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Human Capital as a Factor in the Implementation of Energy-Saving Technologies

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Abstract

It has been proved that human capital is the decisive factor in the implementation of energy-saving technologies. Groups of methods of human capital assessment are identified and analyzed: ROA methods, Market capitalization, Cost, Comparative, Profit, Direct measurement and Indicator system. Thus, on the basis of a balanced scorecard, human capital assessment using ESG indicators has been proposed. The peculiarities of the choice of accounting model of costs on human capital, depending on the classification of the centers of responsibility according to two features: the scope of powers and responsibilities of managers and the functional feature. According to the alternative cost theory, two additional indicators need to be considered: life cycle costs and cost of deferred decision. It has been proposed to create a special reserve at the enterprise, to which funds will be periodically deducted related to the costs of the enterprise during the entire life cycle of the employee, which will ensure the restoration of his/her socio-professional quality and accumulation of funds for training and advanced training in accordance with the requirements of the workplace.

Keywords: methods of human capital assessment, energy-saving technologies, life cycle of employee, alternative costs, staff development

Introduction

In the context of energy saving concept as a paradigm of the new information society, the development of a methodological platform for studying the mechanism for introducing energy-saving technologies is to take into account the “group interests” of agents involved in generating, transporting, consuming energy, organize legal, economic, social and other supervision to improve the categorical apparatus for considering economic processes.

When analyzing and assessing group interests in the implementation of energy-saving technologies, attention should be given to such issues as identifying the function of social and economic expression of group interests. This creates the prerequisites for shaping the needs and requirements of individual groups of people. That is, it is urgent to identify such functions of interacting groups as manifestation of interests, integration, adaptation, etc. Identification of such functions is necessary to eliminate the destructive role in the manifestation of group interests and reduce the impact of one-sided advantage only, for example, the corporate interests of energy generating companies, especially those that shape the direction of implementation of energy efficient technologies.

This can be done precisely when assessing human capital as a decisive factor in implementing energy-saving technologies. The motivation or demotivation of staff to implement energy-saving measures will allow these measures to be implemented.

Literature Survey

One of the options for developing (improving) the human capital assessment system for covering all intangible assets and their expression as the sum of intellectual capital is the "Accounting for the future" accounting model (AFTF) (Bharadwaj, P., Gibson, M., Zivin, J. G., & Neilson, C. (2017)). This model is designed as a special tool for generating financial statements on the value of an enterprise based on the use of enterprise budgeting techniques (Boudreau, J., & Cascio, W. (2017), Cuaresma, J. C. (2017)).

"Value added intellectual coefficient" (VAIC)) accounting model is a system of indicators for measuring the value added generated by the human capital of an enterprise. The development of this model is based on the hypothesis that value added is the main indicator of the transformation of intangible assets into market assets of an enterprise (Decker, Michael, Martin Fischer, and Ingrid Ott. (2017)).

The failure of the accounting system to aggregate objects of human capital, and the financial reporting of modern standardization to provide market institutions with a formalized assessment of it and, together with it, a worthwhile description of the company, leads to the use of poorly formalized information models (Drobyazko S., et al, (2019a, 2019b), Nesterenko S., Drobyazko S., et al, (2019)). In modern practice, Balanced Scorecard (Elsner, B., & Isphording, I. E. (2017)), Value Reporting (Hendricks, L., & Schoellman, T. (2017)), Enterprise Value Map (Kianto, A., Sáenz, J., & Aramburu, N. (2017)), Value Explorer (Lagakos, D., Moll, B., Porzio, T., Qian, N., & Schoellman, T. (2018)) etc. are used; a concept has also been formulated (Human Resources Accounting Levenson, A., & Fink, A. (2017)).

Insufficient justification for accounting, formation and management, determining the efficiency of use, reflection of human capital as an element of intangible assets in the reporting makes it impossible to determine the market capitalization of the enterprise. The paradigm "human capital is the cost of the enterprise" provokes the company's management to reduce the cost of reproduction (primarily social and professional development) of staff when forming a strategy to minimize total costs, especially in times of crisis.

Methods

This raises the question of assessing human capital (hereinafter - HC). Among the various methods, it is possible to separate the methods for assessing it as intangible assets (Novas, J. C., Alves, M. D. C. G., & Sousa, A. (2017), Lutz, W., Goujon, A., KC, S., Stonawski, M., & Stilianakis, N. (2018), Wei, G., Gao, H., Wang, J., & Huang, Y. (2018)):

1. ROA methods is calculated by dividing the average profitability of HC by the average cost of capital of the enterprise.
2. Methods of market capitalization - the difference between an enterprise's market capitalization and its own capital. The value obtained is treated as the value of intangible assets.

3. Cost methods are estimated as the sum of costs actually incurred, necessary or possible for the acquisition, development, etc. of human capital, with a further reference to the value of the expenditure up to the valuation date.
4. Comparative methods - comparison with market prices (value) for similar bearers of human capital under similar conditions of agreements, taking into account the characteristics of assessment subject.
5. Profit methods - the set of future income from the use of human capital, with the subsequent attribution of costs to the date of assessment.
6. Direct measurement - based on the assessment of the value of human capital components (properties).
7. Indicator system - a balanced system of indicators of human capital assessment is formed.

Certainly, each of the methods of human capital assessment has its advantages, disadvantages and limitations. Thus, profit methods have special requirements for the composition of experts, experience, intuition, system of preferences of experts involved in determining the cost of personal care products, and the initial information on the basis of which the assessment has been made (Kwilinski, A., Dalevska, N., Kravchenko, S., Hroznyi, I., Kovalenko, I. (2019)).

But the significant disadvantages of the existing methods are mainly that the assessment indicators are not interconnected, and each intangible asset is considered in isolation from the combination of others (Hilorme, T., Perevozova, I., Shpak, L., Mokhnenko, A. & Korovchuk, Yu. (2019)). For a correct assessment of the impact of human capital on indicators of the value of enterprises, it is necessary to form a single cumulative intangible asset by consolidating several dissimilar intangible assets for the general purpose of their use by the enterprise. An example of such an asset is a portfolio of human capital competencies, which should be defined as a specific cumulative intangible asset of an enterprise, which is a set of interconnected elements (qualities, properties of personal care products) that are used to develop an effective strategy for the innovative development of an enterprise, to increase the efficiency of financial and economic activity in connection with that the effectiveness of the use of human capital affects the creation of additional value - profit.

Results

The future economic benefits of staff are viewed as a measurement of their added value, and cannot be included in the assets of the entities because they can only be controlled in the workplace.

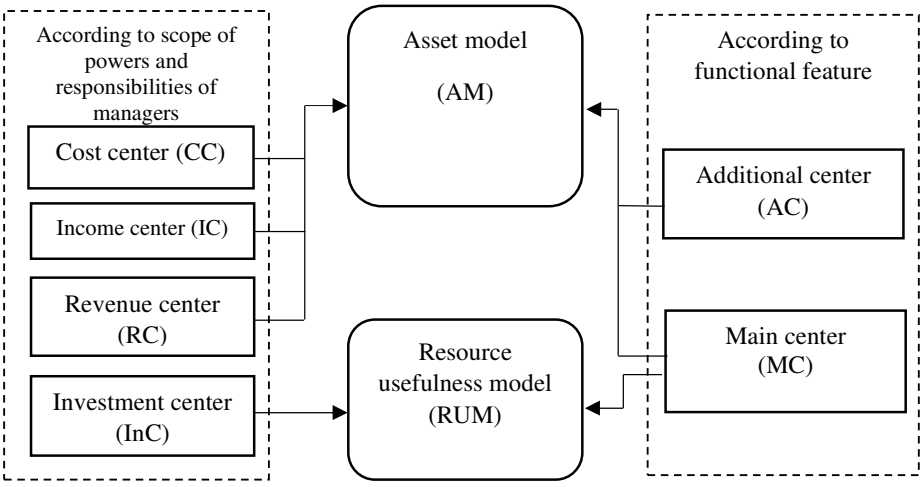

Figure 1: Features of choosing a model for accounting for human capital costs depending on the classification of responsibility centers *(author's development)*

Determining the type of responsibility center depends on the organizational structure of the enterprise. For example, for a linear functional structure, centers are linked to the profitability of the enterprise (Cc, IC, RC), while for a divisional structure - RC (with stable functioning of the unit, efficient use of personnel) and InC (with existing human resources development programs, especially when the payback period of the development project has not yet come) (Hilorme, T., Shurpenkova, R., Kundrya-Vysotska, O., Sarakhman, O., & Lyzunova, O. (2019)).

The choice of a common human cost accounting model for an entity should depend on several factors, in addition to the organizational structure, namely: the life cycle of the enterprise, the requirements of management information users, the need to obtain not only relevant accounting information on human resources costs, etc. (Fig. 1).

Functional dependence of the choice of model for accounting for human capital costs depending on the classification of responsibility centers:

$$(CC, IC, RC), (AC) \rightarrow AM; (InC), (MC) \rightarrow RUM \quad (1)$$

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The choice of a common human cost accounting model for an entity should depend on several factors, in addition to the organizational structure, namely: the life cycle of the enterprise, the requirements of management information users, the need to obtain not only relevant accounting information on human resources costs, etc.

However, according to the alternative cost theory, two additional indicators need to be considered: life cycle costs (project) (LCC) and cost of deferred decisions (CoD).

It is necessary to disclose the features of the indicator for calculating the time for return on investment in staff development programs - life cycle costs (project) (LCC). Inclusion of all costs and savings spent during the “lifetime” of the enterprise staff is an opportunity to assess the profitability of projects. This approach - life cycle costs (project or LCC) - can be adopted by the enterprise management as an antithesis of the necessary procedures for dismissing staff in case of mismatch of functional responsibilities with the rapid innovative development of technology to minimize the overall costs of the enterprise. LCC is a time-consuming calculation, but all the efforts of the enterprise are justified by the survival strategy. The life cycle costs (LCC) help to estimate the net profit during the introduction of the staff development project, taking into account all the main costs and savings during the labor of the employees, discounted to the current value of the money. So, additional issues (calculation of discounted value, factors and discount rates, LCC) require a detailed analysis. A formula is proposed for the life cycle costs (project) (LCC) (taking into account the specifics of the project (program) of staff development) (formula 2):

$$LCC = In - S + M + R \quad (2)$$

where: LCC - life cycle costs (project); In – initial investment in human capital; S – residual value of staff as an asset at the end of the regulatory amortization period of the asset; M - staff costs during the project (program); R- costs for external staff rotation.
The cost of deferred solutions (CoD) allows to identify alternative scenarios “with project - without project”. This proposes an adjusted formula for calculating CoD (taking into account the specific features of the project (program) of staff development) (formula 3):

$$CoD = -(Le + Lb) + In \quad (3)$$

where: CoD – cost of deferred decisions; Lb – economic consequences of changes in the employment behavior of staff (the effect of staff investments); Le – staff cost savings during the project (program); In - initial investment in human capital.

The assets of an entity are the result of past transactions or other events. Businesses typically obtain assets through their acquisition or production; however, other transactions or events also generate assets. It is the development of the personnel that allows to prolong the professional path of the staff, to develop properties under the influence of innovative technologies. Applying the concept of staff life cycle as a specific asset allows to take into account current trends in the formation of a new type of knowledge-based economy. Continuous staff development throughout life, the acquisition of new skills, knowledge, skills, support for health and a good standard of living are the prerequisites for the information society.

At the same time, the amount of lost profit is determined as the largest value of all possible alternatives.
Such a technique can be applied in an enterprise when it is necessary to build a logical chain with all the factors that can form staff costs.

Alternative cost is an economic term that defines the lost profit from the alternative use of a particular resource (Hilorme, T., Zamazii, O., Judina, O., Korolenko, R. & Melnikova, Yu. (2019)). Moreover, its value is determined as the largest value of all possible alternatives. Such a technique can be applied in an enterprise when it is necessary to build a logical chain with all the factors that can form staff costs.
Along with alternative costs, there are also non-recoverable costs that cannot be returned and recoverable costs that can either be canceled or not paid. However, staff costs cannot be recoverable, they are non-recoverable.

Thus, based on the consideration of alternative staff costs, the company is able to make management decisions on the formation and use of staff - to hire external contractors, to use part-time employees, to use the services of contractors, outsourcing or outstaffing of personnel.

In modern management, outsourcing refers to the performance of certain functions - production, service, information, financial, management, or business processes - organizational, financial, economic, production and technological, marketing external organization with the necessary resources for this, on the basis of long-term agreements.

Discussion

In order to manage the value of the company, management can use a balanced scorecard, which was proposed by Norton and Kaplan - decomposition of the strategy into 4 perspectives (finance, customers, business processes and training and growth), this allows to transfer the strategy to the operational level and determine KPI (key performance indicators). But, in our opinion, in order to take into account the interests of all stakeholders, especially human capital, it is necessary to take into account the concept of stakeholders in developing strategies using the CPS method, which will maximize the value of the company.

Consider in more detail the features of applying the FTSE4Good ESG Ratings methodology, while the ESG indicator can have a maximum score of 5. To obtain the digital value of the score, it is necessary to assess the risks and effectiveness of the company in the following areas of social indicators of human capital: rights of personnel in the company, labor standards, state of corporate social management, relations in the workforce (socio-psychological climate), satisfaction of staff as alpha-stakeholders.

According to the approach used in the FTSE4 Good ESG Ratings methodology, there are 3 levels of risk and indicators: topic level; pillar level; general level. For each company, theme risk is in the range of 0 to 3 (0 is no risk and 3 is high risk) and the theme indicator is 0 to 5 (0 is not disclosed, 5

is best practice).

Due to the fact that the total value of the social factor according to the ESG methodology is not more than 5, it is possible to estimate how much the social factor influences the development of the enterprise.

In our view, when implementing ESG calculations taking into account the stakeholder concept, the entity will be able to regularly monitor the dynamics of relations with stakeholders, especially alpha-stakeholders - human capital.
But despite which assessment method of human capital as an intangible asset will be chosen, it is necessary to be taken it into account in the statements of the enterprise: financial, managerial, statistical.

Undoubtedly, traditional accounting, which considers human capital only in terms of costs, does not allow to take into account the future economic benefits, the need to constantly update, prolong the quality of human capital - to consider the development of staff as a dominant development of the entity itself. In our opinion, it is necessary to evaluate human capital in the prism of each staff.

In our view, when implementing ESG calculations taking into account the stakeholder concept, the entity will be able to regularly monitor the dynamics of relations with stakeholders, especially alpha-stakeholders - human capital.

Conclusion

Based on the study conducted, human capital has been identified as an aggregate of personalities, with their inherent personal qualities (properties), creating the market added value of each economic entity - a key priority factor for its development as the only opportunity for survival in today's changing environment. All this requires a change in the outlook to the definition of “human capital”, a change in the whole set of management functions, especially since the beginning of orthodox accounting.

In order to improve the organization of management accounting of staff costs, we consider it advisable to: form social corporate reporting on the basis of peculiarities of models of accounting and assessment of human capital: assets (“cost”, chronological) and usefulness of the resource; improve staff costing system by introducing two additional life cycle costs (LCC) (project) and cost of deferred decision (CoD) indicators according to alternative cost theory in determining the effectiveness of implementing a staff development program (project) as a preventive measure in a crisis; construct organizational models of accounting of staff costs depending on the scope of powers and responsibilities of managers, features of the choice of model of cost accounting depending on the classification of centers of responsibility.

In our opinion, it is necessary to create a special reserve, to which funds will be periodically deducted that relate to the costs of the enterprise throughout the life cycle of the employee, which will ensure the restoration of his/her socio-professional quality and the accumulation of funds for training and professional development in accordance with the requirements of the workplace. The amount of contributions to the provision of professional staff development is formed in accordance with the stage of the life cycle of the employee in the enterprise, taking into account his/her attitude to his/her own professional development: Stage I “Labor adaptation” - desire for development, the uncertainty of the necessary ways; Stage II “Professional growth” - striving for development and awareness of the necessary ways; Stage III “Accumulation of professional experience” - aspiration for development and its realization; Stage IV “Professional realization” - reduction of desire for development and its realization; Stage V “Reduction of professional realization” - lack of desire for development and its necessity.

The rate of transition to each stage depends on internal and external factors. Internal factors are the totality of the qualities of each person: susceptibility to innovations, degree of resistance to

organizational changes, career ambitions, etc. External factors are ensured by the social policy of the enterprise: effective mechanism of motivation and stimulation, implementation of the principles of social responsibility to achieve social effectiveness. Interaction between the internal and external factors is necessary, in particular, by constructing maps of motivators and demotivators.

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