ABSTRACT.** A given paper objectifies the significance of evaluating risks of investment into human capital for an enterprise. The work defines the essence of risk of investment into human capital and suggests the algorithm of the process of investment into human capital. The article also illustrates the procedure of identifying the most dangerous investment risks and provides evidence for quantitative evaluation of risks of investment into human capital. It categorizes the most dangerous risks and puts forward strategies for responding to the most common types of risks of investment into human capital.

***JEL Classification:*** D81, D83, I25, J24, M12

***Keywords***: investment into human capital, planning, enterprise, objective, risk.

## Introduction

The orientation of Ukraine's economic policy course on progressive achievement of knowledge's innovative economy in modern conditions can be carried out due to human capital accumulation which is constant in time and intensive in its nature and which realization is possible by investment. The main position among investors when investing in the human capital is taken by the state, because the development of education, scientific and researches activity, public health care and environment protection is carried out at the expense of the its budget means. The legislation stimulates economic players to activate investment, so the basic tendencies of the country's human capital accumulation are formed in that way.

The changes analysis of the last year's state financing in various directions of the human capital' accumulation has allowed making a conclusion not only about its insufficiency, but also about low efficiency of budgetary funds use invested in this sphere. So, at annually increase of the educational activity financing on a labor market the misbalance of workers with professional degree and experts with higher degree and demand for each of

these workers' categories is observed. Insufficient level of the scientific activity' government financing has led to the low innovative development of Ukraine's industry. Despite the increase of the public health services' financing in Ukraine, its level doesn't correspond to the world requirements. The annual fall of life quality, reduction of its average expected duration, growth of the population's sickness and death rate have been monitored.

In deficiency and limitation of human development' budgetary financing, which was noticed in Ukraine during last years, the natural process of priority redistribution of the sources investment in the human capital in national economy is occurred. As a result the role of the leading investor is passed directly to economic players. For them to conduct their duties in professional development and personnel health protection it is necessary to promptly provide certain investments volume. Study of investments suitability should be based on both economic and social efficiency. At the same time the continuity of such estimation procedure which consists of consecutive interconnected stages is important. In the absence of perfect and practically suitable methods, data ware and effective tools of productivity estimation of investment in the human capital this process completely becomes a prerogative of experts in human resource management both in organizational, and in financial aspects. As a result each enterprise with different success level tries to create its own system of organizational, informational and methodological support of the human capital investment, what makes it impossible to implement the complex intensity and productivity analysis of the mentioned processes at region and country level.

Simultaneously at absence of the enterprises' perfect management tools of efficient investment in the human capital and corresponding methods, and also insufficient level of data ware, such procedure can be labor-consuming, what will lead to decrease in economic appeal of human capital investment. In such conditions the design of practical recommendations' meant to provide the enterprise with methodological apparatus for the analysis, planning and estimation of the investment' social and economic efficiency in the human capital gains a significant value.

However, despite profound studies of various aspects of investment influence on the human capital level' accumulation, there are still pending questions for the studies of social and economic efficiency of this investment. Absence of complete scientifically-methodological basis and of effective scientifically-practical recommendations about formation of social and economic efficiency of investment in the human capital has defined an area of the present research work.

It is therefore the purpose of this article is to study the economic entities and types of risk when investing in human capital at the enterprise level, the implementation of a quantitative assessment of the main types of such risks and develop measures to reduce them further. All of the studies presented in the paper are made independently by the author based on the study of international experience in the field of investment in human capital and confirmed by experiments conducted by the author during 2010-2013 industrial enterprises of Ukraine. In the article the author proposed method is illustrated by the example of the engineering enterprise joint stock company «Donetskgormash». The study results have a theoretical value and practical perspectives can be useful to managers and HR managers all types of organizations. Timely identification and registration of components of risk of investing in human capital to avoid negative tendencies and will promote productive return of funds now directed to the development of human capital.

Article is structured as follows: first, an overview of the literary base, which is the basis of the study (*Literature review*), further theoretical foundation of the economic nature of the risk of investing in human capital and its components stand out (*Risk of investing into human capital*), justified the choice of risk components that have the most negative impact on the effectiveness of and efficiency of investment (*Selection of the most threatening risks*), the

technique of valuation risk (*Valuation base of risks*), the choice of strategies to respond to the existing enterprise risk in investing in human capital (*Matrix of selecting strategy*) and draws conclusions on this article (*Final conclusions*).

## Literature review

Formation of the theory of productive development and human capital in Western science has a long history. By A. Marshall (Marshall, 1959), L. Walras (Walras, 1898), J. Wolsh (Wolsh, 1935), I. Fisher (Fisher, 1927), along with the work of other researchers socioeconomic processes give rise to the creation of human capital theory. Fundamentals of the theory of investing in the man himself was laid in the early 60 XX century leading american economists T. Schultz (Schultz, 1961), G. Becker (Becker, 1967) and J. Mincer (Mincer, 1974). L. Thurow expanded the test concept to include the social, cultural, philosophical and psycho-physical components (Thurow, 1970). E. Denison devoted his labors estimate the economic return on investment in human capital (Denison, 1964). Further research in the field of investment in human capital have been carried out by such scholars Y. Ben-Porath (Ben-Porath, 1967), P. Bourdieu (Bourdieu, 1986), J. Heckman (Heckman, 1976).

Any enterprise' activity, irrespective of an economic activity and technological manufacture' features, the enterprise' size, duration of stay on the market and level of production or services' competitiveness, is carried out in the conditions of unavoidable uncertainty and risk that imposes certain restrictions and advances demands to the procedure of an explanation and acceptance of tactical and strategic managerial decisions. So, the unreasonable and mistaken choice of a certain managerial decision can result not only in full loss of the invested means, but even to reduction of a product market share, that will cause considerable economic losses and will create threat to the enterprise' economic safety. For this reason when making managerial decisions the administration should consider probability of risk and to fulfill the activities to prevent them or to minimize the negative influence in time.

The process of enterprise risk management is complex and requires the timely introduction of procedures, methods and strategies, integrated use of which should help to reduce the probability of threatening consequences of the risk. Scientists propose different approaches to defining the sequence of steps of the risk management procedures. V. Vitlins'kyj and L. Mahanec', by summarizing research American Project Management Institute (PMI) define five interrelated procedures, the sequence of which should form the overall risk management process: identification, qualitative and quantitative assessment, risk response planning, monitoring and control (Vitlins'kyj, 2008). In another study, V. Vitlins'kyj in collaboration with G. Velykoivanenko propose to carry out the procedure of risk analyzes in a different sequence: identification of objective and subjective factors that give rise to a risk analysis of the identified factors; comprehensive assessment of specific types of risk; systemic and comprehensive quantitative risk assessment on a number of indicators, risk tolerance; risk modeling of economic activity with the definition of system characteristics and indicators of economic benefit and risk management to develop appropriate measures and techniques to reduce its power (Vitlins'kyj, 2004). Ju. Chebotar'defines the following stages assess the level of economic risks: species identification of risks, assessment of their probability, establishing potential financial losses from them; setting limit the level of risk (Chebotar', 2005). Despite the very comprehensive and multilateral lighting risk management procedures, the practical use of the proposed sequence of this process allows to cover all components of the complex, but does not consider the specifics of risk associated with investing directly in human capital.

## Risk of investing into human capital

Investment in the human capital can create conditions to obtain social and economic efficiency for the enterprise, region, country and on the international level from the invested means, therefore, as consequence, it is accompanied by the high risk (Becker, 2010). Thus, investment in the human capital, proceeding from intrinsic characteristics of its economic content, simultaneously is the prevention factor of intraproductive components of the enterprise' uncertainty and risk and a source of the new risks creation connected with specificity of the human capital accumulation (Zakharova, 2013).

The risk occurrence when investing the enterprise's means in the human capital is mainly connected with the human factor and impossibility to exactly define and estimate the potential change of a separate worker' labor efficiency level as a result of a certain investment expenses. In this case the main reasons of such uncertainty when making managerial decisions about suitability of investment into the human capital can be the following:

- impossibility to exactly define the worker's intellectual abilities and motivation level to perspective professional development on the preparatory stage of investment;
- instability in time of an individual's psycho-emotional state, unsteadiness of his aspirations, purposes, personal circumstances, possibilities of development and expectations of short – and long-term prospects;
- different speed, level and productivity of new information, knowledge and practical skills learning for every worker, which depends on the individual' intellectual abilities, individual structure of a motivational core of his labor behavior and the possibilities given by the enterprise for their practical use;
- individual influence of the enterprise' business culture and socially-psychological climate in a team on a productivity level and work efficiency;
- dependence of the individual's professional development level on the chosen methods, ways and tutorials;
- change of return on investment into professional development depending on the stage of the worker' life cycle at the moment of investment;
- different workers' physical capacities and health status which tend to deterioration after a while.

Except the uncertainty connected with the human factor, there is also an organizational block of its occurrence reasons in decision-making sphere of suitability and efficiency of the enterprise' investment into the human capital:

- lack of the authentic and exhaustive information about productivity of separate stages of investment in the human capital;
- complexity to achieve the right level of objectivity when making quantitative measurement of various components of investment efficiency in the human capital;
- lack of the reliable and effortless methodological apparatus used by enterprise to esteem various components of human capital investment' efficiency;
- complexity when using the unified procedures of efficiency calculation of a certain kind of investments for every worker;
- impossible to differentiate the separate components of human capital investment efficiency, obtained from various sources (the enterprise, the state, the worker and members of his family, the outside organizations and funds);
- lack of competent experts in human resource management which are capable to develop and practically introduce the complex monitoring system of an estimation of human capital investment efficiency.

Thus, the risk of investment in human capital for the enterprise is a combination of probable threat of non-repayable, full or partial loss of the means invested in the human

capital, and probability not to receive the economic return from human capital investment in present investment conditions and in the future. Such risk constantly follows the managerial decisions making processes which concern the estimation of the social and economic suitability of certain investments on different stages of investment in the human capital and cannot be completely liquidated.

The final result of successful introduction of a risk control system in the enterprise is to reach the stability conditions for the risks of investment in the human capital. It means to achieve such effect in investment risks management that the enterprise can get the built into the budgetary plan level of social and economic effect from means invested in the human capital.

The procedure of definition and calculation of risk when investing in the human capital should be carried out by revealing and estimating all the aspects of its influence on the effectiveness of the investment process.

Therefore the managerial decisions concerning investment into the human capital should be carried out in certain sequence, which will help minimize the negative influence of risk factor components on efficiency of investments into the human capital and to develop the practical strategy of the enterprise' stable growth:

1. The all-round analysis of existing information base concerning a state, intensity and productivity of every kind of investments into the human capital for certain vocational workers groups.
2. Risks identification by the most complete determination of terms when the possible risks of investment in the human capital can occur.
3. Quality and quantity risk determination when investing in the human capital.
4. Determination of the possible negative influence level of the most possible and important risk components on productivity of every investment made into the human capital for certain vocational workers groups.
5. Determination of possible risks' influence after investing in the human capital on occurrence of other risks, connected with investment in the human capital, and not connected to it, which means taking into account the difficult interconnections between the general risk' various components of the enterprise' activity.
6. Design of the alternative decisions variants and a choice of the most suitable managerial decision concerning investment in the human capital, which timely practical realization should provide sufficient level of social and economic efficiency of investment expenses.

On the assumption that the investment in the human capital has a complex influence on all the stages of its reproduction, the enterprise can reach the greatest effect only in case of a complex, well-founded, simultaneous and timely implementation of the various kinds of investments into the human capital (see *Figure 1*).

Investment in workers' education, professional development and retraining has high level of social and economic efficiency both for the enterprise, and for the worker.

However, by investing in personnel' professional and personal development, the enterprise gets at high risk which is connected with high probability of the worker's dismissal right after studies or through the short period of time which has passed after his professional development. First of all it is caused by growth of his cost on a labor market and increase of demand for work of such skill and competence level.

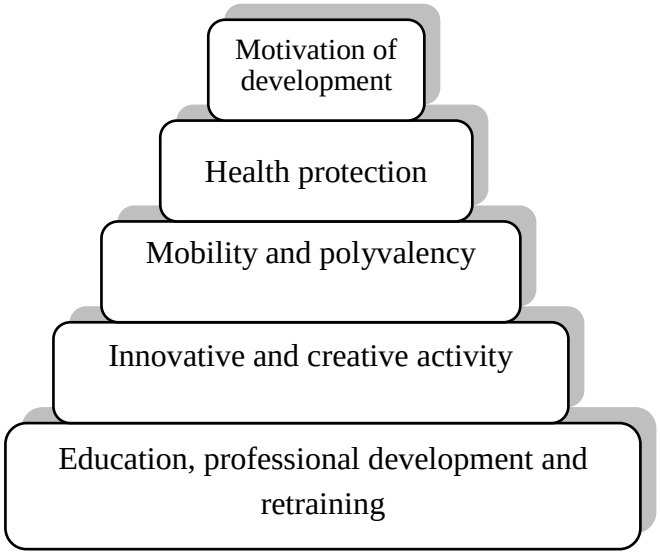


Figure 1. Enterprise' priorities pyramid of the investments into the human capital
*Source*: own research.

Depending on results stipulated by the professional training program (whether it is general knowledge and skills learning or highly focused professional training) the change of the level of the worker's dismissal risk has been monitored. Such regularity can be explained, as giving the worker specific focused professional knowledge in most of the cases limits the area of its full practical use by the enterprise where they have been obtained. Therefore, the demand for such worker on a labor market will be quite low and it reduces the risk that the worker will leave the enterprise in the near future looking for higher earnings or because of the other reason.

The other risk which can occur when investing in workers' education and professional training is a low level of new knowledge and skills learnt by employees while training. The reasons can be following: high complexity of a teaching material and programs, insufficient educational and professional level of workers, insufficient professional skills of teachers and trainers, lack of interest from the side of workers in their professional development. However, even if to assume that the worker has completely learnt a new material and has obtained necessary theoretical knowledge and practical skills, but he has no possibility to practice them in the near future, there is high probability that the enterprise will fully or partly lose the means invested in professional development of such worker. Knowledge and skills which are not updated after a while and are not practiced regularly are subject to moral depreciation and progressive lost. Compensation of such depreciation demands enterprise's additional investment, which quantity can even exceed their initial volumes, invested in the worker's professional development and retraining.

The second kind of investments priority for the enterprise is investment into the human capital which is investment in innovative and creative activity of workers by creation of corresponding motivational conditions, stimulus and interest of workers in an innovative direction of own work. The major risk factors when this kind of investment in the human capital is missing are unwillingness to change place of work and job content and lack of correspondence between the requirements to the quality of work prescribed by the enterprise's governing body and existing pay level. Thus, the main reason of risk in this case is the psychological barrier of the worker which generates his passivity when modernization of the organization's labor activity is needed and dissatisfaction with conditions, work regime and its pay level.

The third privileged enterprise' investment component is investment in mobility and polyvalence which is meant to reduce unreasonably surplus number of workers and to considerably increase their interchangeability and professional functionality. The main risk of this investment is also lack of wish to obtain additional knowledge and skills by hired workers, aspiration to change the job content with the aim to eliminate the discrepancy between requirements to quality of work and its pay level. The lack of possibility to be promoted and to get higher income for the worker who is constantly taking courses for his professional development is also the risk factor for this kind of investment into the human capital.

Public health services development is one of the least attractive kinds of investments into the human capital for the enterprise, however the most desired for the worker and society. This kind of investments creates conditions which help to improve physical and moral health state and workers' quality of life, to reduce and liquidate the cases of diseases and job-related injures what makes it possible to improve the wellbeing of the separate person, family, and a whole society.

Investment in public health services is mostly made by financially successful and socially responsible enterprises, mainly with the foreign capital, by paying for medical insurances, purchasing the gym membership and regular workers' medical inspections. In this case the result of risk can be worker's disease or job-related injure not depending on the enterprise' periodical investment in health protection.

The least priority is the enterprise's investment in the personnel's motivation to professional development as this kind of investment expenses does not give a full guarantee of a fast return from investments and is accompanied by risk of loss of the invested means if the motivation does not give expected effect. In case if motivation will encourage the worker to develop professionally, the level of investment' efficiency will depend on the realization of his wish to professionally develop if it will be done on his own or with financial and organizational enterprise's support and if in future he will be able to fully use obtained knowledge and professional skills in practice.

Thus, when choosing the type of investments into the human capital the enterprise should be guided not only by the aspiration of gaining the biggest social and economic effect in a short term, but also to maximally consider workers' expectations and aspirations concerning their own professional development. At the same time the enterprise should also identify and consider possible factors of uncertainty and investment' risk, and timely develop and introduce risks management measures simultaneously at all the stages of investment into the human capital.

To esteem the influence of risk factors on productivity of investment in the human capital it is appropriate to define the most dangerous and most likely to happen among them. It is necessary to notice that the structure of the most dangerous risks of investment can change in different time periods under influence both internal, and external factors. The further enterprise' activities concerning investment risks management should be directed on the detected risks to minimize its negative influence on productivity of investment into the human capital.

## Selection of the most threatening risks

In order to demonstrate the process of singling out the most threatening risks of investing into human capital the article defines basic constituents of the risk revealed when carrying out a particular type of investment within joint stock company «Donetskgormash». It's worth mentioning that basic constituents of investment risks have been analyzed on the basis of statistical study of human capital investment performance in 2004-2013. Comparing and contrasting dynamics of the criteria under consideration with the change in investment

volume enabled us to identify basic factors of equivocality and that of loss risk of the funds invested into human capital as well as determining possible reasons for decrease or absence of economic returns. Further on, basic constituents of the risk were categorized in terms of type of investment with each group getting letter value, *Table 1.*

Table 1. Total of risks involved in investing into human capital within joint stock company «Donetskgormash»

| Risk constituent of investing into human capital | Investing into human capital | | | | | |
|---|---|---|---|---|---|---|
| | education (e) | professional development and requalification (p) | innovation and creative activity (i) | health protection (z) | mobility and multivalency (m) | motivation for development (d) |
| Dismissing employee before the total return on investment (Z) | $Z_e$ | $Z_p$ | $Z_i$ | $Z_z$ | $Z_m$ | $Z_d$ |
| Lack of motivation to gain new knowledge and professional skills (Y) | $Y_e$ | $Y_p$ | $Y_i$ | $Y_z$ | $Y_m$ | $Y_d$ |
| Low level of mastering new knowledge and professional skills (X) | $X_e$ | $X_p$ | $X_i$ | $X_z$ | $X_m$ | $X_d$ |
| Disease, injuries or death of the employee (U) | $U_e$ | $U_p$ | $U_i$ | $U_z$ | $U_m$ | $U_d$ |
| Inability to put into practice new knowledge and skills (S) | $S_e$ | $S_p$ | $S_i$ | $S_z$ | $S_m$ | $S_d$ |
| Lack of career prospects (G) | $G_e$ | $G_p$ | $G_i$ | $G_z$ | $G_m$ | $G_d$ |
| Discrepancy between employer's expectations of labour yield and level of payment (W) | $W_e$ | $W_p$ | $W_i$ | $W_z$ | $W_m$ | $W_d$ |

*Source*: own research.

To identify the most dangerous risk method was used multi-criteria ranking, where as the main criteria were used indicators:

1) productivity (P);
2) the return on investment in human capital (R);
3) the turnover rate (T).

Was applied a simple model of multi-criteria ranking:

$$\text{Risk} = \{P, R=\uparrow, T=\downarrow\}, \quad (1)$$

As a result, the ranking identified the most threatening and likely risks for the enterprise (see *Figure 2*).

All the attention of HR managers should be aimed at minimizing the negative impact of risks that have a strong negative impact on the return on investment in human capital.

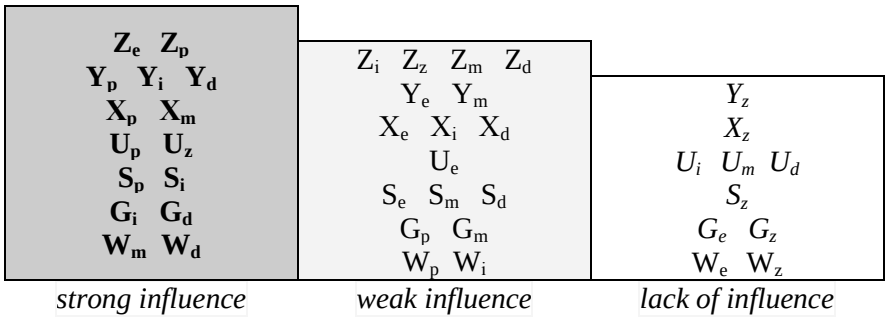


Figure 2. Ranking forces risk impact on the return on investment in human capital

Enterprise is actively investing into human capital expecting to get in the near future long-term forecasted social and economic return on amount of funds invested. Maximum effect can only be expected on condition that the likelihood of various investment risks can be minimized which appears to be rather daunting task in real life and sometimes is impossible to fulfill. In all other cases efficiency of investing into human capital will be largely influenced by possibility of one or another risk constituent arising whose negative impact can be characterized by three types of economic consequences and losses enterprise has to face:

- partial or complete loss of opportunity to get forecasted social and economic return on investment into human capital – this situation is, in the first turn, likely to occur due to inability to apply in practice knowledge and the skills gained by employee during professional development;
- partial or complete loss of funds invested by enterprise into employee's professional development and health care – which may be caused by having to dismiss employee during the process of professional development or upon its completion;
- necessity for another investment of funds with the aim of maintaining quantity and quality of staffing level which can be followed by even larger investment caused by the necessity to fill the vacancy by means of both internal and external sources arising as a result of premature dismissal of employees, whose professional development was financed by an enterprise during particular time.

## Valuation base of risks

After the qualitative identification of the risks of investing in human capital, there is an urgent need for objective quantitative assessment of the probability of occurrence of the individual components of risk and determining the extent of the negative impact on the effectiveness of their investment process. Conceptual provisions for quantitative risk assessment in terms of the various aspects of economic and financial activity laid in the works V. Abchuk (2006), V. Hristianovskij (2000), O. Jastrems'kyj (1992), V. Vitlins'kyj (1996). As a methodological framework for quantitative measurement of risk scientists are encouraged to use probability theory, methodological apparatus which can also be used to quantitatively evaluate the degree of risk of investing in human capital.

Therefore, taking into account the necessity to consider all possible negative consequences (Demenina, 2008) when evaluating valuation base of risks when investing into human capital the following formula for calculating average valuation base of likelihood of negative consequences can be used:

$$\overline{R} = \sum_{i=1}^{n} \sum_{j=1}^{m} (p_{ij} \cdot V_{ij}), \qquad (2)$$

where $p_{ij}$ – likelihood of occurrence of j-type economic loss in case of i-type of risk constituent when investing into human capital; $V_{ij}$ – valuation base of economic loss of j-type observed in conditions of i-type risk constituent when investing into human capital; n – a number of risk constituents typical of an enterprise when investing into human capital; m – a number of economic losses for an enterprise should various risk constituents arise when investing into human capital.

Risks likelihood can be determined on the basis of retrospective analysis of index dynamics (staff turnover, work productivity etc). In order to create reliable and sufficient statistical database it is necessary to resort to the use of statistical estimation by means of determining the ratio of frequency of one or another investment risk constituent when observing the change in indices under consideration with the help of the following formula:

$$p_A = \frac{f_A}{N}, \qquad (3)$$

where $f_A$ – a number of cases leading to event A (occurrence of a particular investment risk constituent whrn investing into human capital); N – total number of observations of the index change which either directly or indirectly characterizes occurrence of each investment risk constituent when investing into human capital, units.

However, the statistic method of defining likelihood of risk constituents is limited due to the inability to determine the link between the moment of risk occurrence and the level of changes in economic indices of company activity. Therefore, in cases when it is difficult or impossible to determine the link mentioned above the likelihood of particular risk constituents can be forecasted only with the help of the expert method.

The level of risk involved in investing into human capital, apart from determining economic loss on investment, can be evaluated by means of the expected level of economic return on investment into human capital with the help of variation indicator (Rimer, 2008):

$$\upsilon_r = \frac{\sigma_r}{\overline{O}} = \frac{\sqrt{\sum_{i=1}^{k}\left(O_i - \overline{O}\right)^2 \cdot P_i}}{\overline{O}}, \qquad (4)$$

where $\upsilon_r$ – coefficient of risk variation; $\sigma_r$ – mean square deviation of risk; $\overline{O}$ – average expected economic return on investment into human capital; $O_i$ – expected level of economic return on i-type investment into human capital; $P_i$ – likelihood of risk as a result of i-type investment into human capital; k – a number of types of human capital investment.

Expected level of economic return on i-type investment into human capital can be determined by formula:

$$\overline{O} = \sum_{1=1}^{n} O_i \cdot P_i. \qquad (5)$$

The likelihood of risk as a result of i-type investment into human capital is calculated by the following formula:

$$P_i = \frac{\sum_{i=1}^{n} f_i}{N}, \qquad (6)$$

where $f_i$ – a number of cases bringing along a particular risk constituent as a result of i-type investment.

All the risks of company activity connected with investing into human capital can be divided into three categories according to the level of negative impact of the consequences on social and economic performance of investment into human capital: they are of high, middle and low intensity. It's worth mentioning, that the level of risk doesn't directly depend on how innovative investment-related management decisions are. In accordance with this qualification, experts have to concentrate their attention on managing the risks which are most likely and threatening for the enterprise, therefore, enabling themselves to forecast potential development of events and give objective evaluation to social and economic performance of investing into human capital.

In order to carry out quantitative analysis of the most threatening risk constituent whrn investing into human capital (see *Table 1*) we determined the likelihood of each risk constituent with the help of statistical method (used for evaluating investment risk constituents Z, X, U and G) and by means of expert evaluation method (used for evaluating investment risk constituents Y, S and W). The levels of negative impact of risk consequences on the performance of investing into human capital were identified by means of statistical referencing of average amount of investment for employee and level of economic results enterprise is likely to get in case of the most threatening risk constituents of investment into human capital. On the basis of the data obtained the most threatening risk constituents were grouped according to the criterion of impact homogeneity and that of likelihood of negative consequences of each of the risk constituents (see *Figure 2*).

| *Probability of risk* | High (100-500) | Middle (501-1000) | Low (1001-1500) |
|---|---|---|---|
| High (0,31-0,60) | $\mathbf{Y_d}$ *(2,5-30,0 ths. UAH)* | $\mathbf{Y_d}$ $\mathbf{W_d}$ *(15,0-60,0 ths. UAH)* | $\mathbf{Z_p}$ $\mathbf{X_p}$ $\mathbf{G_d}$ *(31,0-90,0 ths. UAH)* |
| Middle (0,11-0,30) | $\mathbf{Y_i}$ *(1,1-15,0 ths. UAH)* | $\mathbf{G_i}$ $\mathbf{W_m}$ $\mathbf{U_p}$ *(5,5-30,0 ths. UAH)* | $\mathbf{X_m}$ $\mathbf{U_z}$ *(11,0-45,0 ths. UAH)* |
| Low (0,01-0,10) | $\mathbf{Z_e}$ *(0,1-5,0 ths. UAH)* | $\mathbf{S_i}$ *(0,5-10,0 ths. UAH)* | $\mathbf{S_p}$ *(1,0-15,0 ths. UAH)* |

*Level of negative impact of risk consequences on investment effectiveness, UAH/person*

Figure 2. Grouping the most threatening risk constituents of investing into human capital and total level of economic losses within joint stock company «Donetskgormash»
*Source*: own calculations.

Therefore, for the enterprise under analysis, various risk constituents of investment into human capital may lead to economic loss from UAH 100,000 to UAH 90,000 annually. With a view to preventing negative impact of risk on the effectiveness of investing into human capital it's only logical for an enterprise to introduce risk management procedures by means of objectivities of particular strategy for each risk constituent of investing into human capital.

**Matrix of selecting strategy**

The process of demonstrating and implementing risk management strategies has to be dynamic enough and consist of several management decisions concerned with responding to the most probable and threatening risk constituents of investing into human capital according to current level of economic performance of an enterprise and possible impact of each of the risk

constituents. Having said that, according to one or another risk constituent and current objective of the risk management, the board of an enterprise may choose one of the five alternative management decisions, namely: forecasting and preventing risks, deviating from risks, accepting and non-resisting to risks, reducing risks or passing over responsibility for it (dissipation) (Karpuncov, 2008, Makkarti, 2005). For each group of investment risks there may be recommended the choice of a particular risk management strategy in accordance with the level of probability and level of negative impact on effectiveness of human resources management and general performance of an enterprise. However, when choosing that or another strategy for risk modeling managers have to take into account not only peculiarities of definite types of investment but also current situation in human resources management and achieved economic status of an enterprise. For this particular reason, we have suggested two most efficient in modern terms risk response strategies for the most significant risk constituents within joint stock company «Donetskgormash» – the recommended and the alternative one, *Table 2*.

Suggested strategies for responding to different risk constituents of investing into human capital can be classified as active and passive ones according to the measures, tools and practical methodology to be used for their practical realization. The choice of one of the active strategies for responding to investment risk requires taking particular organizational measures and running particular expenses which is supposed to result in the increase in probability of obtaining additional social and economic return on investment into human capital.

The choice of one of the passive strategies involves either totally preventing the situation which will inevitably lead to undesirable risk or objectivize admitting the fact that the process of investing into human capital will be inevitably followed by definite risk. Manager taking final decision in favour of one or another strategy has to compare expenditure of all types of resources necessary for its implementation and forecasted economic return brought by a particular strategy for every type of investment expenditure of an enterprise.

Table 2. Matrix of selecting strategy for enterprise response to the risk of investing into human capital

| Risk constituent of investing into human capital | Strategy for enterprise response to the risk of investing into human capital | | | | |
|---|---|---|---|---|---|
| | Risk forecasting and preventing | Deviating from the risk | Aversion and non-resisiting to risk | Reducing risk | Passing over responsibility for risk |
| $\mathbf{Z_p, Y_p, X_p}$ | ▨ | | | ▨ | |
| $\mathbf{X_m}$ | | ▨ | | | ▨ |
| $\mathbf{S_i, S_p}$ | | ▨ | ▨ | | |
| $\mathbf{G_i, G_d}$ | ▨ | | ▨ | | |
| $\mathbf{Y_d, Y_i, U_z, U_p}$ | | | ▨ | ▨ | |
| $\mathbf{Z_e, W_m, W_d}$ | | ▨ | | | ▨ |
| *Conventional symbols* | ▨ – strategy recommended for responding to risk | | | | |
| | ▨ – alternative strategy for responding to risk | | | | |

*Source*: own research.

Active strategies of responding to risk embrace risk forecasting, risk preventing and risk reduction. The strategy of forecasting and preventing the risk of investing into human capital is based on monitoring identification of risk probability, forecasting the level of its destructive power and taking measures for timely response with a view to preventing it from occurring. It's worth pointing out that the range of methods aimed at preventing risk of

investing into human capital is quite substantial and consists of different techniques and effective management procedures for staff. The strategy of risk reduction is aimed at managing to minimize its probability when carrying out particular type of investment into human capital and reducing its negative impact on changing the level of social and economic return.

The strategy of risk aversion, its acceptance, non-resistance to it and passing over responsibility for it are of passive character. Practical implementation of risk aversion strategy is only justified when it is forecasted that the expected risk will have devastating effect for further development of an enterprise, therefore, the most reasonable thing to do is to either prevent it from happening or averting it. The strategy of accepting risk and non-resisting to it when using a particular type of investment into human capital can only be exploited by an enterprise when it's obvious that it's difficult or even impossible to reduce its level by means of available methods. However, this risk of investment into human capital requires constant forecasting, controlling and quantitative evaluation of its probability and the level of negative impact on investment performance. The essence of the strategy of passing over responsibility involves total or partial transfer of responsibility for particular type of investment and its risk to an employee himself or herself, their family members or third parties represented either by particular departments of an enterprise or outside organisations.

Preliminary identification and timely implementation of the justified strategy for responding to risk of investment must create conditions for sufficient level of effectiveness of the measures aimed at risk management and increase probability of achieving desirable level of return on investment into human capital.

One of the techniques for minimizing the risk of dead weight loss of the recourses invested into human capital as a result of subjective reasons connected with employee's actions is signing a particular legal document with an employee whose professional development or requalification is financed by an enterprise (enrolment contract, contract of apprenticeship, a contract of indemnity etc). This document must give a detailed description of the rights and obligations of each party. The contract must include the following parts:

- the names of the parties – the contract is signed by the head of the enterprise and a particular employee who shall do a particular professional training (stated in the contract);
- subject matter of contract – exact definition of occupation, qualification and its level, an employee shall obtain as a result of completing a full course of particular type of professional training with the location being stated;
- the terms of the contract – it specifies the duration of training which is determined by a particular programme for professional training or development of an employee;
- the cost of the training – states the exact total cost of the training with the resources used for covering it being mentioned. There are two possible ways of financial provision for investing into human capital – total or partial provision by an employer of the cost of training a particular employee;
- legal obligations of parties – defines obligations of an employer lying in providing employee with quality professional training and retraining both on the premises of an enterprise and on the premises of other outside educational establishment. Employee's obligations have to embrace timely completion of the training programme, passing final exam successfully, getting expected qualification, specialization or occupation. There must be a mentioning of the fact that upon completion of the training employee is obliged to work for an enterprise for a stated period of time;
- liability of the parties – employer is held accountable for untimely reimbursement of the training cost and not providing employee with sufficient amount of free time and other conditions necessary for timely and successful completion of full-length

training. Employee bears responsibility for low quality training, inability to apply in practice the skills gained as a result of training due to subjective reasons or premature dismissal before the expiration of payback period for investment into his/her professional development;

– other conditions that may be connected with the peculiarity of production and economic activities of an enterprise.

Implementing the contract mentioned above as one of the elements of rational organisation of investing into development of human capital will enable not only to boost employee's responsibility for the results of professional training but also encourage him/her to use gained knowledge and skills when doing his/her share of work. Rational management system investment in human capital should cover all the staff without exception.

## Final conclusions

Conducted in a research article led to the following conclusions:

– any investment in human capital is necessarily accompanied by risk;
– the risk of investing in human capital is of a different nature and degree of influence on the effectiveness of the implementation of the process;
– valuation risk possible and allow to classify risks of investing in human capital by raising negative influence;
– diagnostics valuation risks of investing in human capital will allow personnel manager to choose the most effective strategies to respond to the risk of detection is to minimize the negative impact;
– one of the risk management tools from investing in human capital is a contract that clearly regulates the rights and obligations of the parties in the implementation of investment in human capital.

Effectiveness of risk management in human capital is ensured distribution workers on separate stages of their life cycle (adaptation; professional growth; experience; professional implementation and reducing implementation) that diversifies risks. Therefore, volume and intensity of investment into their professional development isn't the same. Classifying employees in terms of their life cycle and their own attitude to professional development can diminish probability of negative consequences of each investment risk constituent that enables enterprise to optimize investment expenditure depending on motivation and expectations of employees and financial possibilities of an enterprise. To this area should be devoted to further research.

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