

MEASUREMENT OF HUMAN IT CAPITAL

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ABSTRACT. New economy fully integrated into international markets and value chains. «Kaspi.kz», «Choco», Freedom Finance grew in open competition with global industry leaders. By the way, no country in continental Europe has done so. For a good Kazakh programmer, the labor market is global. Moving to London, Dublin, San Francisco or back to Kazakhstan is a matter of better conditions and personal preferences. People from the Kazakhstan IT sector continue to participate regularly in launching successful global projects - Telegram, Revolut, Playrix, WayRay, Parallels, Kaspersky Lab, IBS.

KEY WORDS: Human resources, IT human capital, measurement of human resources.

IT САЛАСЫНДАҒЫ АДАМ КАПИТАЛЫН ӨЛШЕУ

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АҢДАТПА. Халықаралық нарықтар мен өндірістік-сату тізбектеріне толық интеграцияланған жаңа экономика. "Kaspi.kz", "Choco", Freedom Finance саланың әлемдік көшбасшыларымен ашық бәсекелестік жағдайында өсті. Айтпақшы, континентальды Еуропадағы бірде-бір ел мұны жасаған жоқ. Жақсы қазақстандық бағдарламашы үшін еңбек нарығы жаһандық болып табылады. Лондонға, Дублинге, Сан-Францискоға немесе Қазақстанға қайту жақсы жағдайлар мен жеке қалауларға байланысты. Қазақстандық IT - сектордағы адамдар табысты жаһандық жобаларды - Telegram, Revolut, Playrix, WayRay, Parallels, Kaspersky Lab, IBS іске қосуға үнемі қатысуды жалғастыруда.

ТҮЙІН СӨЗДЕР: адами ресурстар, ат-адами капитал, адами ресурстарды өлшеу.

ИЗМЕРЕНИЕ ЧЕЛОВЕЧЕСКОГО КАПИТАЛА В IT ОТРАСЛИ

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АННОТАЦИЯ. Новая экономика, полностью интегрированная в международные рынки и производственно-сбытовые цепочки. «Kaspi.kz», «Choco», Freedom Finance росли в условиях открытой конкуренции с мировыми лидерами отрасли. Кстати, ни одна страна в континентальной Европе не сделала этого. Для хорошего казахстанского программиста рынок труда является глобальным. Переезд в Лондон, Дублин, Сан-Франциско или обратно в Казахстан зависит от лучших условий и личных предпочтений. Люди из казахстанского IT-сектора продолжают регулярно участвовать в запуске успешных глобальных проектов - Telegram, Revolut, Playrix, WayRay, Parallels, Kaspersky Lab, IBS.

КЛЮЧЕВЫЕ СЛОВА: человеческие ресурсы, ИТ-человеческий капитал, измерение человеческих ресурсов.

INTRODUCTION. In the global economy, entrepreneurial energy alone is not enough to succeed. It is necessary to clearly define their competitive advantages and, at the same time, to be able to cooperate and integrate into complex value chains. In the early 2000s, many large Kazakh companies tried to build international business with little understanding of their real competitive advantages in new markets, apart from ambitions and capital. Most of these attempts have resulted in economic losses. But it seems even more difficult for large Kazakh corporations to learn to partner. The thinking generated by the rent economy does not imply horizontal cooperation.

At the national level, it is extremely difficult to change the structure of the economy. Today's elites need to believe that, on a reasonable horizon, human capital can create more value than it currently produces in natural

rents, and that the transition itself will not threaten their economic and social standing.

MATERIALS AND METHODS OF RESEARCH. The economy of the future is different from that of the past, not by technology, industry mix, number of robots, or by the power of artificial intelligence, but by the rules of the game, global openness, and reliance on human capital.

Using the system described here has obvious and immediate practical benefits in the form of improved organizational performance. But more broadly, as the links between people and performance become more apparent, organizations will also begin to realize the long-term value of investing in human capital and the folly of fixating on narrow, short-term goals.

Many influential groups, including the Global Reporting Initiative, the Waterfront for Inclusive Capitalism project, the Business Roundtable and the Sustainability

Accounting Standards Board (SASB), have identified human capital as a key driver of long-term value. Recent developments reflect a clear and growing market desire to understand how companies manage and measure human capital. Influential investors have made human capital a priority in their interactions with directors, as well as comment letters from various stakeholders to the US Securities and Exchange Commission in support of greater human capital disclosure and assertion of the importance of human capital management in assessing the potential value and performance of a company in the long term [1].

At the same time, there is a constant cultural shift driven by new generations of workers, digitization, automation, and other megatrends related to the future of work. In this new era, it is critical for management and boards to keep pace with these transformations and consider revisiting long-term value and corporate purpose.

So, we had to understand how individuals could be crucial in themselves. In the 20th century, the most important and truly unique achievement of management was the 50-fold increase in the productivity of physical labor in production enterprises, where the most asset of any company was production equipment. From which, in fact, a new archaic economy was formed.

And then there was time to advance and digital technology. They have shifted the relative value of workers' labor from predetermined shares and quotas to meet new client needs - the creation of unique services and products. Naturally, the means of production have also changed to meet the demand, from the physical strength to the intellectual work of experts [2].

Thanks to the progress of solving repeated tasks today, more and more automation, high-rise buildings with constantly breaking printers, computers, tons of drinkable coffee and «open space» have come to replace huge factories.

But the most important thing is that the work has completely changed its essence, and it has become unique, largely based on knowledge, skills and skills aimed at finding creative solutions. As expected, the transition to the modern digital era has resulted in significant social change and, as a direct result, significant economic effects.

In the 21st century, the most asset a business has is its knowledge workers and their efficiency. The effectiveness of an intellectual worker is determined by six factors:

1. The effectiveness of an intellectual worker requires a clear answer to the question: "What is the job?"
2. Responsibility for efficiency rests entirely with the worker. Intellectuals must manage themselves. They need independence.
3. Continuous innovation should become an integral part of mental work and should be included in the work of the intellectual worker. He should be in charge of innovation.
4. An intellectual worker needs constant training.

5. The effectiveness of an intellectual worker is not measured in quantity or volume. However, great importance is attached to quality. For example, when learning the effectiveness of a teacher, we do not ask how many students attend his classes. We wonder how many students have succeeded in the discipline they are taught, and that's a matter of quality.

6. In order to increase the efficiency of the intellectual labor it is necessary to look at it not as «costs», but as «capital».

Nowhere is the distinction between physical and intellectual workers more pronounced than in economic theory. Economic theory and, to a greater extent, practice view physical labor as costly. Intellectual labor, if it is to be effective, must be regarded as capital stock.

Return on equity is often an even more questionable measure of performance. For example, because they have so few other assets, many companies that have grown through acquisitions find that goodwill, the accounting for which is significantly different, accounts for a large proportion of their total capital. Indeed, after deducting goodwill, many of these companies are left with negative equity. Given these and other difficulties, interpreting the return on equity of people's businesses becomes an arcane science.

Equally problematic are the conventional indicators designed to measure employee productivity. Although these indicators are more suited to people, they usually carry little weight with senior management. This is because the most common indicators, such as sales per employee and profit per employee, are easily distorted. For example, sales per employee is strongly influenced by both outsourcing and the level of capital investment. If a company outsources activities performed by half of its employees, and the cost of outsourcing is the same as keeping those activities in-house, sales per employee doubles, but productivity does not change. Similarly, if a company makes a capital investment and replaces employees with equipment whose capital cost exceeds the cost of replacing the employees, the increase in sales per employee may be accompanied by a drop in productivity.

At university or on special certification courses, people gain knowledge. Skill is, in general, the ability to apply knowledge to perform a simple task. Competence is demonstrated by the application of relevant knowledge and skills, as well as having significant experience in carrying out activities in a professional working environment, through the performance of a job, role or function. Value of human IT capital is based on assessed knowledge, demonstrated skills and competencies. Using a specific mathematical formula, Value of human IT capital can be calculated. Value of human IT capital demonstrates the monetized value of people's knowledge, skills, and competencies [3]. Using our approach and mathematics, we can see the value of an IT professional that no one else sees.

To ensure transparency in the careers of IT

professionals, we use a scientific approach that is accepted around the world - SFIA (Skills Framework for Information Age). SFIA is used as the framework.

Using SFIA [4] we will be able to determine what knowledge, skills, and competencies each of the IT specialists should have, which will also determine its monetary value.

Knowledge is at the heart of the IT Specialist's work as an intellectual worker. Skills and professional competence are achieved at a certain level by applying this knowledge at a given level in the real situation.

Any job description, whether a job description or a person's assessment, includes several different aspects. The diagram illustrates the context for the different aspects that contribute to capacity.



Figure 1 - Structure of human knowledge, skills, and competencies

RESULTS AND THEIR DISCUSSION. Experience is at the center: a person possesses skills or competencies at a certain level because those skills or competencies at that level have been demonstrated, together with the corresponding general characteristics. Learning is not a linear path. By applying knowledge and skills in the workplace, experience is acquired and, as people gain experience in this way, they also accumulate their knowledge and skills and develop their behavior.

Professional Skills. SFIA defines skills according to levels of responsibility. These are the most recognizable components of the SFIA system. They provide the information needed to identify, evaluate, introduce, and develop skills.

Behaviors. Behavior is an important component of abilities and part of the overall SFIA system. Behavioral factors in SFIA are distributed according to common attributes that characterize the levels of responsibility of SFIA. If an organization does not have its own behavioral

structure, SFIA behavioral factors can contribute significantly to meeting this need. SFIA behavioral factors can be used as defined or as the basis of an organization's own behavioral model.

Knowledge. Knowledge is an essential component of competence. In the development of SFIA, it is emphasized that effective demonstration of any skill requires knowledge. To be competent and effective in any role, a person needs a combination of general, specialized, and specialized knowledge.

Qualifications and Certification. Qualifications and certification are an important part of the industry. SFIA recognizes the value of qualifications and certificates and provides a context for their positioning within the skills required by industry and business. Qualifications and certificates show that a person has successfully passed some testing or evaluation; while many require a demonstration of knowledge of the material or recollection of a particular subject area, some test understanding, and some of them confirm the application of the skills.

Formula for calculating the value of human capital:
 $HC = \text{Education} \times \text{Skills} \times \text{Experience} \times \text{Certifications}$.

Where:

Education - total investment in academic degrees:

x1 - bachelor's degree, x1.1 - master's degree, x1.2 - PhD

Skills - total number of skills defined by Skills Assessment approved by SFIA:

x n – Number of fully and largely developed skills according to role x 0.5 is the ratio of probability of daily application of these skills in operational activities

Experience - total number of years of work at the time of costing:

x years of experience.

Qualification and certification - total number of certificates of advanced qualification:

x1.1 is a coefficient for Foundation level classification, x1.2 is a coefficient for Intermediate level classification, and x1.3 is a coefficient for Practitioner level classification.

The standard economic profit calculation can be reformulated by replacing some basic components and using standard algebra to focus on the productivity of people rather than capital. This equation yields the same result but emphasizes the employee-related productivity factors in a human-intensive business.

Let's start by calculating economic returns in terms of capital orientation:

$$\text{ECONOMIC PROFIT} = [\text{ROI} - \text{COC}] \text{IC}$$

where ROI - Return on Investment, COC - Cost of Capital, IC – Invested Capital

Let's replace the term "return on investment" with its equivalent, "profit divided by capital invested":

$$= [E/\text{IC} - \text{COC}] \text{IC}$$

where E/IC – Earning/Invested Capital

Using algebra to get the result:

$$= E - [\text{COC} \times \text{IC}]$$

Replace the word "earnings" with its equivalent,

"revenue minus staff costs minus supplier costs minus depreciation":

$$= R - PC - SC - D - [COC \times IC]$$

where R – Revenue, PC – Personnel Costs, SC – Supplier Costs, D – Depreciation

Using algebra to account for the key people-centered element - the number of people employed - and introduce two metrics, namely staff productivity and average staff costs per person employed:

$$(R-SC-D- [COC \times IC] - PC)/P$$

where P – People Employed

The result is a calculation of economic profit that is meaningful for human-intensive enterprises:

$$ECONOMIC PROFIT = [EPR-ACP] P$$

where EPR – Employee Productivity, ACP – Avg. Cost Person, P – People Employed

The new people-oriented equation mirrors the capital-oriented equation. The productivity of employees corresponds to the productivity of capital, i.e., the return on investment. The average cost of human capital per person employed corresponds to the cost of capital. The number of people employed corresponds to the amount of capital invested [5].

Conclusion. It is worth noting that similar methods already exist in sports management, particularly in football.

The most popular transfer-value aggregator is Transfermarkt. Equally important sources are not based on user estimates, but on a scientific approach. The CIES Football Observatory (an international sports research center based in Switzerland) and the KPMG (one of the world's largest audit firms) provide comprehensive, and therefore more accurate, cost estimates.

In CIES and KPMG, player prices are based on mathematical models. They take as their basis the cost of transitions by players with similar characteristics in the past and additionally consider a variety of factors. The CIES model includes variables related to the club (performance quality and economic factors), the football player (age, game quality, contract duration, calls to the national team and others), and considers inflationary changes in transfer costs over time.

The aggregator went further: by using regression models (showing in what proportions different factors influence the final price), the aggregator also considers the player's media status, his influence on the team and discipline on the field [6].

The model developed by us not only has a strong explanatory capacity but is also reliable. The innovative approach developed in the field of scientific valuation of human capital has a wide range of applications.

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