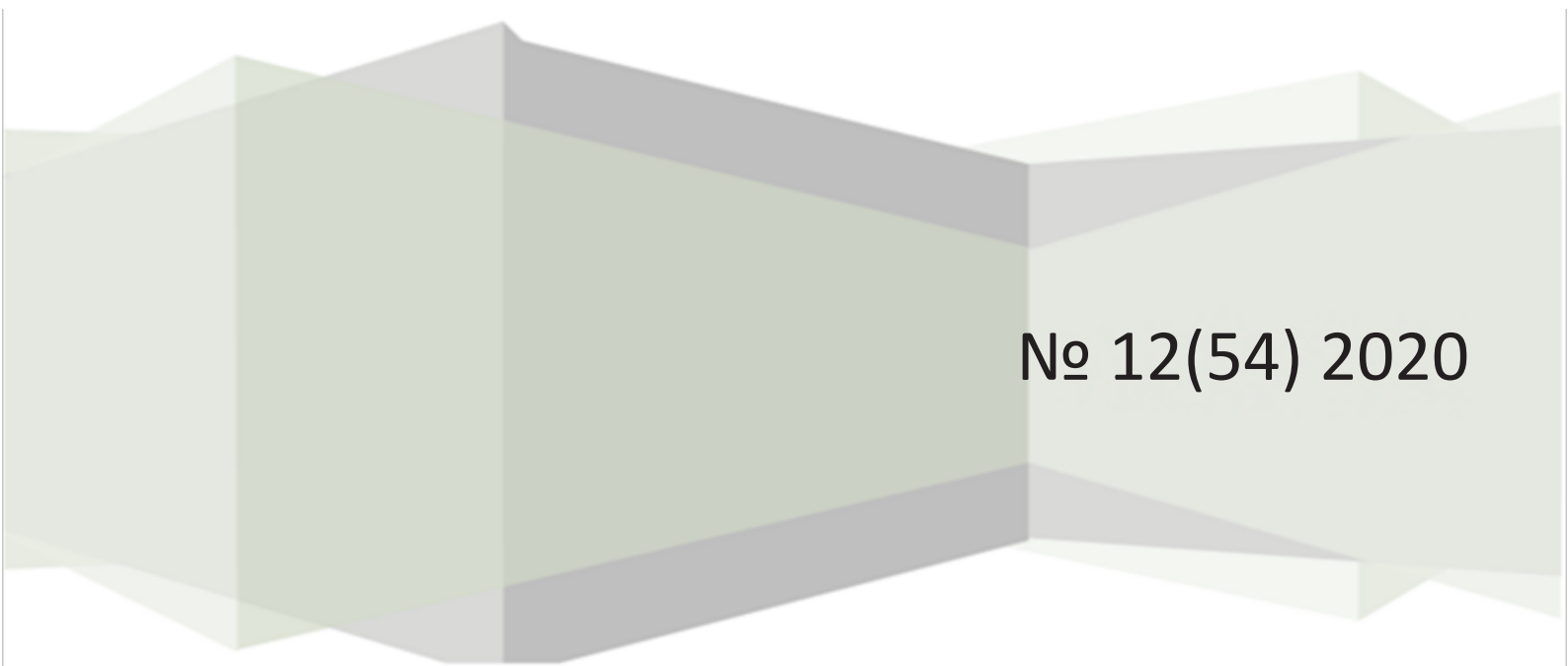


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The Advantages and Efficiency of Using a Hydraulic Pumping Unit in Comparison with Small Pumps

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Key words and phrases: hydraulic drive; deep rod pump; import substitution; small-sized pumps; equipment; rod pumping units.

Abstract. The purpose of this article is to consider the prospect of improving the quality of hydraulic equipment for the analysis of indicators with the help of import substitution by putting into operation wells of rod pumping units. Currently, the oil industry is faced with the task of replacing small-sized pumps with more efficient domestic equipment. In the study, the hydraulic pumping units are considered and the analysis of performance indicators is made. The article deals with the problem of import substitution of well operation by sucker rod pumps with ground hydraulic drive. The research methodology is based on the analysis of data obtained during the operation of the recommended hydraulic pumping unit PSHSNG 120-6-24. A graph of the dependence of the rod speed on the time of the hydraulic drive and the mechanical drive is constructed. As an alternative to import substitution for small-sized pumps, it is recommended to use innovative equipment, a highly efficient hydraulic pumping unit, which provides an overall increase in the efficiency of production processes during operation. The use of this drive leads to a reduction in the costs of the oil and gas production enterprise due to the shortage of oil and prevents equipment failure in the producing fields [5]. The considered method of oil production using a hydraulic pumping unit PSHSNG 120-6-24 has found wide application in the oil and gas industry and has become a worthy alternative to small-sized pumps.

Introduction

Oil production using sucker rod pumps appeared a century ago, with the invention of machine tools in the form of pumping units. Until recently, the sucker rod pump was considered as a symbol of the oil industry. Now the pumping units are used less and less. Global changes in

the dynamically developing world require the use of more sophisticated equipment with effective performance. For the last 20 years, a hydraulic drive has been applied in these pumps a drive. However, during operation, difficulties arise in connection with climatic resistance, payback of equipment, repair of the main pumping station, etc. [1, p. 10].

Formulation of the problem

The government of the Russian Federation encourages oil-producing companies to increase their hydrocarbon production. In this regard, PJSC TATNEFT has set the task of increasing hydrocarbon production up to 30 million tons per year. With the current sanctions on the part of foreign countries, it is difficult to hope for such production. Therefore, the import substitution program is the most promising at this stage. In the present study, we consider the problem of using domestic equipment, which is not inferior in technological characteristics to imported [6].

Research methods

In 2011, on the basis of the NPK UralNeftServis enterprise, a leader in the development of equipment for the production and processing of oil and gas, innovative equipment was developed, a highly efficient hydraulic pumping unit (PSHSNG "GERON"), competing with conventional pumping units. This hydraulic pumping unit is not inferior to foreign analogues in terms of reliability and performance. When developing high-tech equipment, the best experience in the production of oil products on a global scale was used, progressive views and opinions of leading oilmen were studied. The company engaged in testing the hydraulic drive of the deep-well sucker rod pump (PSHSNG "GERON") was the oil company "Rosneft", providing its fields. PJSC "Orenburgneft" was chosen as a test site, which tested the first hydraulic drives at its wells [3, p. 7].

Operating experience

The manufacturing company NPK UralNeftService LLC, in Yekaterinburg, is developing a new generation of hydraulic drives, in connection with the needs and wishes of the market. Developers of alternative equipment for the oil industry are engaged in the manufacture and implementation of new samples of a number of different models of sucker rod pumps, meeting the needs of a new generation of customers. The advantage of the hydraulic drive is that it is quite simple to mount and dismantle. The use of a hydraulic drive makes it possible to quickly assess the parameters of the well operation, remotely control the technological process in real time with minimal participation of maintenance personnel and equipment, and also increase the average daily oil production. Pilot tests of PSHSNG in the fields have proved that the use of new equipment is much easier and cheaper to operate in comparison with traditional pumping units. For the installation of the lightweight and compact structure of "Geron" does not require a special foundation, since the support is mounted on road plates or at the wellhead – this allows to significantly reduce the cost of the total cost of the arrangement, to ensure the convenience and safety of maintenance [3].

Features of the hydraulic drive

The hydraulic drive provides pumping of fluid from oil wells in a conventional motion in the plunger of a deep-well sucker rod pump (**SUP**). Throughout the world, the practice of using a

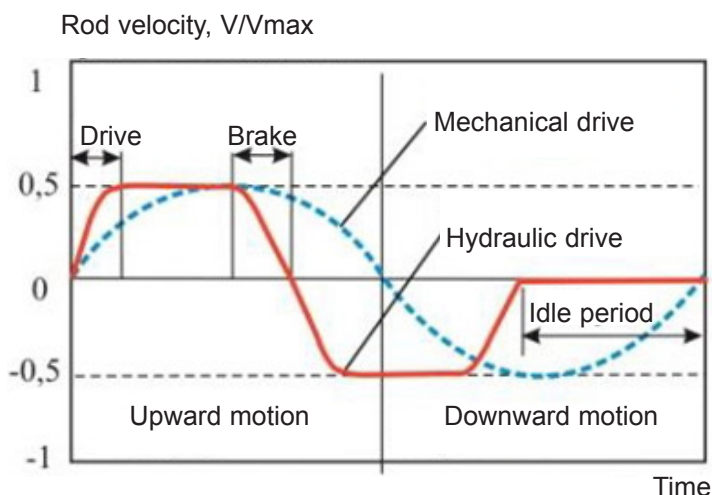


Fig. 1. Graph of the dependence of the rod speed on the time of the hydraulic drive and the mechanical drive

sucker rod pump is widespread due to the setting of optimal parameters for pumping out the well fluid [8]. This increases the filling factor of the pump, especially with high viscosity oil and high gas content in the recovered liquid. Due to the high efficiency of the hydraulic drive, the dynamics of energy consumption is reduced compared to electric centrifugal pumps with a flow rate of up to $50 \text{ m}^3/\text{day}$. In addition, the introduction of hydraulic drives instead of conventional pumping units allows:

- reducing the time of assembly and disassembly of the drive;
- reducing the metal consumption of the mechanism in comparison with traditional drives of pumping units;
- reducing the cost of transporting the drive to oil production sites;
- simplifying the basis for installing hydraulic drives.

Currently, there are a large number of varieties of the design of hydraulic drives, both Russian and foreign.

Disadvantages of foreign analogues are high cost of drives, long delivery time for equipment and spare parts, high cost of components and parts, lack of sufficient knowledge of the maintenance personnel [4].

Disadvantages of domestic hydraulic drives are lack of equipment with the necessary technical characteristics for effective oil production, insufficient reliability of equipment during operation in cold weather due to failure of hydraulic systems [2].

Having analyzed the advantages and disadvantages of the characteristics of this pump, which have not proved themselves to be effective enough during operation; it became necessary to use a sufficiently powerful hydraulic drive. To increase the operation of the wells, it was decided to use the PSHSNG 120-6-24 sucker rod pump drive.

This drive has many advantages over a conventional sucker rod pump: for a certain period of time, the hydraulic drive makes a greater number of reciprocating movements, the time for acceleration and deceleration of the hydraulic drive is much shorter, and fewer idle strokes during operation. The assembly is carried out from the available parts included in the product, relatively inexpensive maintenance of the drive in comparison with the existing equipment, convenient maintenance and affordable service, reliability and reliability of the equipment in difficult climatic conditions.

Results and discussion

The PSHSNG 120-6-24 hydraulic drive, in comparison with the electric centrifugal pump (**ECP**) has increased reliability in the presence of mechanical impurities in the well fluid [9], less sensitivity to salt deposition and asphalt-resin-paraffin deposits (**ARPD**), lower power consumption at a flow rate of up to 50 m³/day.

According to the official reviews of representatives of the closed joint-stock company Kara Altyn Enterprises, located in the Republic of Tatarstan, during the trial operation of the Geron hydraulic drive for sucker pumping rod, produced by the Ural company OOO NPK UralNeftServis at the Agan oil field in 2015, the productivity wells more than doubled due to the competent selection of the speed mode when raising and lowering the pump rod, as well as the correct setting of the stroke length and the number of double strokes. Given the positive test results, the Geron hydraulic drive is recommended for further operation at the company fields [2].

The design of the Geron hydraulic drive has proven its work in the most extreme climatic conditions of both Turkmenistan and Colombia, where the temperature rises to +56 °C. The flow rate of formation fluid with a conventional pumping unit was 4 m³/day, and when using the PSHSNG unit it reached 9 m³ / day. In the conditions of the Far North, the hydraulic drive we are considering has proven itself at a temperature of –55 °C. In Nyagan, Khanty-Mansi Autonomous Okrug – Yugra, the flow rate of formation fluid with a conventional pumping unit was 9 m³/day, and when using the PSHSNG unit on this well it was 11 m³/day. Good oil flow rates were also obtained at PA Kogalymneftegaz.

A positive effect from the use of hydraulic drives PSHSNG 120-6-24 manifests itself in the following: oil production increases, the level of structural failures decreases; equipment downtime and repair costs are reduced. According to preliminary estimates, the annual economic effect of using one unit is 97.8 thousand rubles per year.

Conclusion

Thus, hydraulic pumping units have successfully proven themselves both in domestic and foreign oil fields. The use of new generation equipment provides a general increase in the efficiency of production processes, increases oil production during well operation in the optimal mode up to 60 %, reduces oil workers' costs by reducing the level of oil deficit to 50 % or more, and prevents equipment failure at the fields.

This paper discusses a method of oil production using the hydraulic drive PSHSNG 120-6-24, which has found wide application in the oil and gas industry, has advantages and proven efficiency of use in relation to small-sized pumps.

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Преимущества и эффективность использования гидропривода в соотношении с малогабаритными насосами

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Ключевые слова и фразы: гидравлический привод; глубинный штанговый насос; импортозамещение; малогабаритные насосы; оборудование; штанговые насосные установки.

Аннотация. Цель данной статьи – рассмотреть перспективу улучшения качества работы гидравлического оборудования по анализу показателей с помощью импортозамещения путем введения в эксплуатацию скважин штанговых насосных установок. В настоящее время в нефтяной промышленности встала задача замещения малогабаритных насосов на более эффективное оборудование отечественного производства. В исследовании рассмотрен вариант с эксплуатацией гидроприводов и сделан анализ показателей работы. В статье рассматривается задача импортозамещения эксплуатации скважин штанговыми насосными установками, имеющими наземный гидропривод. Методика исследования основана на анализе данных, полученных при работе рекомендуемого для применения гидравлического привода ПШСНГ 120-6-24. Построен график зависимости скорости штока от времени работы гидропривода и механического привода. В качестве альтернативы импортозамещения малогабаритных насосов рекомендовано применение инновационного оборудования – высокоэффективного гидравлического привода глубинного штангового насоса, обеспечивающего общее повышение эффективности производственных процессов во время работы. Применение данного привода ведет к уменьшению затрат нефтегазодобывающего предприятия за счет дефицита нефти и предотвращает отказ оборудования на добывающих месторождениях [5]. Рассмотренный способ добычи нефти при помощи гидравлического привода ПШСНГ 120-6-24 нашёл широкое применение в нефтегазовой отрасли и стал достойной альтернативой малогабаритных насосов.

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The Influence of Cooperative Communities on the Economic Development in Conditions of Market Instability

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Key words and phrases: cooperative; collective activity; psychological factors; resources; transferable utility.

Abstract. In a situation of instability in both the economy and financial markets, large economic entities are often less adaptive and are forced to resort to the help of state institutions than small self-organizing systems such as cooperatives. Using the methods of game theory, a formal mathematical model of the internal organization of a cooperative community and the principle of conflict-free division of transferable utility are investigated and proposed.

The instability of the economy and financial markets, especially aggravated in recent decades, has become both the cause of financial crises and the oppression of the economic development of individual industries and countries, even the world market as a whole, but at the same time these same circumstances generated the processes of self-organization of the population. In times of crisis, people feel a sense of solidarity and social responsibility. During such periods, the cooperative forms of the socio-economic life of society are experiencing a renaissance and are most in demand.

A distinctive feature of cooperation is that it acts as a model of self-organization of individuals, is a unique system generated by social and economic circumstances, representing both a way of existence and the possibility of implementing a creative initiative. Historically, cooperatives have emerged as small communities of employees who have entered into coalitions and committed themselves to joint survival efforts.

Until now, the theory of cooperation has not sufficiently investigated the phenomenon of the dialectical unity of two ambivalent principles – “individualism-communality” and the ultimate socio-economic goal – “the achievement of profit and the distribution of the common good”. We believe that in the ratio of these two factors lies the potential of the entire enterprise.

The global economic system is constantly becoming more complex, increasing the uncertainty factor of the consequences of the decisions made [2]. Cooperatives of the current post-industrial period – the first quarter of the 21st century – arise in the context of a new information technology paradigm - in a competitive environment of markets and total computerization of all spheres of public life.

In the economy during the period of globalization, cooperation takes place between large, medium and small individual businesses. The balance of social and economic values inherent

in cooperation was the basis of its stable development in the past and, of course, remains in the era of post-industrial society.

The earliest cooperatives were public organizations with a social orientation with activities focused on public goals. The social role of cooperatives persists in the post-industrial era, confirming the humanitarian essence of the philosophy of the cooperative movement.

The cooperative model of labor organization and management of cooperative resources is distinguished by a great variety and an underexplored nature of self-organization. One constant principle can only be noted: the combination of collective and individual interests. The balance of these two principles, as shown by E. Ostrom [3], is able to give results that exceed expectations. The psychological mechanisms of economic regulation based on trust and social solidarity in relatively small farms often demonstrate a higher degree of adaptation to changing market conditions than large economic entities. The success of a collective enterprise and cooperative depends on two aspects:

- 1) the method of forming a cooperative and its psychological stability;
- 2) the way of distributing the transferable utility of the total good.

Formally, both problems can be considered within the framework of a unified mathematical model (the Gale-Shapley algorithm or the “deferred agreement” algorithm), adapted to the following axioms [4]:

1) “fairness” requires that all income be distributed only among the members of the cooperative;

2) the receipt by each of the players of his share of the profit does not depend on when the participant joined the team; it follows from this that the participants occupying the same positions in the general hierarchy receive the same payments;

3) if some participant does not make any contribution to the achievement of the common good, then he does not receive anything;

4) there are no strategies for the behavior of individual participants and strategies of internal coalitions that could provide them (players and coalitions) with higher payments and at the same time would not decrease the payments of other participants (Pareto optimality).

If the formulated conditions are satisfied, then the procedure for sharing the transferable utility leads to a single distribution:

$$j_i(v) = \sum_{i \in T \subset N} j_i(T) [v(T) - v(T \setminus \{i\})] = \sum_{\substack{T \subset N \\ i \in T}} \frac{(|T|-1)! \cdot (n-|T|)!}{n!} [v(T) - v(T \setminus \{i\})].$$

Summation is carried out by members and all coalitions. Here $i \in T \wedge T \subset N = \{1, 2, \dots, n\}$; T is arbitrary coalition that is part of a grand coalition (cooperative) N . $|T|$ is the number of coalition members T . The fraction under the sum sign is the averaging over all possible ways of forming a cooperative. Vector $j(v) = (j_1, \dots, j_n)$ makes up the distribution of the total profit among all members. Thus, for each member, his share is equal to the mathematical expectation of a personal contribution to the corresponding coalition T .

The Gale-Shapley algorithm considered above was modified by A. Roth [5] and was successfully tested in practice in various social groups.

The non-institutional nature of cooperative activity provides a wide variety of forms of internal structure. If in the regulated Keynesian market and the liberal Myrdal-Friedman market, relatively speaking, there are “laws” that we know and hear about – free competition, liberalism, monetarism, etc., then about the laws of the processes that form the economic relations of

the subjects in a co-operative sector smaller than the global market, we, surprisingly, do not know much.

In the modern era, more and more attention in theoretical research and practical activity is paid to the so-called behavioral economics. Numerous social contacts are more and more reflected in the economic results of increasing social interaction.

It should be noted the conclusion made by E. Ostrom that economic behavior based on collective forms of management and collective psychology of participants united by national traditions, family and friendly relations can give higher results of economic activity than the economic materialization of the “capitalist spirit” - the spirit of commercialization [3; 6].

Thus the psychological stability and economic efficiency of the cooperative model can be a method of game theory. Intragroup solidarity in relation to the encompassing market space is connoted as a coalition strategy of optimal behavior. Members who are true co-owners of collective property act as an independent subject of market relations. It is obvious that heuristic methods of intragroup regulation in the broader context of understanding economic behavior still remain a form of rational choice [7].

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Влияние кооперативных сообществ на развитие экономики в условиях нестабильности рынков

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Ключевые слова и фразы: коллективная деятельность; кооператив; психологиче-

ские факторы; ресурсы; трансферабельная полезность.

Аннотация. В ситуации нестабильности экономики и финансовых рынков крупные хозяйствующие субъекты зачастую менее адаптивны и вынуждены прибегать к помощи государственных институтов, нежели небольшие самоорганизующиеся системы, такие как кооперативы. Методами теории игр исследованы и предложены: формальная математическая модель внутренней организации кооперативного сообщества и принцип бесконфликтного разделения трансферабельной полезности.

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Modern Problems of Economic Science

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Key words and phrases: spheres of public life; modern theories of society development; economic potential; market and socially oriented economy; economic science; theoretical problems; practical efficiency of the economy.

Abstract. The most important sphere of activity of the society has always been the economic activity, so all modern theories of the analysis of the past and future of society are based on the study of its economic basis. The purpose of studying both market economy and socially oriented economy is to determine the role of business and entrepreneurship in the further development of society. In the course of the study, the main theoretical problems of economic science were studied. The influence of the theoretical attitudes on the practical effectiveness of the implementation of these tasks is revealed.

Economy has always considered as one of the most important spheres of society, and all modern theories of the development of society are based on the analysis of its economic potential. This applies to the market economy and socially oriented economy, marketing, management, business and entrepreneurship, etc. Today, in the face of economic science are numerous theoretical problems. The degree of adjustment of theoretical settings depends on the practical effectiveness of the implementation of these tasks.

Economic science (from a methodological point of view) faces a series of significant problems. Let us take a quick look at five of the most important ones.

The first problem is the problem of the subject of economic science research, and it relates directly to the sphere of social life that the economic science explores. Here theory and practice apply a fairly extensive range of terms regarding the activity, including economic, entrepreneurial, commercial, financial, banking, usury, cooperative joint-stock, etc., as well as management, although it is a type of management activity.

Studies conducted by many scientists show that the most acceptable concept for economic theory is the concept of economic activity. This concept, in relation to the subject of the study, characterizes the family economy and the state economy, as well as the federal, regional, district, etc. It is the economy that is connected with the realization of the known four basic functions: production, distribution, exchange and consumption of material goods. The economic activity solves the main target problem – to meet the material needs of the population with material goods in all their forms and forms.

The economic activity from the point of view of the historical plan is transformed into

economic activity with the beginning of the emergence of commodity production on the basis of natural production, and this is considered a natural process. A later formation is the economic activity associated with commodity production, which is well shown by K. Marx [Capital, vol. 1]. At the heart of economic activity is the production of goods, not products. The dynamics of the transformation of natural production into commodity production can be traced in three standard forms:

- 1) Money – Commodity – Production – Commodity – Money;
- 2) Money – Product – Money;
- 3) Money – Money.

The first form of the capital movement is industrial, the second one is commercial, and the third one is banking. The easiest way to make a profit is the third form, so it is used as a financial, banking and usurious way of doing business. In historical terms, all capital flows into this form, which leads to the creation of a “virtual economy” in the world, when enterprises do not work, and money, while in motion, creates profit. And such a pattern in the field of economics requires the need to study it using specific economic methods.

The second problem to be considered is the methodological development of the basic concept of the economy-property. Property as an objective relation of subjects is placed in the economic life of society, where it becomes a legal concept.

Objectively, the owner can be the entity that can appropriate (buy) and alienate (sell) an object. Therefore, in general, property is defined by the relationship of appropriation and alienation between subjects. They can be individuals and communities of any type. In today's reality, property objects are grouped into five types: labor, means of production, products, securities, and intellectual property (products).

According to the nature of the owners-subjects, all types of property can be divided into two types: collective and individual. According to the nature of labor reproduced by property, it is collective and individual property, divided into two types: based on personal labor or on wage labor. According to the nature of the distribution of the results obtained, property can also be divided into two types: fair distribution and unfair distribution. If you put three bases on top of each other, you get eight (that is, $2 \cdot 2 \cdot 2 = 8$) property types. Each society decides which orientation to adhere to: collective property based on personal labor and fair distribution (as option 1), or collective property based on wage labor and unfair distribution (option 8).

The third problem is an important methodological issue – the distribution of material goods among the population-has not been resolved. The problem of wages is reduced to the ways of evaluating the work of people and measuring the amount of money to be paid for their work. In the current conditions, when wages for similar and identical work differ by 1–2 orders of magnitude or more, we should return to the “old Marx formula”: payment by the quantity and quality of the work done. Quantifying the work of an employee based on the current time and pieces does not cause much difficulty in practice. The situation with the quality of work is more complicated – the quality of work of any employee must be studied in a differentiated way. Therefore, here, depending on the specific conditions, it is necessary to develop special provisions with quality indicators and, accordingly, the amount of payments.

Human activities comprise eight components: subject, object, means, process, conditions, result, system, and environment. If the result is taken into account separately, the remaining cost mechanism will contain seven indicators, from the expenditure of human potential to the system, the environment. All these indicators can be clearly calculated and, taking into account expert and other assessments, can be applied to the assessment (payment) of labor results,

and a variety of experience (Japan, the United States, Great Britain, Germany, etc.) indicates the possibility of obtaining a high social and economic effect.

The fourth problem is the methodological analysis required by the privatization carried out in the country. Many consider its voucher stage to be particularly unfair, since the nominal value of the voucher was indicated at 10,000 rubles, and not 276,000, as it should be in reality. In fact, the population of our country was deceived. According to the recognition of Russian President Vladimir Putin (autumn 2004), the privatization was carried out in violation of legal laws, but there will be no deprivation (revision).

The content-based privatization is the process of combining living labor (employee) and materialized labor (property). In fact, there was a huge gap between these two statuses. The rational effective model of privatization, obtained by means of methodological analysis, has the form:

- 1) the first stage of privatization, carried out in two forms: the transfer of property and the sale of property;
- 2) the second stage: the transfer and sale, made in two types;
- 3) transfer or sale for use or ownership.

As a result, the model offers four ways to privatize:

- transfer of property;
- transfer of ownership;
- sale of property (long-term lease);
- sale to the property.

In practice, the model was adopted in the fourth version, which was far from the most successful.

The fifth problem is that the methodological problem of the structure of economic theory has not yet been solved. The economic activity, as it was shown by Karl Marx, has four cycles: production, distribution, exchange, and consumption. Each of them has laws of economic movement (value; supply-demand; dependence of production on the sphere of consumption; elevation of needs, etc.).

By analogy, the whole of economic theory could be constructed according to these theoretical sections: production, distribution, exchange, and consumption, and in these sections all eight components of economic activity could be examined: subject, object, means, process, conditions, result, system and environment.

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Современные проблемы экономической науки

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Ключевые слова и фразы: сферы общественной жизни; современные теории развития общества; экономический потенциал; рыночная и социально ориентированная экономика; экономическая наука; теоретические задачи; практическая эффективность экономики.

Аннотация. Важнейшей сферой деятельности общества всегда была экономическая деятельность, поэтому все современные теории анализа прошлого и будущего общества основываются на изучении его экономической основы. Целью изучения как рыночной, так и социально ориентированной экономики является определение роли бизнеса и предпринимательства в дальнейшем развитии общества. В ходе исследования изучались основные теоретические задачи экономической науки. Выявлено влияние теоретических установок на практическую эффективность реализации этих задач.

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Transformation of the Labor Market in the Context of Digitalization of the Economy

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Key words and phrases: digital technologies; labor market transformation; technological unemployment; main trends in the development of the digital economy.

Abstract. The article deals with the problems associated with the use of digital technologies in the modern economy. The purpose of this study was to identify negative trends associated with the use of digital technologies, in particular, the threat of technological unemployment. The hypothesis of the study is that the use of digital technologies can create a number of systemic problems for both employers and employees, as well as lead to changes in the education system. The main research methods in the article are the analysis of scientific literature and methods of system analysis. Based on the results of the study, the authors concluded that there are currently a number of objective threats associated with the introduction of information technologies in the economy and considered measures to minimize them.

Currently, there are two diametrically opposite points of view on the transformation of the labor market in the transition of the world economy to a new technological order.

Proponents of the first approach are confident that the number of new professions will exceed the number of old ones. With each new technological order, new professions appear. The most popular professions of the early 20th century were grooms, blacksmiths and coachmen. Horses were a leading force in the economy. However, in the modern world, there are not even enough horses to provide the appropriate number of specialists in these professions [1, p. 35]. But the main thing is that there are many more professions than then. The same will happen in the future. With each new technological order, new professions appear. And their number is much more than the old ones. So everyone will find a case according to their wishes and capabilities.

There are a lot of publications devoted to new professions. Many of the new names of professions have not yet entered dictionaries and have not become a fact of the literary language. For now, they are more like professional jargon. Sometimes they are known only to specialists in this field. For example, RBC, after studying the forecasts of Russian and foreign futurologists, has compiled its list of the most interesting and popular specialties for the next half century. 100 professions of the future are divided into 17 branches, among them there are such professions as: a personal manager for the human microbiome; specialist in brain implants; a specialist in

biohacking and programmable health; cyberdesigner; a specialist in reviving extinct species; engineer for 3d printing of food products; an underground drone-drifter operator; a builder of underwater cities; a lawyer in the field of unmanned vehicles; an engineer for digitization and storage of memory; an expert in “the way of the future” of the child. And these are not the most exotic names [3].

Proponents of the second approach believe that there is no guarantee that the number of new jobs will increase at the same rate as technological unemployment. Alarmists report that as a result of the introduction of new technologies, a huge mass of people will be left out of work, the race between machines and people will finally be won by machines, the world is entering an era of unprecedented high technological unemployment.

The traditional welfare state is unable to help its victims and therefore it is necessary to introduce a tax on robots and immediately begin to implement the idea of an unconditional universal income.

In the coming decades, about half of all existing professions will die out and the speed of technological change will be so high that workers will simply not have time to physically retrain for new professions, thus continuously adding to the army of the unemployed.

We need to be prepared for the complete disappearance of many not only low- or medium-sized, but also highly qualified jobs as new technologies will increasingly take over the performance of intellectual functions that have hitherto remained the exclusive property of man.

The main existential problem that humanity will soon face is what to do in conditions of forced inactivity, when the very concept of “work” will become a thing of the past and smart machines will do everything for us.

In our opinion, in the conditions of slowing economic growth on the one hand, and increased automation and digitalization of industries, on the other hand, the number of unemployed will increase. The statistics show that as a result of increased production efficiency, more employees are laid off than create new jobs in the economy as a whole. Negative forecasts were made even before the pandemic. For example, forecasts of the Institute of National Economic Forecasting of the Russian Academy of Sciences.

According to Rosstat, the labor force aged 15 years and older in October 2020 was 75.0 million people, of which 70.3 million people were classified as engaged in economic activities and 4.7 million people were unemployed (they did not have a job or income-generating employment, were looking for a job and were ready to start it in the week under review). The unemployment rate (the ratio of the number of unemployed to the labor force) in October 2020 was 6.3 % [4].

With a prolonged pandemic, adaptation mechanisms will be exhausted, and the coming crisis may be the first time when a truly large-scale release of workers begins. According to the calculations, in the baseline scenario, which assumes repeated quarantine due to coronavirus in the fall and winter, the unemployment rate in Russia may grow to 8–8.3 % in 2021 and 7–7.3 % in 2022–2023. Real wages will be reduced by 4.5–4.8 % in 2020 and will reach a growth rate of 2.2–2.5 % only in 2023 [5].

The Ministry of Economic Development expects that the average annual unemployment rate in 2020 will be 5.7 % of the economically active population, after 4.6 % in 2019. In 2021, the Agency predicts a decrease in the unemployment rate to 5.4 %, in 2022 – to 4.9 %, in 2023 – to 4.7 % [5].

Another factor that will put pressure on the labor market will be the low adaptability of age-related employees to changes in the technological conditions of production. In particular, many employees who lose their jobs will not be able to find a job again, as their competencies will be outdated for modern requirements of employers.

Today's applicants are very concerned about what professions will be in demand in the new era, the era of the digital economy. However, the paradox is that with the advent of digital transformation in business, the concept of professions will disappear altogether. Soon, everything that can be described in a certain sequence of instructions will be transferred to the machines. In our opinion, a person will be left with those vacancies that require truly human qualities from him, namely, creativity, readiness for cross-functionality and work without instructions, but for a certain result. Career from vertical to horizontal. The University will be asked to choose not a profession, but a field of knowledge [2, p. 183]. The task of the employer will be to reveal the creative abilities of its employees. Vacancies will be created for the person they want to see in their team. The attractiveness of the employer will consist in its ability to reveal the creative potential of the employee, to train and develop it not in a specific profession, but in a variety of knowledge.

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Трансформация рынка труда в условиях цифровизации экономики

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Ключевые слова и фразы: основные тренды развития цифровой экономики; технологическая безработица; трансформация рынка труда; цифровые технологии.

Аннотация. В статье рассмотрены проблемы, связанные с применением цифровых технологий в современной экономике. Целью данного исследования было выявление негативных трендов, связанных с использованием цифровых технологий, в частности, угроза технологической безработицы. Гипотеза исследования заключается в предположении о том, что использование цифровых технологий может создавать ряд системных проблем как для работодателей, так и для наемных работников, а также привести к изменению

системы образования. Основные методы исследования в статье – анализ научной литературы и методы системного анализа. По итогам исследования авторами сделаны выводы о том, что в настоящее время существует ряд объективных угроз, связанных с внедрением информационных технологий в экономику и рассмотрены меры по их минимизации.

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Priorities of Russia's Foreign Economic Activity

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Key words and phrases: foreign economic policy; achievement of leading positions; global economy; world division of labor; increase of global competitiveness; national economy.

Abstract. The purpose of this article is to analyze the main priorities of the Russian foreign economic policy. As a result of the conducted research and statistical comparison of economic indicators of Russia's foreign economic policy of the last period, it is proposed that it is necessary to create conditions for Russia to achieve a leading position in the global economy on the basis of effective participation in the global division of labor and increase the global competitiveness of its national economy.

The goal of the government's foreign economic policy has always been to create conditions for Russia to achieve a leading position in the global economy on the basis of effective participation in the global division of labor and increasing the global competitiveness of its national economy.

The achievement of this goal involves.

Achieving this goal involves:

- focusing the Russian economy on production of high-tech products and goods with a high degree of processing, as well as the provision of intellectual services;
- strengthening Russia's position in the world market as an exporter of agricultural products, reducing dependence on imports of agricultural products and food;
- ensuring the global competitiveness of the processed sectors using customs and tariff policy, regulation of domestic markets, attracting foreign capital and the formation of competencies in industries that are embedded in global value chains;
- achievement of leading positions in the introduction of energy resources to world markets based on the geographical and product diversification of exports, in the formation of a global infrastructure and the use of global energy markets;
- using competitive advantages in the field of transport, agricultural sector and raw materials processing;
- strengthening the role of Russia in solving global problems and shaping the world order;
- geographic diversification of foreign economic relations, ensuring the consolidation of the positions of Russian exporters and investors in the Russian markets and the development of new markets;

Table 1. Commodity structure of exports Russian Federation with all countries (thousands USD), November 2020

| PCN EAEU | Commodity sector | Non-CIS countries | | | Growth rate January- November 2020 to January- November 2019, % | CIS countries | | | Growth rate January- November 2020 to January- November 2019? % |
|-----------------|--|-------------------|--------------|----------------------|---|---------------|-------------|----------------------|---|
| | | October | November | January- November | | October | November | January- November | |
| | TOTAL: | 23 957 057.2 | 25 528 216.4 | 256 761 912.8 | 76.4 | 4 615 272.3 | 4 447 483.7 | 43 586 967.5 | 89.4 |
| 01-24 | Foodstuffs and agricultural raw materials (excluding textiles) | 2 565 374.6 | 2 446 752.3 | 20 238 504.5 | 118.9 | 613 294.4 | 613 196.6 | 5 963 661.0 | 112.1 |
| 25-27 | Mineral products | 11 298 621.9 | 12 673 517.5 | 144 320 930.0 | 62.6 | 1 162 100.8 | 1 325 007.5 | 11 514 894.0 | 75.7 |
| 27 | Fuel and energy products | 10 872 202.6 | 12 250 181.4 | 140 568 593.4 | 61.9 | 1 067 376.0 | 1 252 471.6 | 10 665 670.7 | 75.9 |
| 28-40 | Chemical industry products, rubber | 1 612 963.7 | 1 304 943.1 | 15 470 196.2 | 86.4 | 605 488.8 | 584 036.2 | 6 154 527.3 | 94.3 |
| 41-43 | Raw hides, furs and products from them | 6 832.9 | 6 111.6 | 76 997.0 | 64.7 | 6 721.2 | 8 216.8 | 64 759.6 | 101.6 |
| 44-49 | Wood and pulp and paper products | 834 180.9 | 822 247.6 | 9 117 771.2 | 96.6 | 206 095.1 | 185 649.4 | 2 061 003.4 | 92.2 |
| 50-67 | Textiles, textile products and footwear | 27 550.3 | 28 614.4 | 285 786.5 | 100.1 | 117 357.7 | 115 493.8 | 1 032 932.3 | 105.6 |
| 71 | Precious stones, precious metals and products from them | 3 587 541.5 | 3 250 493.6 | 26 786 809.2 | 206.8 | 37 554.5 | 100 229.3 | 619 199.2 | 154.1 |
| 72-83 | Metals and metal products | 2 027 293.4 | 2 582 951.1 | 24 157 341.7 | 86.7 | 583 515.0 | 503 745.9 | 6 118 327.6 | 91.9 |
| 84-90 | Machinery, equipment and vehicles | 1 503 579.4 | 1 595 575.0 | 13 041 463.3 | 91.1 | 998 031.2 | 840 428.1 | 8 275 435.7 | 85.4 |
| 68-70, 91-97 | Other | 493 118.6 | 817 010.1 | 3 266 113.2 | 61.3 | 285 113.6 | 171 480.1 | 1 782 227.5 | 105.0 |

- creating a Eurasian economic space with an integration core – EURASEC, as well as ensuring favorable conditions for border and interregional cooperation with the participation of the subjects of the Russian Federation;
- building stable diversified ties with world economic centers, increasing the long-term sustainability of the development of the Russian economy;
- strengthening trade and economic relations with China, India, Brazil, Mexico, South Africa, Egypt, Saudi Arabia, South Korea, Turkey, ASEAN countries and other countries of the Asia-Pacific region, the Near and Middle East, Africa and Latin America;
- increasing the efficiency of using Russian companies and investors abroad, improving the international legal framework in the foreign economic and foreign trade spheres in order to reduce technical barriers to trade.

The composition of the commodity structure of Russian exports for November 2020 are presented in Table 1.

According to customs statistics in January-November 2020, the following conclusions can be drawn.

1. Russia's foreign trade turnover amounted to 511.4 billion US dollars and decreased by 16.3 % compared to January-November 2019.
2. The trade balance was positive in the amount of 92.7 billion US dollars, which is 69.2 billion US dollars less than in January-November 2019.
3. Russia's exports in January-November 2020 amounted to 302.0 billion US dollars and decreased by 21.8 % compared to January-November 2019. The share of non-CIS countries accounted for 85.5 %, and the CIS countries – 14.5 %.
4. The basis of Russian exports in January-November 2020 was traditionally fuel and energy products, the share of which in the commodity structure of exports was 50.4 % (in January-November 2019 – 62.7 %).
5. In the country structure of Russia's foreign trade, the leading place is occupied by the European Union, as the country's largest economic partner. The European Union accounted for 38.8 % of Russian trade turnover in January-November 2020 (41.7 % in January-November 2019), the CIS countries – 13.0 % (12.2 %), the EAEU countries – 9.1 % (8.7 %), and the APEC countries – 34.0 % (32.0 %).
6. The main trading partners of Russia in January-November 2020 among the non-CIS countries were China, with a trade turnover of 93.2 billion US dollars (93.0 % compared to January-November 2019), Germany – US \$ 37.5 billion (77.5 %), the Netherlands – US \$ 25.7 billion (57.0 %), the United Kingdom – US \$ 24.4 billion (161.4 %), the USA – 21.7 billion (90.8 %), Turkey – US \$ 18.5 billion (78.1 %), Italy – US \$ 17.9 billion (77.6 %), the Republic of Korea – US \$ 17.3 billion (75.9 %), Japan – \$ 14.7 billion (77.9 %), Poland – US \$ 12.9 billion (80.1 %).

For many decades, the global goal of the Russian government's foreign economic policy has always been to achieve leading positions in the global economy and in the global division of labor, and to increase the competitiveness of national products.

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Приоритеты внешнеэкономической деятельности России

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Ключевые слова и фразы: внешнеэкономическая политика; глобальная экономика; достижение лидирующих позиций; мировое разделение труда; национальное хозяйство; повышение глобальной конкурентоспособности.

Аннотация. Целью написания статьи является анализ основных приоритетов российской внешнеэкономической политики. В результате проведенного исследования и статистического сопоставления экономических показателей внешнеэкономической политики России последнего периода выдвинуто предположение, что необходимо создание условий для достижения Россией лидирующих позиций в глобальной экономике на основе эффективного участия в мировом разделении труда и повышения глобальной конкурентоспособности ее национального хозяйства.

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