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Article

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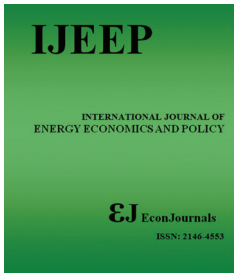

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Human Capital of Transnational Corporations in the Energy Sector

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ABSTRACT

For the development of the energy sector, at the present stage, it is necessary to use certain resources. The paper analyzed the application of human capital in the energy sector. To achieve this goal, the authors used the method of offset. It is established that the world energy consumption increases, and the dynamics of the employed population in the energy sector remains within the same norm. It is determined that an important factor for the development of the economy is the gross regional product. As its increase helps to reduce energy intensity. The authors show that human potential is not only a personal characteristic received by the employee independently, but also by the acquired position, which is ensured by the implementation of corporate tools. The paper considers the economic, social and legal provision of such instruments.

Keywords: Labor Resources, Electrification, Energy Efficiency, Expert Evaluation, Energy System
JEL Classifications: A10, P48

1. INTRODUCTION

Energy is a set of industries that supply the economy with energy resources. It includes all fuel industries and electric power industry with their enterprises and connections ensuring the exploration, development, production, processing and transportation of energy resources, as well as the production and transportation of thermal and electric energy received with their use. For the development of any area, including energy, human resources (human capital) are needed (Teleuyev et al., 2017; Kapitonov and Voloshin, 2017).

The transnationalization of human capital is conditioned by the activity and development of supranational TNCs as organizations, the basis for the formation and functioning of which are processes of internationalization of production, scientific and technical activities, capital, etc. In modern conditions, TNCs are a form of human capital formation, a means of using and realizing the capabilities of each individual. Employment in the world's 100 largest corporations was 5.1 million in 1993, foreign workers accounted for 47.7%, in 2010 8.7 million and 56.1% respectively (Del et al., 2015). The data presented indicate a significant increase in the scope of TNC control of the world's labor resources (Vinichenko and Shihovtsova, 2016).

Due to the high degree of development of the production and technological base and the sufficient maturity of the labor relations system, as well as the important place for the social development of the economic entity as one of the bases of its competitiveness, the reproduction processes of the human potential of a large enterprise should not be spontaneous (Wang et al., 2018). In this context, the key role of the system of managing the social development of an enterprise as a complex instrument that ensures the stable and regulated nature of the phenomena under consideration is unquestionable (Li et al., 2018). In practice, the factor being investigated appears in the form of a cumulative employee of the enterprise. In this regard, it seems that the correct point of

view that the human factor can be accumulated and realized only through the development of all employees of the enterprise and their professional joint activities, although formulated with reference to the services sector, is quite relevant for other business entities (Shirangi et al., 2018). Therefore, the human factor exists in the form of a cumulative employee of a service enterprise. The cumulative employee of a service enterprise is a group of employees engaged in joint work, including a business leader, who constantly work in the same enterprise and expend individual labor as a single unit in order to best meet the growing service needs (Atems and Hotaling, 2018).

Thus, the initial thesis is this: The qualitative and quantitative parameters of the cumulative employee of an power enterprise have a major influence on the nature of the functioning of the economic entity, especially in terms of ensuring its stable and long-term sustainable development. In the light of the foregoing, an in-depth review of the positions of various scientists and scientific schools on the problems under consideration seems to be theoretically and practically meaningful.

2. MATERIALS AND METHODS

Proceeding from the notion of potential as a collection of available energetic resources that can be mobilized to achieve the goals of the system, it is suggested to use the offset method for its evaluation (Vinichenko and Strokova, 2016; Kittichaisaree, 2017). Still, the system has different potentialities to achieve a certain development strategy in the conditions of existing resource constraints, in particular, human and intellectual capital:

$$PES_i = \frac{\min(q_{i,p}; q_{i,pos})}{q_{i,p}} \times 100\% \quad (1)$$

Where PES_i– the potential of the economic system in the i^{th} strategic direction; $q_{i,p}$ – the planned state of the system according to the i^{th} vector of strategic objectives; $q_{i,pos}$ – the possible state of the system for the i^{th} direction of strategic development, which is determined by the volume of human and intellectual capital.

To measure intellectual capital, we calculate the value of the consumer capital of the country's economy, which is characterized by the level of competitiveness of its industries:

$$CK_i^{`} = \frac{G_{T,i}}{G_{E,i}^{`}}; CK_i^{``} = \frac{G_{T,i}}{G_{E,i}^{``}} \quad (2)$$

Where – the consumer capital of the i^{th} industry, respectively, in the domestic and foreign markets; $G_{T,i}$ group index of production of the i^{th} industry in terms of technical parameters; $G_{E,i}^{'}; G_{E,i}^{"}$ – the group index of the i^{th} industry output by economic parameters, respectively, for the domestic and foreign markets.

The indicator of the consumer capital is used for an estimation of a borrowed market share's speed of change by production of i^{th} branch of own manufacture during time t: (Danielewicz-Betz, 2016).

$$\frac{\delta(d_i^{`})}{\delta t} = d_i^{`}(CK_i^{`} - 1)(1 - d_i^{`}) \quad (3)$$

$$\frac{\delta(d_i^{``})}{\delta t} = d_i^{``}(CK_i^{``} - 1)(1 - d_i^{``}) \quad (4)$$

Where $d_i^{'}; d_i^{"}$ – respectively, the share of the domestic and foreign market, which deals with the products of its own production of the i^{th} industry.

Structural (organizational) capital of the economy is characterized by the level of development and use of technological structures and can be determined by the vector of the share of added value received by each branch – $v(v_1, v_2, ., v_n)$. The average level of organizational capital (OC) of all sectors of the economy will be calculated as follows:

$$OK = \frac{\sum_{i=1}^{n}(X_i \times v_i)}{\sum_{i=1}^{n} X_i} \quad (5)$$

Where X_i– is the equilibrium output of the i^{th} industry; n – is the number of the economy branches.

The prerequisite for the growth of OC is consumer capital. The added value of the i^{th} industry, which is calculated as $X_i \times OK_i$, excluding depreciation and business taxes, is the source of such revenues:

$$X_i \times OK_i - A_i - T_i = W_i + R_i + P_i \quad (6)$$

Where A_i– depreciation on fixed assets; T_i– indirect taxes on business; W_i– income of human capital owners; R_i– income of borrowed capital owners; P_i– income of the capital owners.

Given this, the amount of human capital of the i^{th} industry will be calculated by the formula:

$$LK_i = \frac{W_i}{C_i} \times 100\%, \text{ where } C_i = \frac{R_i + P_i}{PK_i + VK_i} \times 100\% \quad (7)$$

Where LK_i - is the human capital of the i^{th} industry; PK_i; VK_i– respectively, the volume of own and borrowed capital that is used by the i^{th} industry; – C_i– is the measured average capital price.

The need to measure the intellectual capital of the microeconomic system is conditioned by the need to assess the level of competitiveness of business entities in market conditions.

3. RESULTS AND DISCUSSION

Currently, the definition of the human capital of TNCs is inherent in its identification with the personnel, human potential, intellectual capital of transnational corporations. The human capital of TNCs is the aggregate labor force that represents the entire mass of workers who, to some extent, participate in the activities of the corporation, ensuring its functioning in all forms and stages of the

capital movement on the basis of organizational and economic ties, national in form and international in content (Wetzel, 2016). But in order to understand how much human capital is needed for the development of the industry, the authors conducted an analysis of consumption, fuses of energy resources, both in the world and in the Russian Federation.

World consumption of electricity increased in 2016, after its stabilization in 2015, but its growth remained below its long-term growth trend.

Asian countries that are not part of the OECD (India, Indonesia, Malaysia, Thailand and others), due to their dynamic economic development and the electrification of their territory, are the second main region that provoked an increase in electricity consumption. Improved energy efficiency has led to a reduction in electricity demand in the United States, for the 6th time in 8 years, as well as to a reduction in demand in Japan and its stabilization in the European Union. Despite the fact that China, which is the world's largest energy consumer since 2009, has registered a jump in growth in 2016, its energy consumption has seriously slowed down over the last 3 years compared to the trends of 2000–2013 (Salim et al., 2017). India continues to make a significant contribution to global energy consumption, and providing a quarter of global growth in 2016. Dynamics of strong growth was recorded in Turkey and in countries such as Indonesia, Malaysia and South Korea. In contrast, in Latin America, such as Brazil, Colombia and Mexico, declined. At the same time, demand in the European Union countries remains stable. In Figure 1 shows the dynamics

Figure 1: Dynamics of oil production in the world

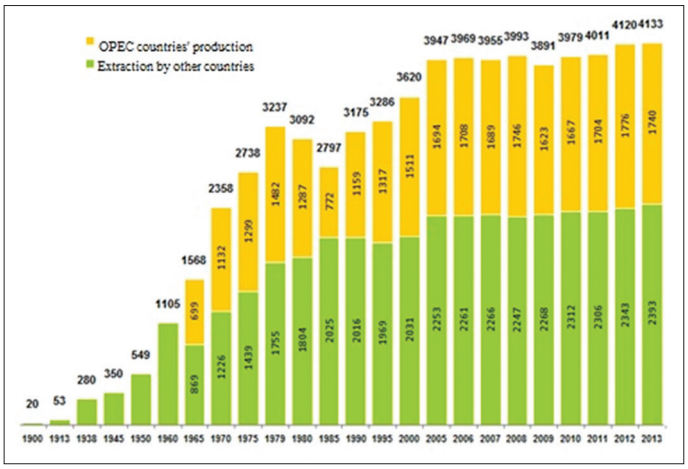
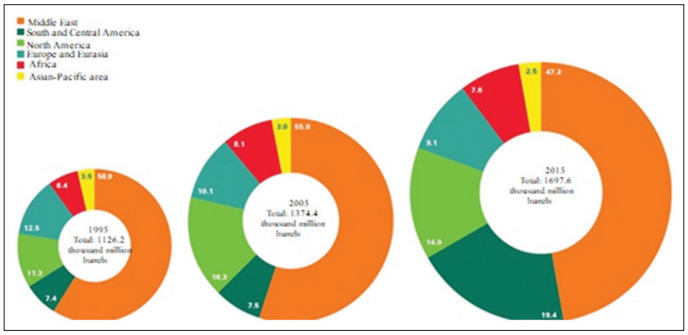


Figure 2: Explored world oil reserves by region, %



of oil production in the world. Oil reserves by region are shown in Figure 2.

The systematization of possible indicators allows the development of criteria that will be used to assess the level of innovation potential of workers. The criteria that are used in practice may vary depending on the characteristics of enterprises (Klikauer a universal system of criteria is impossible, but a number of factors that regulate the activities of the vast majority of these enterprises should be determined, which is quite realistic (Solaiman, 2017). As a result of expert assessments basic requirements to the criteria and their content were formulated (Klikauer, 2016).

According to existing requirements, 9 main criteria were selected by expert estimates, on the basis of which was developed a method of complex assessment of the level of innovative potential of enterprise personnel (Starr-Glass, 2017). They were: Intensity of innovation processes (innovations speed); intellectual development of personnel; level of professionalism (competence of personnel); educational level; level of information and communication support; investment in innovation and the achieved technical and technological level of the enterprise; ensuring long-term competitiveness; ensuring financial sustainability and innovation effectiveness; psychological climate. According to the proposed methodology, 9 indices (on a point scale) are evaluated expertly for a particular enterprise, with the maximum development of the planned results (Ness and Cope, 2016) corresponding to the unit. The dynamics of employment in the Russian Federation, in the energy sector is presented in Table 1. Employment of the population is represented as a percentage of the total number of industries.

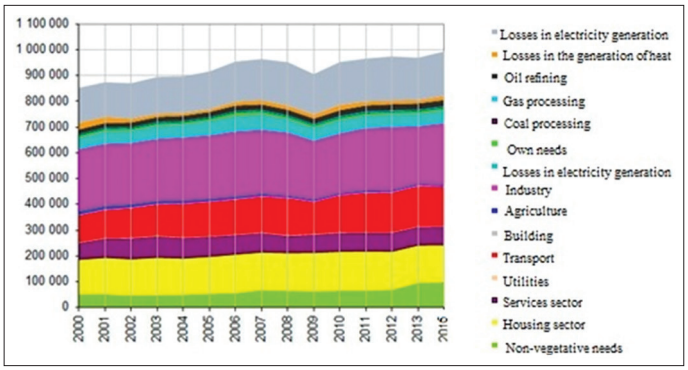
In 2010, primary energy consumption in Russia almost reached the level of the pre-crisis peak of 2008, and in 2014 it exceeded it by 3%. According to preliminary estimates for 2015, it fell to almost the level of 2008. In 2007–2014, the most dynamically energy consumption grew in transport and non-energy needs (Shuen et al., 2014; Buley et al., 2016). In 2015, Russia's GDP remained approximately at the level of 2008 and 1990. Primary energy cons umption was lower than in 1990, by 27%. Russia is moving to a growth model when slow GDP growth is not accompanied by an increase in energy consumption. Many developed countries have been developing for this model for 10–20 years. For the developers of the Energy Strategy of the Russian Federation this development seems strange and undesirable. In it, in all scenarios, primary energy consumption continues to grow. The dynamics of energy consumption in Russia by main sectors of the economy is presented in Figure 3.

An important factor is the characteristics of the dynamics of the regional economy. In regions where the gross regional product (GRP) grew dynamically, the energy intensity decreased more rapidly, and vice versa. This was due to more dynamic structural shifts in favor of less energy-intensive activities, increased capacity utilization, more dynamic modernization of equipment and buildings due to more intensive implementation of energy efficiency policies and programs (Dilaver et al., 2014). Also, an important role in the dynamics of primary energy consumption is the growth of their use for non-energy needs. Perhaps, when

Table 1: Structure of employment in the energy sector, %

Activity\year	2005	2006	2007	2008	2009	2010	2011	2014	2016
Power engineering	2.9	3.1	2.9	3.0	3.2	3.3	3.2	3.3	3.2

Figure 3: Dynamics of energy consumption in Russia by main sectors of the economy



comparing regions by the energy intensity level of GRP, this component of energy consumption should not be taken into account.

To do this, it should be more clear than what Rosstat is currently doing, it is determined what is included and how the use of energy for non-energy needs is determined (Burke and Stephens, 2017). Another problem is the assignment of energy consumption in interregional transport systems - pipelines, railways, airports - to consumption of individual regions and a change in the statistics of accounting for these volumes. The third reason is the poor quality of data on fuel consumption in road transport. The dynamics of the world production of energy resources is shown in Figure 4. The distribution of energy consumption by sectors of the economy is shown in Figure 5.

For example, the structure of energy distribution by industry in Ugra is described in Figure 6.

The total volume of electricity consumption and generation in Russia as a whole consists of indicators of electricity consumption and production of facilities located in the Unified Energy System of Russia and facilities operating in isolated power systems (Taymyr, Kamchatka, Sakhalin, Magadan, Chukotka, power systems in central and western Yakutia). The actual performance of the energy systems of isolated territories is represented by the subjects of operational dispatch control of these power systems. From January 1, 2017, the consumption and output indicators for UES of Russia and UES of the South are formed taking into account the Crimean energy system. The maximum consumption of electric power in the UES of Russia in 2017 was fixed on 9 January. Its value was 151 170 MW, which is 0.1% more than the same indicator in 2016 (Mahmood and Ahmad, 2018).

The increase in electricity and capacity consumption by UES of Russia in 2017 is due to the temperature factor: In February 2017, the power system experienced a significant decrease in the outside air temperature relative to the same indicator in 2016 - by 4.6°C. The average monthly air temperature, which was lower than in 2016, was also in April–August 2017.

The main load for ensuring the demand for electricity in the UES of Russia in December 2017 was carried by thermal power plants, the production of which amounted to 62.2 billion kWh, which is 4.7% less than in December 2016. The hydropower plant produced 14.4 billion kWh in the same month (5.6% more than in December 2016), the nuclear power plant output was 18.5 billion kWh (4.0% less than in December 2016), the development of power plants of industrial enterprises - 5.5 billion kW • h (0.2% more than in December 2016). The maximum power consumption by UES of Russia in December 2017 was 146 526 MW, which is less than the maximum capacity consumption in December 2016 by 3.0%.

The decrease in electricity and capacity consumption in December 2017 relative to the same month of 2016 is due to the temperature factor: The average monthly outside air temperature in December 2017 as a whole for the UES of Russia was −6.1°C, which is 4.6% higher than the December 2016 temperature FROM. The branch structure of the power supply potential is shown in the Figure 7.

The authors considered an example of the use of energy resources in the Republic of Belarus. The main amount of electricity in the republic is consumed in industry. A feature of the electric power industry in Belarus is that almost 100% of all electricity produced is provided by thermal power plants that operate on imported fuel (fuel oil, natural gas). More than 50% of electricity is generated in the Minsk and Gomel regions (Pereira and Silva, 2017). But the most powerful thermal power plant in the Republic of Belarus is Lukomlskaya GRES with a capacity of 2.4 million kW (2.4 GW) located in the Vitebsk region. About 1 GW has capacity Berezovskaya GRES, the smaller - Smolevichskaya and Vasilevichskaya GRES. Part of the electricity is generated by CHP plants located in large cities (Minsk, Vitebsk, Gomel, etc.) as well as at CHP plants at some Belarusian enterprises: Sugar factories, the Belaruskaliy association, the Dobrush paper mill. The energy system of the country includes the patriarch of the domestic energy-BelGRES, which was erected in 1930. It is located in the bowels of peat bogs two dozen kilometers from Orsha in the town of Orekhovsk, Orsha district. And now let's imagine the amount of energy used in Russia (Figure 8). These indicators affect, among other things, the number of employed people in a particular sector of the economy.

The increase in energy consumption is proportional to the growth of the population of the planet (which continues to increase). Following the increase in energy consumption in industrialized countries, which have risen sharply since the 1920s, in developing countries, such growth began in the 1960s, and continues at a similar pace, sometimes even ahead of schedule. The peak of oil production falls on 2000–2025, gas - in different countries is in the interval between 2000 and 2040; but by 2100, and according to the optimistic and pessimistic scenario, a significant decline is expected. The reason is that stocks are exhaustible. So, as of 2005, oil has already produced 152 billion tons, proven reserves - 179 billion tons; gas already produced 86 trillion. m3,

Figure 4: Dynamics of world production of energy resources, billion tons of electricity

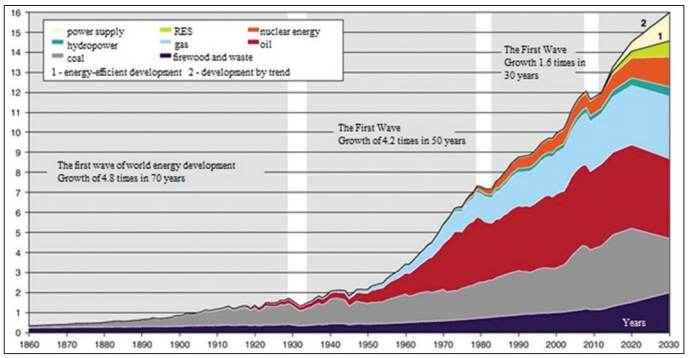


Figure 5: Structure of natural gas consumption in Russia

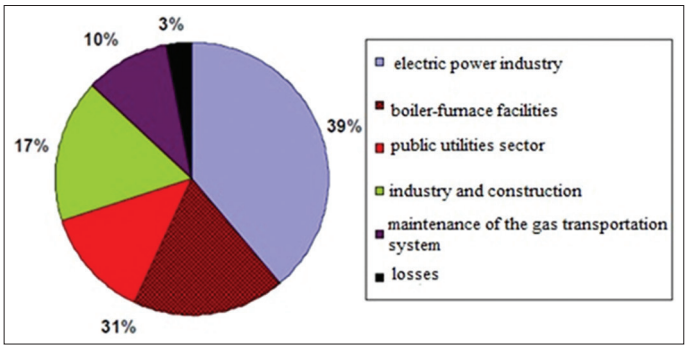
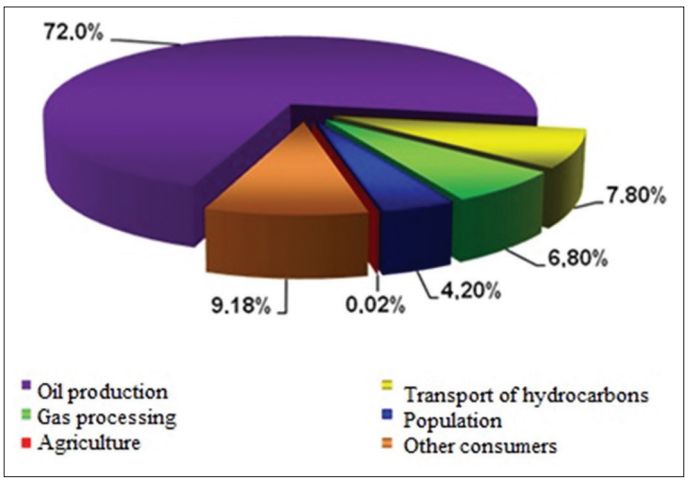


Figure 6: Structure of energy distribution by industry in Ugra



proven reserves of 180 trillion cubic meters. At the same time, we should not forget that all readily available deposits have already been worked out, which means that each newly extracted unit of organic fuel will cost more and more (Wang et al., 2016).

Taking into account the above, starting from 2011 the unsatisfied energy demand is predicted, which will grow and by 2050 will amount to more than 5 million tons of oil equivalent. Russia is for the most part a northern country with very significant heating costs, still far behind developed countries in terms of energy efficiency of the economy. The specific energy intensity of the Russian economy (in terms of purchasing power parity) is 2.5 times higher than the world average, 2.8 times higher than the average for the OECD countries and 3.5 times higher than the energy intensity of Japan's GDP. The

Figure 7: Branch structure of the power supply potential

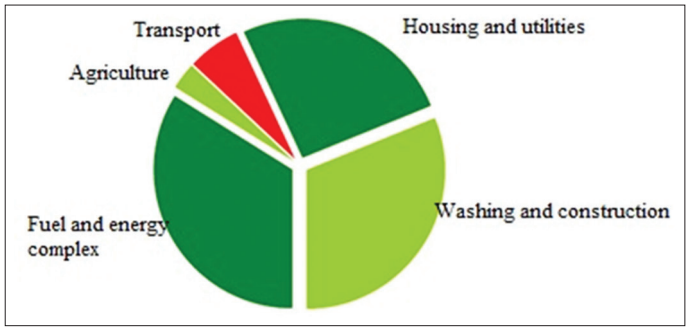
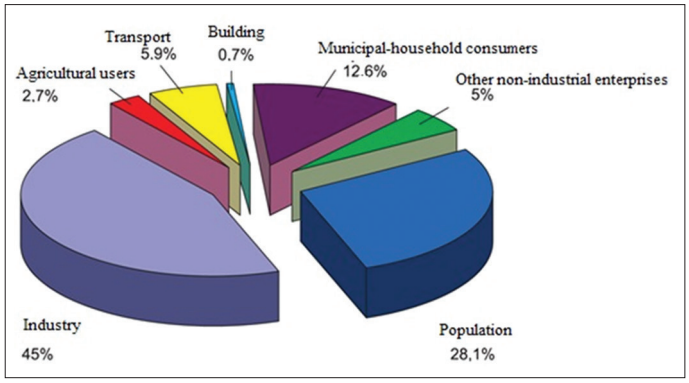


Figure 8: The structure of energy consumption in Russia



reasons for this situation, apart from the harsh climatic conditions and the territorial factor, are the structure of industrial production formed over a long period of time and the growing technological backwardness of energy-intensive industries and housing and communal services, as well as an underestimation of the cost of energy resources that does not stimulate energy saving (Dilaver et al., 2014). The existing energy saving potential in Russia is about 40-45% of current energy consumption, or * million tons of equivalent fuel. The application of the algorithm for all industrial instruments, based on the energy company OAO NK "Rosneft" (Table 2).

Thus, the proposed methods of analysis and evaluation make it possible to really assess the level of social work carried out at the levels of individual directions. All this allows not only to increase the efficiency of reproduction of the human potential of the corporation, but also to strengthen the company's market positions through the formation of its positive image and increase of investment attractiveness.

4. CONCLUSIONS

The energy complex is developing at an ever-increasing rate. But for the development of a certain industry, including energy, it is necessary to attract human resources. The transnationalization of human capital is carried out in the structure of control, concentration and monopolization of TNCs on the basis of: International migration - labor and education; international production, scientific and technical, innovative cooperation; international private equity movement; international cooperation, the organization of which is not connected with participation in the capital.

Table 2: Assessment of the effectiveness of OAO NK Rosneft, 2016

Company CSP tools	OJSC "Rosneft Oil Company"	
	Absolute value	Scores
Average monthly calculated salary (thousand rubles)	61.023	8.8
The ratio of the average monthly salary in the company to that in the region (%)	228	10
Salary score		9.4
Annual labor protection costs per employee (thousand rubles/person)	24.28	10
The number of victims at work to the number of the corporation employees (in per mille)	0.2	10
Labor safety assessment score		10
Number of employees covered in the reporting year by production training to the number of the corporation employees (%)	75.6	10
The ratio of annual expenses for industrial training to the annual remuneration fund (%)	0.35	2.1
Production training score		6.05
"Social partnership" instrument		
Number of the trade union members in relation to the number of the corporation employees (%)	24.1	2
The share of employees covered by the collective contract (%)	72.8	7.5
Score values of social partnership		4.75
CSP score in the production sphere		7.55
Salary indexing efficiency (%)	9.5	10
The ratio of the nominal salary index to the consumer price index (in the number of times)	1.1	10
Salary indexing scores		10
The amount of annual payments of a social nature per employee (thousand rubles/person)	35.6	6.8
The ratio of the annual social benefit fund to the annual remuneration fund (%)	4.95	4.9
Social package scores		5.85
Amount of annual expenses for medical and sanatorium-resort services per employee (thousand rubles/person)	9.5	1.9
Annual housing costs per participant of the relevant programs (thousand rubles/person)	650	10
Annual payments on the pension program per participant (thousand rubles/person)	23.8	2.3
Scores of the fundamental social benefits		4.73
CSP score in the consumption sphere		6.86
Number of employees covered in physical culture and sports by number of employees (%)	47	7
The amount of annual expenses for physical culture and sport per one employee of the corporation (thousand rubles/person)	1.98	3.3
Physical culture and sports scores		5.15
Number of employees covered by cultural events to the number of employees (%)	41	6
The amount of annual expenses for cultural events per employee (thousand rubles/person)	1.98	4.1
Cultural events scores		5.05
Number of employees covered by active recreation and tourism to the number of employees (%)	42	6
The amount of annual expenses for active recreation and tourism per one employee of the corporation (thousand rubles/person)	1.99	4
Active recreation and tourism scores		5
CSP score in the recreation sphere		5.07
The share of environmental expenses in the total social costs of the corporation (%)	58.23	10
The ratio of the environmental expenses to the net profit of the corporation (%)	3.15	5.5
Environmental protection scores		7.75
The share of expenses on regional social infrastructure in the total social costs of the corporation (%)	13.7	6.2
The ratio of the expenses regional to the social infrastructure and the net profit of the corporation (%)	0.72	1.75
Regional social infrastructure scores		3.98
The share of expenses for the support of small nations and local traditions in the total social costs of the corporation (%)	5.12	8.3
The ratio of the expenses for the support of small nations and local traditions to the net profit of the corporation (%)	0.29	2.75
Support for small nations and local traditions scores		5.52
CSP score in the sphere of a certain habitat		5.75
CSP scores in general (On a 10-score system)		6.31

Thus, the human capital of transnational corporations are – controlled, concentrated and monopolized by TNCs knowledge, abilities and skills of workers engaged in its global supply system, which is a resource of creation and growth of value, income and a factor of international competitiveness. The monopolization of human capital by transnational corporations has conflicting consequences for national economies. The transnationalization of human capital is a factor in its globalization. The components of global human capital, which is formed under the influence of post-industrial social changes, is the human capital of TNCs, regional integration entities, network electronic communities, international and transnational innovation clusters. In practice, the functioning of the system of managing the social development of an enterprise in accordance with the objective logic of the basic functions of management is in the form of planning, organization and control in the sphere of reproduction of the human potential of the business entity.

The recently adopted concept of "corporate social policy (CSP)" embraces both the processes of social development of the

enterprise and the management system for them. In the light of the foregoing, it can be argued that the categories "social management system of the enterprise" and "CSP" (in its management part) are synonymous. Managing the reproduction of human potential in the production sector is based on the use of the following tools: Labor remuneration; labor protection; production training; social partnership. When managing the reproduction of human potential in the sphere of consumption, such social instruments are used: Indexation of wages; providing employees with a decent social package; meeting the needs of staff in basic social goods and services. The main tasks of the methods of analysis and evaluation of the CSP are to ensure the measurement of the social management's results both for each instrument and for their enlarged groups and the system of social management in general. To this end, based on the analysis of RSC data, social reports of leading corporations on the website of the RUIE, JSC UMC statistics, interviews with employees and experts, we developed the following principal algorithm: Two or three key indicators (parameters) are substantiated for each CSP tool, which most fully characterize the essence of the tool used; to ensure comparison and reducibility of the above indicators, their specific values are translated into points on a specially developed 10-point scale.

The sums of the scores obtained make it possible to assess the effectiveness, firstly, of each instrument separately, secondly, their groups in the sphere of CSP, and thirdly, the social management system of the enterprise as a whole. All this allows not only to increase the efficiency of reproduction of the human potential of the corporation, but also to strengthen the company's market positions through the formation of its positive image and increase of investment attractiveness.

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